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Two essays on financial condition of firms

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Two Essays on Financial Condition of Firms

by

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ABSTRACT

This dissertation includes two related chapters that analyze financial condition of firms. In the first chapter, I examine the relationship between the firms' level of cash holdings and governance. The findings show that higher levels of cash holdings are significantly related to strong governance. The results also show that firms with strong governance hold asymmetrically higher levels of cash than firms with weak governance when they have high growth opportunities. Furthermore, I also test the impact of financial constraint status of the firm on the level of cash holdings for both good and poorly governed firms separately. The results suggest that strong governance firms hold higher levels of cash to use as financial slack in order to avoid financial distress. In the second essay I examine if a firm's success in leaving distress is explained by firm characteristics and manager decisions. I proxy the managers' decisions by measuring changes in operating, investing, and financing choice variables. Timely decisions with regard to product refinement, proxied by increased investment in research and development and reduction in capital expenditures, increase the probability of successful turnaround. Further the results show that increased financing through additional sale of equity, acquisitions and sale of assets do not help a firm exit financial distress.

Essay 1

Is the Level of Cash Holdings Influenced by Corporate Governance?

1.1 Introduction

Corporate liquidity enables firms to make investments when opportunities arise without the need to access external capital markets (Keynes, 1936), thereby avoiding transactions costs and the costs of information asymmetries often associated with equity issuances. On the contrary, the agency argument against padding up cash states that additional cash in the hands of managers will be misused (Jensen, 1986). Typically, the intuitive notion is agency costs are real and it would be more valuable to put cash into use making a positive return instead of keeping for manager discretion. Given this idea it is surprising to see firms increasing their cash holdings as a percentage of total assets on average in recent times (Ditmar and Mahrt-Smith, 2007). I examine cash holdings to determine if it is driven by firm interest or manager interest. In other words, is the increase in cash holdings a manifestation of agency costs or manager identification of a new effective use of cash?

To determine if increased cash holdings are pro-firm or anti-firm I turn to firm governance. All else equal, firms with better governance should act more in the interest of shareholders than firms with poor governance. In the same vein, managers who are less entrenched should act more in line with the interests of shareholders as compared to firms with deeply entrenched managers. Given the ability of governance to force

managers to act in the best interests of shareholders, if firm governance is positively related to cash holdings then the recent increase in cash holdings may be a positive development. On the other hand, if firm governance is negatively related to cash holdings then the trend of increased cash holdings may be a reflection of agency problems. In this paper, I attempt to address the following questions. Do firms with strong or poor governance hold more cash, and if so, why does governance influence cash holdings?

Managers who maximize shareholder wealth should set the firm's cash holdings at a level where the marginal benefit of cash holdings equals the marginal cost (Opler et al., 1999). The potential benefits of holding more cash are found to be increased financial slack and lower risk with higher liquidity. Financial slack and higher liquidity will allow firms to take advantage of more opportunities (Myers and Majluf, 1984) and avoid financial troubles. The costs of holding liquid assets are lower returns, higher taxation on the interest, and perhaps the most dangerous is an increase in agency costs (Jensen (1986); Stulz (1990)). Available funds provide managers the ability to invest in projects providing pecuniary benefits, thus increasing agency costs. Increased agency costs have been shown to affect firm performance adversely.

Given the tradeoff between the benefits and costs of holding cash, I find evidence that the higher levels of cash holdings are not, on average, associated with higher agency problems. The results illustrate increased cash holdings are positively related with governance, as firms with strong governance hold significantly more cash as a percentage of assets. I find this result to be robust to two different measures of firm governance, Gompers, et al (2003) Governance (G-index) and the Bebchuck, et al. (2005) Entrenchment index (E-index). I also find this difference to be robust after using

numerous controls to measure the differences between firms with strong and poor governance, including documented performance differences by controlling for firm cash flows. Firms with better governance are able to reduce the marginal cost of carrying cash, thus increasing the value of cash. The results of this paper are consistent with the value of cash when in the hands of strong (well governed) managers. Next, I turn my attention to why do firms with strong governance hold more cash?

To explain the large difference in cash holdings between firms with strong versus poor governance, I hypothesize that firms with strong governance will increase their cash holdings when it makes sense to do so. Firms with strong governance will take advantage of the benefits of holding cash such as increased financial slack during times of higher growth opportunities and will increase cash when free of financial constraint. The results are consistent with this idea as they show firms with strong governance hold higher levels of cash when they have good investment opportunities. While the findings show that both well and poorly governed firms hold larger percentages of cash when they have increased growth opportunities, firms with strong governance hold asymmetrically higher amounts than firms with poor governance. The results also demonstrate that firms with strong governance do not significantly increase their cash holdings when they do not have strong growth opportunities. Another potential reason for higher levels of cash holdings by strong governance firms is to build up slack in order to avoid financial pitfalls (Lamont, 1997), classified in this paper as financial constraint or distress. I find strong governance firms invariably vary the level of cash holdings in times of financial constraint while poor governance firms appear to use up cash and hold low levels of cash holdings, whether they are financially constrained or not.

This paper adds to the current literature in two different areas. The first area looks at the importance and value of cash to firms (Pinkowitz and Williamson, 2007). I build on the idea of Opler, Pinkowitz, Stulz, and Williamson (1999). They show that managers maximize shareholder wealth by setting the firm's cash holdings at a level such that the marginal benefit of cash holdings equals the marginal cost of those holdings. I show firm governance can mitigate agency issues and increase the value of cash holdings, thus offering an explanation for the observed trend of higher cash holdings seen in recent times. I also add to the literature emphasizing the importance of corporate governance and agency issues in the workings of modern corporations. Prior research focuses on the impact of governance mechanisms on (i) firm performance (Hermalin and Weisbach, 1991, Bhagat and Black, 2002 and Gompers, Ishii and Metrick, 2003), (ii) acquisition activity (Byrd and Hickman, 1992), (iii) over investment of free-cash flow (Richardson, 2006), (iv) diversification discount (Jiraporn, Kim and Davidson, 2006) and (v) write-offs (Minnick, 2004). I add to this literature by investigating how the quality of corporate governance can influence a firm's level of cash holdings. The results of this paper are consistent with the work of Gompers, Ishii, and Metric (2003) and provide some potential insight as to how firms with strong governance can lead to increases in stock returns.

I also add another side to the results of Dittmar and Mahrt-Smith (2007). Their study focuses on the value effects of governance on cash resources by analyzing how a change in cash holdings leads to a change in the market valuation of a firm. They find a positive and significant difference in the change in valuation of firm under the influence

of a strong governance policy. They also value the excess cash[1] for poor and well governed firms and find that well governed firms have double the value of cash as compared to poorly governed firms. Based on these findings, they illustrate governance as having a relatively minor impact on how firms accumulate cash, but a significant impact on how firms spend their money.

Harford, et al. (2008) also study how agency problems affect cash holdings of firms. Their study primarily comments on the behavior and policy issues observed for poor governance firms with respect to the use of excess cash holdings. In analyzing the differences in cash holdings of strong and poorly governed firms, they focus on the investment behavior and pay out policies of their sample firms. Their results show that firms with higher levels of excess cash and poor governance increase capital expenditures, increase acquisition activity and disburse excess cash to shareholders as share repurchases, thus exhibiting a less commitment behavior. Firms with excess cash and good governance disburse cash to shareholders by initiating or increasing dividends. While Harford et al. (2008) address how firms with poor governance end up with lower levels of cash holdings, my paper attempts to address why firms with different governance structures tend to hold different levels of cash holdings by analyzing the impact of growth opportunities of firms. Consistent with Harford et al. (2008), my initial results show that good governance firms with better growth opportunities hold higher levels of cash holdings. I examine the role of growth opportunities further by separating the sample into groups of high, average and low growth firms (Growth opportunities

[1] Dittmar and Mahrt-Smith define excess cash as cash reserves held in excess of those needed for operations and investments.

proxied by Q). I run my tests on these three sub samples and find that only well governed firms with high and average growth opportunities tend to hold higher levels of cash holdings. Good governance firms with low Q values do not significantly hold higher cash holdings. This analysis provides new evidence on the interaction of firm growth and governance in influencing cash holdings. Another important distinction this paper has from the Harford et al. paper is about the explanation of the role of financial constraints for good and poor governance firms with respect to the cash holdings. After showing that financially unconstrained firms hold higher levels of cash holdings on average, I further explore the role of financial constraints and governance on firm's cash holdings. The results show that firm governance influences cash holdings only for financially unconstrained firms. Further tests reveal that financially unconstrained and well governed firms hold higher level of cash holdings as compared to well governed and financially constrained firms. Firms with poor governance hold lower cash holdings, whether they are financially constrained or not. That is, this study identifies situations where strong governance firms hold more cash and poses explanations for the significant difference between the average cash holding of firms with strong versus weak governance.

The next section reviews the related literature and section III addresses the issues with sample construction. Section IV comments on the observations made on summary statistics, and discusses the results of the empirical tests and robustness tests and section V concludes.

1.2 Related Literature

Managers and shareholders view the costs and benefits of liquid asset holdings differently. Managers have greater preference for cash, because it reduces firm risk and increases their discretion. Opler et al. (1999) state that "*As long as there is any cost to holding cash, a firm that simply accumulates cash will at some point have an excessive amount of cash, and shareholders would be better off if the firm used that cash to pay additional dividends or to repurchase shares.*" Analysis of investment decisions of firms occupies a prominent place in research programs in economics and corporate finance. Starting with Modigliani and Miller (1958) a vast amount of finance literature focuses on the pace and pattern of business investment in fixed capital. This paper belongs to the subset of this literature that treats cash holdings as investment in cash asset. Asymmetric information[2] raises complications concerning the optimal choice of the financing method and the appropriate discount rate to use in present value calculations when evaluating investments. Investment expenditures in fixed capital and net working capital reduce dependence on external financing in presence of higher levels of cash holdings by firms. This analysis lends support for the argument that the level of cash holdings of a firm helps determine both the future growth and its ability to sustain downturns.

1.2.1 Costly External Financing

An important insight, due to Myers and Majluf (1984), Myers (1984) and Greenwald, and Stiglitz and Weiss (1984), is that raising equity externally will generally be problematic due to an adverse-selection problem of the sort first identified by Akerlof

[2] Asymmetric information problems in capital markets: *Greenwald, Stiglitz, and Weiss (1984), Myers and Majluf (1984), Myers (1984), et al.*

(1970). Of course, an inability to access new equity would not compromise investment if firms could frictionlessly raise unlimited amounts of debt financing. However, a variety of theories suggest that this is unlikely to be the case. Stiglitz and Weiss (1981, 1983) and others, show that the same adverse-selection problem can lead to credit rationing, whereby firms are simply unable to obtain all the debt financing they would like at the prevailing market interest rate. Myers (1977), examines the impact of conflicts between firms' claimholders on their investment decisions leading to debt 'overhang' and hence underinvestment. Thus, cash reserves provide benefits to equity holders by reducing the underinvestment problem. Managers wishing to avoid the costs associated with external financing in an imperfect information environment find it optimal to maintain sufficient internal financial flexibility to allow them to reduce the underinvestment problem. Further, since the equity holders suffer the loss from underinvestment, they find it value increasing for managers to maintain the buffer stock of cash.

1.2.2 Costs and Benefits of Liquid Asset Holdings

Chudson (1945) suggests that cash-to-assets ratios tend to vary systematically by industry, and tend to be higher among profitable companies. Vogel and Maddala (1967) show that cash balances declined over the time frame they examined, especially for larger firms. The more recent research papers have focused on the corporate actions resulting from high liquid asset holdings. Baskin (1987) highlights that firms use cash holdings for competitive purposes and Harford (1999) shows that cash-rich firms are more likely to make acquisitions. Opler et al (1999) analyze the benefits of liquid assets holdings under two different motivations. (i) Transaction cost motive – a firm saves transaction costs to raise funds and does not have to liquidate assets to make payments, and (ii) Precautionary

motive – firm can use the liquid assets to finance its activities and investments if other sources of funding are not available or are excessively costly. Recent literature has focused on the relation between cash holdings and its impact on the value of firm. Faulkender and Wang (2006) argue that the value of one additional dollar of cash reserves varies with its intended use. They analyze three specific uses: (1) paying back to shareholders in the form of dividends, (2) capital spending and (3) repaying debt or other obligations. Dittmar and Mahrt-Smith (2007) explore this issue further by asking "How does corporate governance impact the value of the firm and eventual use of cash reserves?" They document value destruction and performance declines of poorly governed, cash rich firms. Similarly Harford et al (2008) analyze how agency problems affect the propensity to stockpile cash in the US. They primarily find that poorly governed firms dissipate cash more quickly either by increasing investments, acquisition activity or exercising a payout policy of stock repurchases. My paper results concur with earlier literature and additionally I focus on the motivation issues behind the reasons for higher cash holdings by good governance firms. This paper adds to this line of literature, by extending the discussion to include arguments for explaining the circumstances as to when it is appropriate for good governance firms to hold higher level of cash holdings

1.2.3 Investments and Financing Constraints

A common way of examining the impact of financial constraints in firms' investment choices empirically was pioneered by Fazzari, Hubbard and Petersen (1988). Using a-priori criterion that relates to the gap between the costs of external financing and available internal funds, firms are categorized into classes of more- or less financially constrained. Hoshi, Kashyap, and Scharfstein (1991) estimate the investment-cash flow

sensitivities of Japanese companies and find that firms, which are associated with *keiretsu*[3] groups, have significantly lower sensitivities. Whited (1992) uses a financial constraint premise in that small firms with low liquid asset positions have limited access to debt markets, because they lack collateral necessary to back up their borrowing. Her study finds the exogenous finance constraint to be particularly binding for the constrained group of firms. Gilchrist and Himmelberg (1995) find that firms with access to commercial paper and bond markets plan their investments independent of firm's cash flows for the period. However, for firms with only limited access to capital markets (as indicated by lack of participation in public debt markets), investment in the firm tends to be 'excessively' sensitive to fluctuations in cash flow. Lamont (1997) shows that firms faced with a cash flow shock in their core business reduce investment in core and non-core segments. These and other studies found that the association between investment and cash flow is higher for firms that are expected to be more financially constrained according to various a-priori criteria.

The consensus regarding the positive relation between the degree of financial constraints and investment-cash flow sensitivity was disturbed by the influential work of Kaplan and Zingales (1997). They show that the theoretical relation between the degree of financial constraints and the sensitivity of investment to cash flow does not have to be uniformly positive. Kaplan and Zingales support their argument empirically by applying subjective criteria to identify financially constrained and unconstrained firms, and demonstrating that firms that are less financially constrained exhibit significantly higher investment-cash flow sensitivities than those that appear more constrained. Their findings

[3] Keiretsu institution coordinates the activities of member firms and finances much of their investment activity

are supported by Cleary (1999), who uses large samples of U.S. and international firms, and reports results that are consistent with Kaplan and Zingales' findings.

1.2.4 Corporate Governance Impacting Corporate Finance

Richardson (2006) examines whether firms' governance structures are associated with over-investment of free cash flow. Prior literature argues that agency conflicts arise when firms have free cash flow (e.g., Jensen, 1986, 1993 and Stulz, 1990). Richardson finds little systematic evidence that governance structures are determined in response to the severity of these agency costs; however, he finds evidence that governance structures mitigate over-investment. Gompers, Ishii and Metrick (2003) retrace the shift in governance structure by analyzing the takeover market since the advent of junk bonds in 1980s. They argue that the rise of junk bond market enabled hostile-takeover offers for even the largest of public firms, in response to which many firms added takeover defenses and other restrictions of shareholder rights. They also note that during the same time period, many states passed antitakeover laws giving firms further defenses against hostile bids. They combine a large set of governance provisions into an index which proxies for the strength of shareholder rights, and then study the empirical relationship between this index and corporate performance. They find that firms with stronger shareholder rights had higher firm value, higher profits, higher sales growth, lower capital expenditures, and made fewer corporate acquisitions.

Jiraporn, Kim and Davidson (2006) explore the agency theory as an explanation for the diversification discount. They empirically examine the potential connections between corporate governance, shareholder rights, firm value, and the propensity for a firm to be diversified. The governance index developed by Gompers, Ishii, and Metrick

(2003) is employed as the measure of strength of shareholder rights. Their empirical studies reveal that firms in which shareholder rights are more suppressed by restrictive corporate governance suffer a deeper diversification discount.

1.3 Sample Construction

Before addressing the core issues related to data, I first detail information regarding the construction of the index used for governance measures. Next I provide information regarding the construction of the KZ index used for distinguishing firms as financially constrained and unconstrained, followed by the information regarding construction of Ohlson's O score used to identify probability of distress for firms.

1.3.1 Measure of Governance Characteristics

To measure the strength of shareholder rights, the database I use employs the G-Index developed by Gompers, Ishii, and Metrick, (2003), henceforth GIM and the E-Index developed by Bebchuck, Cohen and Ferrell (2005), henceforth BCF. They both use data from the Investor Responsibility Research Center (IRRC), which publishes detailed listings of corporate governance provisions for individual firms in *Corporate Takeover Defenses*, by Virginia Rosenbaum. The data on governance provisions are derived from various sources, such as corporate bylaws, charters, proxy statements, annual reports, as well as 10-K and 10-Q documents filed with SEC.

The governance Index is constructed as follows: for every firm GIM add one point for every provision that restricts shareholder rights (increase managerial power). While this index does not accurately reflect the relative impacts of the various provisions, it has the advantage of being transparent and easily reproducible. The index does not require any judgments about the efficacy or wealth effects of any of these provisions;

GIM consider only the impact on the balance of power. To clarify the logic behind the construction on the Governance Index, GIM use the following example; consider classified boards, a provision that staggers the terms and elections of directors and, thus, can be employed to slow down a hostile takeover. If management uses this power judiciously, it could possibly lead to an increase in overall shareholder wealth; if management, however, uses this power to maintain private benefits of control, then this provision would diminish shareholder wealth. Either way, it is apparent that classified boards enhance the power of managers and weaken the control rights of large shareholders. Hence, the Governance Index captures the balance of power between management and shareholder.

Most provisions other than classified boards can be viewed with the same logic. Almost every provision enables management to resist different types of shareholder activism, such as calling special meetings, changing the firm's charter or bylaws, suing the directors, or replacing them all at once. GIM note, however, that there are two exceptions, secret ballots (confidential voting) and cumulative voting. A secret ballot designates a third party to count proxy votes and, therefore, prevents management from observing how specific shareholders vote. Cumulative voting enables shareholders to concentrate their director's votes so that a large minority shareholder can ensure some board representation. These two provisions are usually proposed by shareholders and opposed by management because they enhance shareholder rights and diminish the power of management. Thus, for each one, GIM add one point to the Governance Index when firms do not have it. For all other provisions, GIM add one point when firms do have it.

In summary, the Governance Index is simply the sum of one point for the presence (or absence) of each provision.

BCF (2005) argue that there is no a priori reason to expect that all the 24 IRRC provisions have equal relevance when measuring firm's governance. They study which IRRC provisions matter to the relationship between corporate governance and firm value. Their analysis leads them to identify six provisions that are likely to play a substantial role in determining the governance of firms. Based on these six provisions they construct an index that they label the 'entrenchment index". Each firm in their database is given a score, from zero to six, with higher the score indicating deeper entrenchment by the managers and hence proxied for poorer governance.

1.3.2 Measure for Financial Constraints

In order to study the impact of financial status (constraint / unconstraint), I divide the sample into sub samples that face greater financing constraints than others as defined by the existing literature. The approach I use to distinguish the sample as financially constrained and unconstrained is based on the results of Kaplan and Zingales (1997) study. Kaplan and Zingales (1997) classify firms into discrete categories of financial constraint and then use an ordered logit regression to relate their classifications to accounting variables. Lamont, Polk and Saa-Requejo (2001) used these regression coefficients to construct an index consisting of a linear combination of five accounting ratios, called the KZ index. The KZ index is higher for firms that are more constrained. The five variables, along with the signs of their coefficients in the KZ index, are: cash flow to total capital (negative), the market to book ratio (positive), debt to total capital (positive), dividends to total capital (negative), and cash holdings to capital (negative).

Following Lamont, Polk and Saa-Raquejo (2001), I construct the five variable KZ index for each firm-year as the following linear combination:

KZ Index (five variable) = *-1.002*CashFlow + 0.283*Q + 3.130*Leverage – 39.368*Dividends – 1.315*CashHoldings.*

I classify the top tercile of all firms in the total sample ranked on the KZ index as financially constrained and classify the bottom tercile as financially unconstrained. This classification results in 6,153 firm-years as financially constrained and 5,509 firm-years as financially unconstrained.

1.3.3 Measure for Financial Distress

Ohlson (1980) uses maximum likelihood estimation of the so-called conditional logit model to predict corporate failure as evidenced by the event of bankruptcy. They identify four basic factors as being statistically significant in affecting the probability of failure within one year – (i) size; (ii) measures of financial structure; (iii) measures of performance and (iv) measures of current liquidity. In this paper I use Ohlson's probabilistic prediction of bankruptcy measure very closely following Bhagat, Moyen and Suh (2005)'s use of the same measure to identify firms in performance declines. This measure is based on Ohlson's predicted bankruptcy probabilities p, where $P = 1/(1+e^{-Yit})$

Y_{it} = -1.32 - .407*(ln (TA)) + 6.03*TLTA – 1.43*WCTA + .757*CLCA – 2.37*NITA – 1.83*FUTL + .285*INTWO – 1.72OENEG - .521*CHIN

Wherein TA is total assets (COMPUSTAT #s in parentheses) (#6); TLTA is total liabilities to total assets (#181/#6); WCTA is the ratio of working capital to total assets [(#4 - #5) / #6]; CLCA is the current liabilities to current assets ratio (#5/#4); NITA is net income to total assets ratio (#172/#6) and FUTL is fund from operations to total liabilities

ratio (#110/#181). INTWO = 1 if net income (#172) is negative in previous two years or zero otherwise; ONEEG = 1 if total liabilities (#181) is greater than total assets (#6), 0 otherwise and CHIN is the ratio of the difference in net income of current period with previous period over the absolute value of the difference $(NI_t - NI_{t-1})/ (|NI_t| - |NI_{t-1}|)$. Following Bhagat et al (2005) this measure is obtained from a variant of Ohlson's bankruptcy probability model. Because the FUTL variable greatly restricts the sample size, pseudo-bankruptcy probabilities ˜p are calculated by ignoring the effect of FUTL in predicting bankruptcy probabilities: $\tilde{p} = 1/ (1 + e^{-Yit})$

Firms with declining performance and facing financial distress include firm-year observations with pseudo-bankruptcy probabilities greater than or equal to 50%.

1.3.4 The Sample Selection Process

I use the G-index developed by Gompers et al (2003) and E-index developed by Bebchuck et al. (2005) as my measures of governance in order to distinguish between strong and poorly governed firms. Due to this fact the sample size for this paper is constrained by the firm-years for which the G-Index and the E-Index numbers that have been computed and provided for research purposes on the respective authors' homepages. The accounting data for the sample comes from the Research Insight – COMPUSTAT database (numbers in parentheses are COMPUSTAT data items). I include firms for all the years of the sample period (1990-2005) for which *t*-1 and *t*-2 COMPUSTAT data is available for the said parameters detailed in Table 1. The final sample size is 17,587 firm-years.

Table 1. Variable Definition and Construction

S.No	Variable Notation	Variable Description	COMPUSTAT Notation
1.	Size	Natural logarithm of total assets	Ln(#6)
2.	Cash Flow	Income before Extraordinary Items + Depreciation and Amortization	#18 + #14
3.	Q	Market value of assets / Book Value of assets	{(#199 * #25) + #6 – (#60 + #74)} / #6
4.	Leverage	Total Liabilities / Total Assets	#181 / #6
5.	KZ	*-1.002*CashFlow+0.283*Q+3.130*Leverage– 39.368*Dividends – 1.315*CashHoldings*	Item #8 is a lagged variable.
		CashFlow	*(#18 + #14) / #8*
		Q	*{(#6 + (#25 * #24) – #60 – #74)} /* #6
		Leverage	(#9 + #34) / (#9 + #34 + #216)
		Dividends	(#21 + #19) / #8]
		CashHoldings	#1 / #8
6.	O-Score	*Yit = -1.32 - .407*(ln(TA)) + 6.03*TLTA – 1.43*WCTA + .757*CLCA – 2.37*NITA – 1.83*FUTL + .285*INTWO – 1.72OENEG - .521*CHIN*	
		Ln(TA)	Ln(#6)
		TLTA	#181/#6
		WCTA	(#4 - #5) / #6
		CLCA	#5/#4
		NITA	#172/#6
		FUTL	#110/#181
		INTWO	1 if $\#172_t$ & $\#172_{t-1}$ < 0; 0 otherwise.
		OENEG	1 if #181 > #6; 0 otherwise.
		CHIN	$(NI_t – NI_{t-1})/(\|NI_t\| - \|NI_{t-1}\|)$
7.	Cash Holdings	{Cash + Mkt Sec}/ {T.A}	[#1 / {#6}]
8.	Net Assets	Book value of Total assets - Cash & Mkt Sec.	#6 - #1
9.	P/O Ratio	Common and preferred dividends / Net Income	(#19 + #21) / #172
10.	NWC	{Current assets – Cash & Mkt Sec – Current Liabilities}	{#4 - #1 - #5}
11	Acq	Acquisitions	#129
12.	CAPEX	Capital Expenditures	#128
13.	G-index	The Gompers, Ishii and Metrick (2003) Governance Index	
14.	E-Index	The Bebchuck, Cohen, and Ferrell (2005) Entrenchment Index	
15.	Strong Gov	Firms for which the G number is less than or equal to 7 or E number is less than or equal to 2	
16.	Bad Gov	Firms for which the G number is greater than or equal to 12 or E number is greater than or equal to 4	

This table briefly describes the construction of the control and test variables used in this paper.

For a firm to be included in the sample in a given year *t*, it must meet the following criteria. (a) It has at least two years of COMPUSTAT data prior to year *t* for all the variables listed in Table 1 and (b) it has to have a governance index (G) score as tabulated by Gompers, Ishii, and Metrick (2003) and entrenchment index (E) as tabulated by Bebchuck, Cohen and Ferrell (2005). The G index score have numbers from 0 to 24, with the higher the score indicating poor governance. In the construction of the E index only a subset of IRRC provisions are used and the index goes from 0 to 6, again with a higher index score indicating poor governance. I have made one critical assumption with respect to the governance index and the entrenchment index numbers for the firms in my sample. Both databases provide index numbers for discrete years such as 1990, 1993, et al. It is widely accepted in the governance literature that governance characteristics for firms do not change significantly, if at all, from year to year.

Hence, in order to complete my panel data I make an assumption that G and E scores respectively for all firms in the years not tabulated by GIM (2003) and BCF(2005) have the same G score and E score respectively as that of the previously reported year until new data is available. For example, Amgen Inc., (TIC: AMGN) has a G score 9 in year 1993 and 10 in year 1995 as per the GIM (2003) tabulations. Based on my assumptions, I tabulate for AMGN a G score of 9 for 1994 and a score of 10 for year 1996 and 1997. Following this assumption I fill up the G and E scores for the years 1991, 1992, 1994, 1996, 1997, 1999, 2001, and 2003. I then classify the firms with a G score[4]

[4] Gompers, Ishii, and Metrick (2003) refer to the portfolio of firms with G <= 5 as a “democracy” portfolio and a portfolio of firms with G >= 14 as a “dictatorship” portfolio. Harford et al. (2008) sort the GIndex into quartiles and term the 1st quartile (strong shareholder rights) as firms' with good governance and the 4th (weak shareholder rights) quartiles as firms with poor governance.

of 7 and less as firms with strong governance and firms with G score of 12 and greater as poor governance firms.

1.3.5 Variable Description

Table 1 lists all the variables used in this paper. I use the market-to-book ratio as measure of a firm's growth opportunities, since the value of growth options are not included in a firm's book value, but should be reflected in its market value. I define the firm's cash flow as income before extraordinary items plus depreciation and amortization charges. A firm's decision with regard to its holdings of cash is modeled as a function of a number of sources and (competing) uses of funds (Almeida et al. 2004). Fazzari and Petersen (1993) argue that firms can offset the impact of cash flow shocks on fixed investment by adjusting working capital. Opler, Pinkowitz, Stulz and Williamson (1999) find that capital expenditures increase monotonically with excess cash. Harford (1999) finds that cash-rich firms tend increase its acquisition activity. I include net working capital, which I define as current assets, minus cash and marketable securities, minus current liabilities. The control variables net working capital, capital expenditure, acquisition, and cash flow are scaled by net assets, which is the book value of total assets net of cash. The Governance variables have been borrowed from the Gompers, Ishii and Metrick (2003) Governance Index and Bebchuck, Cohen, and Ferrell (2005) Entrenchment Index. Table 1 list each of these variables and very briefly mentions its construction methodology.

1.4 Empirical Results

1.4.1 Summary Statistics

Table 2 provides descriptive statistics for the different variables used in the paper. The average cash holdings over the 15-year sample period used is about 0.12. In other words, firms hold just under 12 percentage points of their total assets in cash. The next two variables examine the governance of firms. First, the G-index developed by Gompers, Ishii and Metrick (2003) is constructed as a proxy for the balance of power between shareholders and managers. The average G-index score for the sample is just over nine. The E-index developed by Bebchuck, Cohen and Ferrell (2005) as another governance measure, examines the entrenchment level of managers. The average E-index score for the sample is around 2.27.

The two variables, the KZ-index and the probability of distress, focus on measuring the level of financial constraint for firms. The average KZ-index[5] is about -3.9. The distress variables focus on firms taking financial constraint one step further. The measure for firm level of distress is the probability of bankruptcy (distress) as measured by the Ohlson (1980). The average is 0.31 for this measure.

The final seven variables are control variables used in the regressions including size, cash flow, leverage, Q, net working capital, capital expenditure, and acquisitions. Table 2 shows the averages of each of these variables. Table 2 also breaks down the sample based on strong and poor governance. Separating the types of governance illustrates the major difference in cash holdings between strong and poor governance, which is around 7.5 percentage points.

[5] The KZ index is constructed by Lamont, Polk and Saa-Requejo (2001) using results from Kaplan and Zingales (1997) measures of firm level of financial constraints.

Table 2. Descriptive Statistics

	Full Sample			Strong Gov	Poor Gov	Difference
Variable	Obs.	Mean	Std. Dev.	Mean	Mean	Good-Bad
Cash Holdings	17587	0.1187	0.1646	0.1471	0.0728	0.0743***
G-index	17587	9.0545	2.7601	5.8420	13.0109	-7.169***
E-index	17587	2.2746	1.3447	1.0306	3.6213	-2.5908***
KZ Index	17587	-3.8991	17.8584	-5.1551	-2.5422	-2.6129***
Prob. of Distress	17587	0.3137	0.2863	0.2980	0.3112	-0.0133***
Size	17587	7.1672	1.5020	6.8232	7.5417	-0.7185***
Cashflow	17587	0.2227	0.6666	0.3009	0.0998	0.2011***
Leverage	17587	0.5677	0.3322	0.5371	0.5980	-0.0608***
Q	17587	1.8357	1.4371	1.9911	1.6725	0.3186***
NWC	17587	0.0664	0.3042	0.0707	0.0868	-0.0161
CAPX	17587	0.0685	0.0597	0.0731	0.0622	0.0110***
ACQ	17587	0.0247	0.0636	0.0238	0.0264	-0.0027

This table provides summary statistics on key variables of the sample of 17,587 firm-year observations (1990-2005). Cash Holdings is computed as cash and marketable securities standardized by total assets. G-index and E-index are the governance and entrenchment index numbers as tabulated by Gompers et al (2003) and Bebchuck et al. (2005) respectively. KZ index, a proxy for financial constraint, is measured following the methodology employed by Lamont et al (2001). Probability of distress is measured following Ohlson's (1980) probabilistic prediction of bankruptcy methodology. Size is measured as natural log of total assets. Cashflow is measured as income before extraordinary items plus depreciation and amortization. Leverage is ratio of total liabilities to total assets. Q is measured as ratio of market value to book value of assets. Net working capital is measured as current assets less of cash and marketable securities and current liabilities. Variables Cashflow, Net working capital, Capital expenditures and Acquisitions all are standardized by net assets (Total assets minus cash and marketable securities) following Opler et al. (1999). The construction of all variables is detailed in Table 1.

This table also illustrates differences between both strong and poor governance firms, especially in terms of performance as measured by cash flow. A higher number for KZ index indicates financially constrained. Table 2 shows that on average poorly governed

firms are more financially constrained. Poorly governed firms on average have higher leverage and lower growth opportunities and hence lower capital expenditures as compared to strong governance firms. Further, it can be observed that both investment in net working capital and acquisitions are higher for poorly governed firms, although the differences for these two parameters are not statistically significant.

1.4.2 Univariate Tests

Table 3 breaks down the cash holdings by year and by governance quality. Using the G-index, governance is split up into good, average, and poor governance. Column 'N' notes the firm count under each category. Consistent with prior evidence such as Dittmar and Mahrt-Smith (2007)[6], this table shows cash holdings are increasing over time. During the sample time period, cash holdings increase from about 8.6 percent of total assets to just over 20 percent of total assets. Firms with strong governance experience an increase in cash holdings of about 14 percentage points over the time period, while firms with poor governance experience only about an 8 percentage point increase. The difference in cash holdings between strong and bad governance firms increases over the sample period and peaks in 2002 and 2003. This evidence would not provide support for the classic agency argument predicting higher cash holdings for poor governance firms.

[6] The sample considered in their paper reflects variation in cash holdings as percentage of total assets from 5% in year 1990 to 13% in 2003.

Table 3. Sample Sort: Cash Holdings by Governance Over Time (Using G-Index)

	Good Gov		Avg. Gov		Poor Gov		Total		Diff. (Good Gov - Poor Gov)
Year	CH	N	CH	N	CH	N	CH	N	
1990	0.1031	339	0.0834	498	0.0633	159	0.0861	997	0.0398
1991	0.1026	343	0.0848	505	0.0639	181	0.0865	1030	0.0387
1992	0.1051	326	0.0838	484	0.0625	168	0.0866	979	0.0426
1993	0.1190	318	0.0961	551	0.0768	224	0.0985	1094	0.0421
1994	0.1186	306	0.0852	532	0.0646	218	0.0905	1057	0.0540
1995	0.1147	301	0.0842	551	0.0600	253	0.0869	1106	0.0548
1996	0.1149	289	0.0885	531	0.0639	242	0.0899	1063	0.0510
1997	0.1215	271	0.0852	494	0.0626	218	0.0900	983	0.0588
1998	0.1490	349	0.0950	603	0.0636	259	0.1091	1210	0.0854
1999	0.1489	316	0.0946	576	0.0591	265	0.1076	1157	0.0898
2000	0.1416	401	0.1103	567	0.0615	302	0.1110	1271	0.0801
2001	0.1587	412	0.1246	554	0.0732	326	0.1260	1291	0.0855
2002	0.2225	382	0.1771	534	0.0865	285	0.1748	1202	0.1360
2003	0.2298	365	0.1809	684	0.0979	293	0.1801	1342	0.1319
2004	0.1957	350	0.1894	757	0.1114	290	0.1778	1396	0.0843
2005	0.2397	103	0.2064	229	0.1417	77	0.2017	409	0.0980
Total	0.1471	5173	0.1195	9262	0.0728	3762	0.1187	17587	0.0743

This table breaks down the cash holdings by year over the sample period 1990-2005 as shown under the column Total. Further, the cash holdings are also tabulated separately for good, average and poor governed firms by each year. The governance measure considered here is the Gompers et al (2003) G-Index measure. Firms with G-score of 7 and below are termed as Good governance firms. Firms with G-score 12 and higher are categorized as poorly governed firms. Finally, all the firm with a G-score between 8 and 11 are termed as firms with average governance.

Table 4 provides a correlation matrix for all variables to be used in the regressions. I find that the correlation coefficient between most of the variables is fairly low. We do see as expected a high correlation between the G-index and the E-index.

Table 4. Correlation Matrix

	CH	Gindex	Eindex	Size	KZ	Leverage	Q	CAPX	ACQ	Cashflow	NWC
CH	1.0000										
Gindex	-0.0721	1.0000									
	(0.0000)										
eindex	-0.0047	0.7934	1.0000								
	(0.5187)	(0.0000)									
Size	-0.4370	0.2653	0.0316	1.0000							
	(0.0000	(0.0000)	(0.0000)								
KZ	-0.1813	0.0022	0.0253	0.1110	1.0000						
	(0.0000	(0.7750)	(0.0009)	(0.0000)							
Leverage	-0.3495	0.0674	0.0178	0.2834	0.1780	1.0000					
	(0.0000)	(0.0000)	(0.0154)	(0.0000)	(0.0000)						
Q	0.5184	-0.0926	-0.0692	-0.3030	-0.0615	-0.2408	1.0000				
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)					
CAPX	0.0730	-0.0088	-0.0487	-0.0768	0.1012	-0.0174	0.1099	1.0000			
	(0.0000)	(0.2298)	(0.0000)	(0.0000)	(0.0000)	(0.0175)	(0.0000)				
ACQ	-0.1315	0.0319	0.0716	-0.0983	-0.3210	0.0532	-0.0568	-0.2050	1.0000		
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)			
Cashflow	0.8794	-0.0326	-0.0367	-0.3465	-0.1050	-0.2329	0.3105	0.0498	-0.1125	1.0000	
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)		
NWC	-0.3704	-0.0556	-0.0407	-0.0141	0.0200	-0.2539	-0.1361	-0.0919	0.0117	0.4389	1.0000
	(0.0000)	(0.0000)	(0.0000)	(0.0546)	(0.0083)	(0.0000)	(0.0000)	(0.0000)	(0.1138)	(0.0000)	

This table shows the correlation matrix between the independent variables used in this paper. G-index and E-index are the governance and entrenchment index numbers as tabulated by Gompers et al (2003) and Bebchuck et al. (2005) respectively. Size is measured as natural log of total assets. KZ index, a proxy for financial constraint, is measured following the methodology employed by Lamont et al (2001). Construction of variables: Cashflow, Q, Leverage, CAPX, ACQ and NWC are detailed in Table 1. P-values in parentheses.

This is expected as these two measures are created from the same IRRC provisions, where the E-index is a subset of the G-index focused on entrenchment provisions. These two variables are not used in the same regression in the paper. The two are used only independently to show the results are robust to either measurement of governance. In order to make certain that multicollinearity is not an issue between independent variables, Variance inflation factor (VIF) test was performed. VIF measures the impact of collinearity among the independent variables' in a regression model on the precision of estimation. It expresses the degree to which collinearity among the predictors degrades the precision of an estimate. Typically a VIF value greater than 10 is of concern. VIF tests resulted with a maximum VIF measure 2.64 for leverage and the over-all mean VIF was 1.42.

Table 5 runs a univariate sort on the sample. Panel A lists the cash holdings over the sample period for all differing levels of governance. There is an obvious trend for both G-index and E-index where cash holdings decrease as the G-index and E-index increase. Increases in the G-index and E-index signify a worsening in firm governance. Consistent with the findings of Table 3, firms with better governance hold more cash. Panel B of Table 5 sorts cash holdings by additional variables. Also shown in the table is a t-test of the difference between the high and low group of each different sort. The first sort looks at G-index, which is a recap of table 3 and tests the difference between strong and bad governance. The difference is almost 7.5 percentage points and is statistically significant at the 1% level. E-index has a similar result to G-index.

Splitting the sample based on size shows smaller firms hold a higher percentage of cash than larger firms. Small firms hold almost 11 percentage points more cash as

compared to assets as large firms do. The next factor examined is the financial constraint level of firms, as measured by the KZ-index.

Table 5A: Univariate Test (Cash Holdings vs. Governance Measures)

Panel A: Cash Holdings

G-Index		Mean	E-index		Mean
2	Best Governance	0.2326	0	Best Governance	0.1435
3		0.1615	1		0.1554
4		0.1484	2		0.1329
				Average	
5		0.1466	3	Governance	0.1113
6		0.1466	4		0.0808
7		0.1568	5		0.0582
				Worst	
8		0.1493	6	Governance	0.0997
	Average				
9	Governance	0.1283			
10		0.1163			
11		0.0941			
12		0.0868			
13		0.0640			
14		0.0642			
15		0.0628			
16		0.0549			
17		0.1076			
18		0.0743			
	Worst				
19	Governance	0.0530			

Panel A shows cash holdings based on different levels of governance. G-Index is the Gompers et al (2003) score and E-Index is the Bebchuck et al (2005) score. In both cases the lower the index number, the better the governance of firms. The means reported here are the mean values of cash holdings for firms with respective G and E index numbers. Cash holdings are computed as cash and marketable securities standardized by total assets.

Table 5B: Univariate Test (Cash Holdings vs. Test Variables)

Panel B: Cash Holdings

Variable	Description	Mean	Difference (1-3)
G-Index 1	Strong Governance	0.1471	
G-Index 2	Average Governance	0.1195	
G-Index 3	Poor Governance	0.0728	0.0743***
E-Index 1	Strong Governance	0.1511	
E-Index 2	Average Governance	0.1220	
E-Index 3	Poor Governance	0.0773	0.0738***
Size 1	Small	0.1818	
Size 2	Medium	0.1095	
Size 3	Large	0.0742	0.1076***
KZ-Index 1	Not Constrained	0.2176	
KZ-Index 2	Average Constrained	0.0979	
KZ-Index 3	Constrained	0.0530	0.1646***
Distress Dummy: 0	Not Distress	0.1301	
Distress Dummy: 1	Distress	0.0948	0.0353***
Q 1	Low Q	0.0790	
Q 2	Average Q	0.0933	
Q 3	High Q	0.2042	-0.1252***

Panel B shows cash holdings based on different levels of governance measures, Size, Financial Constraint and Distress status and Growth Opportunities. G-Index and the E-Index broadly grouped as good, average and poor governance firms respectively. The next sets of variables are grouped by size. Size as measured by total assets (adjusted for CPI index for 2004 dollars) are sorted and grouped as size 1 (bottom tercile), size 3 (top tercile) with size 2 constituting the middle tercile. KZ index scores, computed in accordance with Lamont et al (2001) methodology, are also grouped by terciles, the smallest of the three labeled as financially unconstrained firms. Probability of distress is measured following Ohlson's (1980) probabilistic prediction of bankruptcy methodology. Distress dummy is 1 when Ohlson's probability of bankruptcy is greater than 0.5. Q variable is computed as the ratio of market value of firm to the book value of firm and proxy growth opportunities. Q values with less than 1 are firms with low growth opportunities, Q values between 1 and 2 as firms with average growth opportunities and Q values greater than 2 are firms with greatest growth opportunities. Cash holdings are computed as cash and marketable securities standardized by total assets. The last column shows difference of means t-test.

*** indicates significant at 1% confidence level

Financially constrained firms hold over 16 percentage points less cash than non-financially constrained firms. Financially constrained firms find it difficult to access financial markets (Whited, 1992; Gilchrist and Himmelberg, 1995) and thus are forced to put all of their assets to use and are unable to hold excess levels of cash. Firms considered in financial distress have a similar issue with shortage of cash. Investment opportunities as measured by Q also impact the level of cash holdings[7]. Firms with a higher Q or high growth opportunities hold around 12.5 percentage points more cash as compared to assets than firms with low growth opportunities. This is not surprising as firms with more future growth opportunities will hold more cash on hand to quickly and more efficiently take advantage of opportunities as they become available.

Table 6 examines the industry concentration of the firms in the sample. We examine different industries to see if the difference in cash holdings between firms with strong and poor governance is concentrated in certain industries. I report in Panel A as any industry with at least 250 firm-year observations.

Table 6 is sorted by the total concentration of the sample by industry. Reported in the table are cash holdings for each type of governance as well as the ratio of cash holdings of strong governance firms to poor governance firms. I find certain industries have greater differences, but only three industries of the reported 20 industries have ratios less than one. That is, only 15 percent of the industries with significant concentrations do not follow the trend of strong governance firms holding more cash.

[7] The Q variable is used as a measure of the firm's future growth opportunities in this paper. However, Q is also sometimes employed as a performance measure. Thus, to avoid problems with interpretation of Q, we also use an alternative measure of growth opportunities in a later section.

Table 6A: Cash Holdings by Industry and Governance

SIC Code	Industry	Full Sample		Good Gov		Bad Gov		Good/Bad
		Con	CH	Con	CH	Con	CH	Ratio
49	Electric, Gas and Sanitary Services	9.10%	0.0217	7.01%	0.0178	7.68%	0.0198	0.8993
28	Chemicals and Allied Products	8.10%	0.1707	7.63%	0.2108	9.88%	0.0993	2.1222
73	Business Services	7.51%	0.2678	9.93%	0.2828	3.26%	0.1160	2.4387
36	Electrical and Electronic Equipment (Ex. Computers)	7.36%	0.2153	9.08%	0.2531	4.97%	0.1431	1.7686
35	Industry and Commercial Machinery and Computers	7.14%	0.1756	7.54%	0.2203	8.03%	0.0768	2.8669
38	Measuring and Analyzing Instruments	4.86%	0.1583	3.37%	0.1873	5.97%	0.1174	1.5955
37	Transportation Equipment	3.16%	0.0761	1.97%	0.0812	3.39%	0.0795	1.0211
20	Food and Kindred Products	3.15%	0.0570	3.83%	0.0749	2.61%	0.0416	1.7977
48	Communication	2.94%	0.0736	3.81%	0.0952	3.39%	0.0156	6.1050
13	Oil & Gas Extraction	2.78%	0.0525	2.13%	0.0747	2.04%	0.0349	2.1424
33	Primary Metal Industries	2.59%	0.0493	2.37%	0.0483	4.13%	0.0436	1.1074
50	Wholesale Trade - Durable Goods	2.54%	0.0582	2.46%	0.0467	2.88%	0.0542	0.8623
27	Printing, Publishing & Allied Industries	2.48%	0.0813	1.88%	0.1150	3.37%	0.0359	3.2000
26	Paper and Allied Products	2.08%	0.0262	1.14%	0.0268	2.74%	0.0225	1.1907
34	Fabricated Metal Products	2.05%	0.0536	1.25%	0.0825	2.88%	0.0440	1.8737
60	Depository Institutions	2.03%	0.1158	2.04%	0.1407	1.82%	0.0868	1.6206
59	Miscellaneous Retail	1.77%	0.0951	3.09%	0.0954	0.62%	0.0487	1.9601
51	Wholesale Trade – Non Durable Goods	1.52%	0.0594	0.60%	0.1223	2.85%	0.0328	3.7299
56	Apparel and Accessory Stores	1.49%	0.1745	1.93%	0.1537	2.31%	0.1371	1.1212
58	Eating and Drinking Places	1.42%	0.0499	1.39%	0.0533	1.57%	0.0564	0.9465

This table presents cash holdings (standardized by total assets) for firms differentiated by industry. Only firms with at least 250 firm-year observations per industry are reported here. The column Con represents concentration of firms by industry for the total sample. Next, I report cash holdings for good governance firms and poor governance firms again segregated by industry. The governance measure used here to is the Gomper, Ishii, and Metrick (2003) G-Index. Similar results were obtained when Bebchuck, Cohen and Ferrell (2005) E-Index was used. The last column reports the ratio of cash holdings for good over poor governance firms.

Table 6B. Cash Holdings by Industry and Growth Opportunities

SIC Code	Industry	Con	Mean-Q	Good/Bad Ratio
50	Wholesale Trade - Durable goods	2.54%	1.393	0.862
49	Electric, Gas and Sanitary Services	9.10%	1.107	0.899
58	Eating and Drinking Places	1.42%	1.990	0.947
37	Transportation Equipment	3.16%	1.531	1.021
33	Primary Metal Industries	2.59%	1.290	1.107
56	Apparel and Accessory Stores	1.49%	2.043	1.121
26	Paper and Allied Products	2.08%	1.465	1.191
38	Measuring and Analyzing Instruments	4.86%	2.219	1.596
60	Depository Institutions	2.03%	1.219	1.621
36	Electrical and Electronic Equipment (Ex. Computers)	7.36%	2.129	1.769
20	Food and Kindred Products	3.15%	2.058	1.798
34	Fabricated Metal Products	2.05%	1.512	1.874
59	Miscellaneous Retail	1.77%	2.015	1.960
28	Chemicals and Allied Products	8.10%	2.567	2.122
13	Oil & Gas Extraction	2.78%	1.505	2.142
73	Business Services	7.51%	2.514	2.439
35	Industry and Commercial Machinery and Computers	7.14%	1.890	2.867
27	Printing, Publishing & Allied Industries	2.48%	1.829	3.200
51	Wholesale Trade – Non Durable goods	1.52%	1.511	3.730
48	Communication	2.94%	1.760	6.105

This table reflects cash holdings (standardized by total assets) for firms differentiated by industry. Only firms with at least 250 firm-year observations per industry are reported here. The column 'Con' represents concentration of firms by industry for the total sample. Next, I compute the cash holdings for strong governance firms and poor governance firms again segregated by industry. The last column reports the ratio of cash holdings for strong over poor governance firms. The governance measure used here to is the Gomper, Ishii, and Metrick (2003) G-Index. Similar results were obtained when Bebchuck, Cohen and Ferrell (2005) E-Index was used. The results are sorted in increasing order of the ratio of cash holdings held by strong governance firms over poor governance firms. The corresponding average Q values are reported here for the respective industry.

In Panel B of Table 6, I further examine this issue by sorting the industries by the ratio of cash holdings of strong and poor governance and adding in average Q of the industry. The results of the table are consistent with the idea as an industry's Q increase so does the cash holdings ratio. This table is sorted by the ratio, as tabulated in the last column.

1.4.3 Multivariate Tests

Table 7 illustrates the results from a regression with cash holdings as the dependent variable. The regression examines the effects of governance on cash holdings, while controlling for several other factors. The base model is as follows:

$$Cash\_Holdings_{i\,t} = a_0 + a_1 G_{i,t} + a_2 KZ_{i,t} + a_3 Size_{i,t} + a_4 CashFlow_{i,t} + a_5 Leverage_{i,t}$$
$$a_6 Market\text{-}to\text{-}book_{i,t} + a_7 NWC_{i,t} + a_8 Capital\ Expenditures_{i,t} + a_9 Aquisitions_{i,t} + Year\ Dummies + Industry\ Dummies + e_{i,t}$$

The results of the fixed effects regression confirm the main findings of the previous univariate tests in a multivariate setting. The coefficient for G-index in column (1) of Table 7 is negative and statistically significant, meaning firms with better governance hold a significantly higher percentage of assets in cash. The coefficient for KZ-index is also negative and significant. Since increases in KZ mean higher financial constraint, the negative relation means firms with lower levels of constraint hold more cash. This result lends support to the rational expectation that firms hold more cash when they are able to (low financial constraints), and they hold less cash when sources of funds are tight (high financial constraints). Size is also negative and significant as smaller firms hold a higher percentage of cash per asset. Cash flow is positive and significant as better firm performance leads to higher total cash holdings. This variable also helps to control

for the documented difference in performance between strong and poor governance (Harford, et al. 2008). Leverage is negative and significant, which suggests that the high fixed payments associated with high leverage lowers cash holdings. Consistent with the univariate findings, the coefficient for Q is positive and significant as firms with better opportunities hold a higher percentage of cash. The positive relationship between capital expenditures and cash holdings indicates that firms in greater need for capital additions hold a greater percentage of cash. The acquisition variable shows a negative and significant relationship with cash holdings, indicating that firms engaging in acquisition activity hold a lower percentage of cash. This finding is in line with Harford (1999), who shows that cash rich firms are more likely to actively pursue active acquisition strategy and in the process lower their cash holdings. The R-squared of this regression is high at 0.8526.

Column (2) of table 7 adds net working capital to the regression. This variable is negative and significant and is in agreement with prior work. Dittmar et al. (2003) show similar results and comment that net working capital and cash holdings appear to be substitutes. Column (3) of Table 7 uses a dummy variable for strong governance instead of using the raw g-index number. This is done to see if we get the same result as was conducted in Column (1) when we use a dummy variable instead of the continuous g-index variable since the results could be influenced by a few firms with really strong or poor governance. The result from the dummy variable used to measure strong governance is the same as when using the raw g-index in column (1) and supports the results from the previous tables. The other variables in this regression do not change significantly. Columns (4) and (5) run similar tests but use the e-index instead of the g-index used in

the other columns. The results using e-index are the same as those found when using g-index. As e-index decrease or as managers become less entrenched they hold a higher percentage of cash.

Table 7. Multivariate Tests: Impact of Governance on Cash Holdings

Dependant Variable: Cash Holding (Cash / TA)

	(1)	(2)	(3)	(4)	(5)
G-Index	-0.0046	-0.0044			
	(0.00)	(0.00)			
Strong Governance Dummy			0.0313	0.0303	
			(0.00)	(0.00)	
Poor Governance Dummy			-0.0021	-0.0007	
			(0.22)	(0.70)	
E-index					-0.0125
					(0.00)
KZ-Index	-0.0005	-0.0005	-0.0006	-0.0005	-0.0005
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Size	-0.0046	-0.0044	-0.0066	-0.0066	-0.0054
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Cashflow	0.1831	0.1733	0.1863	0.1746	0.1826
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Leverage	-0.0637	-0.0972	-0.0595	-0.0994	-0.0607
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Q	0.0211	0.0194	0.0208	0.0189	0.0199
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
NWC		-0.0576		-0.0701	
		(0.00)		(0.01)	
CAPEX	0.1141	0.1207	0.1112	0.1156	0.1341
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
ACQ	-0.1641	-0.1546	-0.1704	-0.1586	-0.1614
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Constant	Yes	Yes	Yes	Yes	Yes
Number of Obs.	17587	17587	17587	17587	17587
R-squared Overall	0.8526	0.8525	0.7656	0.7418	0.8486

This table shows the regression of the dependant variable: Cash Holdings (Cash / TA) on governance measures G-index in model (1) and (2). Model (3) and (4) use strong and poor governance dummy by G-Index and E-Index respectively. Size, Leverage, Cash flow, Q, Net working capital, capital expenditures, Acquisitions, the financial constraint measure KZ index are being used as control variables in this regression. The construction of these variables is detailed in Table 1. 2-digit SIC codes are used as industry dummy. Finally the year dummies were also considered in order to control for fluctuations on account of passage of time. Model (5) uses E-index in place of G-index. P-values are shown in parentheses.

Both measures of governance lead to the same result, with strong governance positively related to cash holdings. These findings suggest that agency problems are not the driving force behind the higher cash holdings in recent years. After finding this result, the big question that arises is why do firms with better governance hold a higher percentage of their assets in cash. We address this question next.

Table 8 examines the question of governance and cash holdings with a two-way sort of governance and other key variables used in the regression. The results with size and governance illustrate small firms with strong governance hold the highest cash as a percentage of assets, while large poor governance firms hold the least cash. The next sort examines governance with Q and finds the highest level of cash holdings for firms with strong governance and high Q or high growth opportunities. This makes sense as firms with greater opportunities may want to hold higher levels of cash to take better advantage of future opportunities.

The next sort examines governance and the KZ-index. Firms with strong governance and low financial constraint hold the highest percentage of cash, suggesting that these firms may hold more cash when they are financially able to, perhaps building up slack for weaker times. The difference between firms with strong and weak governance is negligible when firms in both the groups are financially constrained. These findings suggest that firms with strong governance build up cash when available, but poor governance firms do not build up as much cash even when they are not financially constrained. Finally, I observe higher cash holdings for firms that are not in distress as compared to firms in distress. Panel B uses e-index as a measure for governance with a similar result.

Table 8A. Cash Holdings and Governance Using G Index – Double Sort

Panel A: G-Index is used to calculate good, average, and poor governance

	Good	Average	Poor	Difference (Good - Poor)
Large Size	0.0944	0.0761	0.0544	0.0400**
Medium Size	0.1194	0.1176	0.0734	0.0460**
Small Size	0.2079	0.1789	0.1130	0.0949***

	Good	Average	Poor	Difference
Low Q	0.0900	0.0796	0.0530	0.0369**
Avg Q	0.1182	0.0962	0.0573	0.0610**
High Q	0.2353	0.2056	0.1310	0.1043***

	Good	Average	Poor	Difference
KZ1 (Con)	0.0604	0.0520	0.0410	0.0195**
KZ2 (Avg)	0.1285	0.0978	0.0617	0.0669**
KZ3 (Not Con)	0.2696	0.2250	0.1147	0.1549***

	Good	Average	Poor	Difference
Distressed	0.1146	0.0953	0.0602	0.0544**
Not Distress	0.1629	0.1318	0.0770	0.0859**

Panel A of this table reflects the univariate test of the key variable – the cash holdings against the governance measures G-Index broadly grouped as good, average and poor governance firms respectively. G-Index is the Gompers et al (2003) score used as a proxy for governance measure of firms in this paper. The next sets of variables are grouped by size. Total assets adjusted for CPI index for 2004 dollars are sorted and the smallest tercile grouped as small firms and so on. KZ index scores, computed in accordance with Lamont et al (2001) methodology, are also grouped by terciles, the smallest of the three labeled as financially unconstrained firms. Probability of distress is measured following Ohlson's (1980) probabilistic prediction of bankruptcy methodology. Distress dummy is 1 when Ohlson's probability of bankruptcy is greater than 0.5. Q variable is computed as the ratio of market value of firm to the book value of firm and proxy growth opportunities. Q values with less than 1 are firms with low growth opportunities, Q values between 1 and 2 as firms with average growth opportunities and Q values greater than 2 are firms with greatest growth opportunities. Cash holdings are computed as cash and marketable securities standardized by total assets. The last column shows difference of means t-test.

*** indicates significant at 1% confidence level

Table 8B. Cash Holdings and Governance Using E Index – Double Sort

Panel B: E-Index is used to calculate good, average, and poor governance

	Good	Average	Poor	Difference
Large Size	0.0974	0.0732	0.0490	0.0485***
Medium Size	0.1299	0.1132	0.0718	0.0581***
Small Size	0.2134	0.1783	0.1261	0.0873***

	Good	Average	Poor	Difference
Low Q	0.0851	0.0831	0.0587	0.0264**
Avg Q	0.1128	0.0962	0.0648	0.0480**
High Q	0.2408	0.1957	0.1375	0.1033***

	Good	Average	Poor	Difference
KZ1 (Con)	0.0605	0.0539	0.0399	0.0207**
KZ2 (Avg)	0.1227	0.0981	0.0669	0.0558***
KZ3 (not Con)	0.2548	0.2195	0.1379	0.1168***

	Good	Average	Poor	Difference
Distressed	0.1143	0.0996	0.0572	0.0571***
Not Distressed	0.1615	0.1290	0.0840	0.0775***

Panel B of this table reflects the univariate test of the key variable – the cash holdings against the governance measure E-Index broadly grouped as good, average and poor governance firms respectively. E-Index is the Bebchuck et al (2005) score, being used as a proxy for governance measure of firms in this paper. The next sets of variables are grouped by size. Total assets adjusted for CPI index for 2004 dollars are sorted and the smallest tercile grouped as small firms and so on. KZ index scores, computed in accordance with Lamont et al (2001) methodology, are also grouped by terciles, the smallest of the three labeled as financially unconstrained firms. Probability of distress is measured following Ohlson's (1980) probabilistic prediction of bankruptcy methodology. Distress dummy is 1 when Ohlson's probability of bankruptcy is greater than 0.5. Q variable is computed as the ratio of market value of firm to the book value of firm and proxy growth opportunities. Q values with less than 1 are firms with low growth opportunities, Q values between 1 and 2 as firms with average growth opportunities and Q values greater than 2 are firms with greatest growth opportunities. Cash holdings are computed as cash and marketable securities standardized by total assets. The last column shows difference of means t-test.

*** indicates significant at 1% confidence level

It appears that firms with strong governance hold higher levels of cash as growth opportunities increase. My proposal is strong governance firms will increase holdings when advised to do so. One of the times when firms could be benefited from higher cash holdings is when they have strong growth opportunities. Table 9 takes a deeper look into this notion. Column (1) of table 9 examines the sample of firms with high levels of Q as measured with a Q above 2. Column (2) and column (3) examine the sample of firms with average Q (Q values between 1 and 2) and low Q (Q values less than 1) respectively. The examination of each sample illustrates the magnitude of g-index decreases when moving from high Q to low Q. In column (3), which examines only low Q firms, the g-index is insignificant. That is, governance is not significantly related to cash holdings when examining firms with limited growth opportunities.

This story is consistent with the idea of firms with strong governance holding more cash when appropriate or when it is in shareholders' best interest. Column (4) examines the whole sample and uses a dummy for both strong governance and high Q. It also includes an interaction variable of high Q and strong governance. All three variables are positive and significant. Strong governance, high Q, and the combination of the two all increase cash holdings. The strong governance dummy variable is significant but lower in magnitude as compared to Table (7) where the interaction term is not used. This would appear to be consistent with the idea of one viable reason for strong governance firms to hold more cash. They hold higher level of cash when these firms have stronger growth opportunities and do so more than other firms with weaker governance. This in depth analysis of the role of growth opportunities to firm cash holdings adds to the results shown in Harford et al. (2008) paper.

Table 9. Multivariate Tests: Sample Differentiated by Growth Opportunities

Dependant Variable: Cash Holding (Cash / TA)

Sample	High Q	Avg Q	Low Q	Full Sample
	(1)	(2)	(3)	(4)
G-Index	-0.0216	-0.0067	-0.0002	
	(0.00)	(0.00)	(0.46)	
Strong Governance Dummy				0.0365
				(0.00)
Poor Governance Dummy				-0.0034
				(0.05)
KZ-Index	-0.0044	-0.0001	-0.0011	-0.0006
	(0.00)	(0.00)	(0.00)	(0.00)
Size	-0.0194	-0.0102	-0.0237	-0.0040
	(0.00)	(0.00)	(0.00)	(0.00)
Cashflow	0.2185	0.1413	0.1351	0.1714
	(0.00)	(0.00)	(0.00)	(0.00)
Leverage	-0.1324	-0.1307	-0.1065	-0.1270
	(0.00)	(0.00)	(0.00)	(0.00)
Q	0.0170	0.0731	0.0457	
	(0.00)	(0.00)	(0.22)	
High Q Dummy				0.0385
				(0.00)
Low Q Dummy				-0.0211
				(0.00)
Strong Governance Dummy * Q				0.0008
				(0.10)
NWC	-0.0811	-0.1128	-0.0735	-0.0734
	(0.00)	(0.00)	(0.00)	(0.00)
CAPEX	0.1905	0.1401	0.3742	0.1366
	(0.00)	(0.01)	(0.00)	(0.00)
ACQ	-0.5599	-0.0986	-0.0208	-0.1678
	(0.00)	(0.00)	(0.10)	(0.00)
Constant	Yes	Yes	Yes	Yes
Number of Obs.	4558	10266	2763	17587
R-squared Overall	0.7921	0.7598	0.2349	0.8300

This table shows the regression of the dependant Variable: Cash Holding (Cash/TA) on governance measure G-index, constraint measure KZ index, and other control variables – Size (log of total assets), cash flow, Q, Leverage, NWC, CAPEX and ACQ. 2-digit SIC codes are used as industry dummy. Finally the year dummies were also considered in order to control for fluctuations on account of passage of time. The sample of independent variables is restricted in sample size by grouping firms in brackets of High Q, Average Q and Low Q. The last column reflects the results of using full sample. High Q, Low Q dummy variables and an interaction variable of strong governance dummy with Q is included in this model.

In this paper I agree with Harford et al. results that firms with better governance and better growth opportunities hold higher levels of cash holdings, but I further extend my study to show that only well-governed firms with better growth opportunities hold significantly higher levels of cash holdings. Well governed firms with low growth opportunities do not significantly differ in their cash holdings when compared to poorly-governed firms with low growth opportunities.

Another reason for holding additional cash is financial slack. It may help firms to hold additional cash as it may help them avoid financial constraints and even financial distress. To test this notion I examine if firm governance is negatively related to financial constraint status of firms. Table 10 examines this issue. Column (1) examines the sample of firms considered financially unconstrained by the KZ-index measure. For firms considered financially unconstrained, governance as measured by the g-index is negative and significant. That is, financially unconstrained firms with better governance hold more cash than unconstrained firms with poor governance. In contrast, as shown in column (2), governance does not affect the level of cash holdings when firms are financially constrained. This finding suggests that strong governance firms hold cash when available (i.e., when financially unconstrained). Columns (3) and (4) examine firms with strong governance and poor governance. Cash holdings for firms with strong governance are significantly influenced by the KZ-index and level of Q, while firms with poor governance are unaffected by the KZ-index and influenced by Q at a much smaller margin. The results of this table are consistent with the idea of firms with strong governance holding more cash with increasing growth opportunities (as measured by Q) and decreasing financial constraint (as measured by the KZ-index). The other interesting

insight in this table is that poorly governed firms choose to hold lower levels of cash holdings and do not plan for contingencies of constraint or growth opportunities' conditions.

Table 10. Multivariate Tests: Sample Differentiated by Financial Status and Governance

Dependant Variable: Cash Holding (Cash / TA)

Sample	Non-Constrained	Constrained	Good Gov	Poor Gov
	(1)	(2)	(3)	(4)
G-Index	-0.0118	-0.0010		
	(0.00)	(0.19)		
KZ-Index			-0.0078	0.0000
			(0.00)	(0.84)
Size	-0.0104	-0.0001	-0.0061	-0.0047
	(0.00)	(0.15)	(0.00)	(0.00)
Cashflow	0.1446	0.5811	0.1793	0.4641
	(0.00)	(0.00)	(0.00)	(0.00)
Leverage	-0.0768	-0.0016	-0.1078	-0.1252
	(0.00)	(0.00)	(0.00)	(0.00)
Q	0.0115	0.0059	0.0183	0.0015
	(0.00)	(0.00)	(0.00)	(0.00)
NWC	-0.0445	0.0407	-0.0992	0.0117
	(0.00)	(0.00)	(0.00)	(0.00)
CAPEX	0.2742	0.0402	0.0942	-0.0644
	(0.00)	(0.00)	(0.00)	(0.00)
ACQ	-0.2221	-0.0473	-0.0769	-0.0018
	(0.00)	(0.00)	(0.00)	(0.28)
Constant	Yes	Yes	Yes	Yes
Number of Obs.	5509	6153	5451	3457
R-squared Overall	0.8450	0.9481	0.7416	0.6738

This table shows the regression of the dependant Variable: Cash Holding (Cash/TA) on governance measure G-index, constraint measure KZ index, and other control variables – Size (log of total assets), cash flow, Q, Leverage, NWC, CAPEX and ACQ. The construction of these variables is detailed in Table 1. 2-digit SIC codes are used as industry dummy. Finally the year dummies were also considered in order to control for fluctuations on account of passage of time. The sample of independent variables is restricted in sample size by grouping firms in brackets of Constraint, Non-Constraint, Good governance and Poor governance firms using KZ Governance dummy respectively.

Harford at al. (2008) paper do not study the role of financial constraints when analyzing the firm cash holdings in presence of firm governance. The results that the higher cash holdings for financially unconstrained firms as against financially constraint firms is true only when firms are well governed, is significant addition to existing literature. The other variables under column (4) of this table show that poorly governed firms lower the level of cash holdings when faced with choices of additional capital expenditures, acquisitions and in paying off some of the debt from its balance sheet.

Table 11 tests the robustness of the results from the early tables, looking to see if the results are influenced by differing time periods of the sample or by industry affects. I examine time affects and industry affects as the results from tables 3 and 5 indicate variation in time and in industries. Column (1) of table 11 examines the time period from 1990—1997. This regression illustrates governance was a significant during the time period but to a lesser degree than shown in table 7. Column (2) of table 11 examines the period from 1998-2005. This regression demonstrates a similar relation with governance but the magnitude is over double in size. The results from the time period analysis indicate governance has become more significant in terms of determining cash holding of firms. In column (3) of table 11, I conduct regressions using fixed effects for industry (3). I find the use of fixed effects for industry does not significantly change the results reported from table 7. The results of this table indicate time period and industry does not change the relation between governance and cash holdings.

Table 11. Robustness Tests – Time and Industry Variation

Dep. Var: CH	1990-1997	1998-2005	Fixed Industry	Macro_Adj	Ind_Adj_ch
	(1)	(2)	(3)	(4)	(5)
G-Index	-0.0015	-0.0032	-0.0075	-0.0019	-0.0039
	(0.00)	(0.00)	(0.00)	0.000	(0.000)
KZ-Index	-0.0004	-0.0006	-0.0005	-0.0001	-0.0001
	(0.00)	(0.00)	(0.00)	0.000	(0.079)
Size	-0.0053	-0.0031	-0.0035	-0.0013	-0.0106
	(0.00)	(0.00)	(0.00)	0.000	(0.000)
Cashflow	0.2884	0.1631	0.1658	0.2693	0.1031
	(0.00)	(0.00)	(0.00)	0.000	(0.000)
Leverage	-0.0269	-0.0187	-0.1139	-0.0431	-0.0058
	(0.00)	(0.00)	(0.00)	0.000	(0.000)
Q	0.0136	0.0164	0.0204	0.0057	0.0059
	(0.00)	(0.00)	(0.00)	0.000	(0.000)
NWC	-0.0188	-0.0233	-0.0335	-0.0598	-0.0018
	(0.00)	(0.00)	(0.00)	0.000	(0.000)
CAPEX	0.1078	0.0896	0.2504	-0.0439	0.1044
	(0.00)	(0.00)	(0.00)	0.000	(0.000)
ACQ	-0.0367	-0.0930	-0.1447	-0.0795	-0.0017
	(0.04)	(0.00)	(0.00)	0.000	(0.000)
GDP_Gr_Dummy				-0.0057	
				0.000	
Year Dummies	Yes	Yes	Yes	No	No
Industry Dummies	Yes	Yes	No	Yes	No
Constant	Yes	Yes	Yes	Yes	Yes
Number of Obs.	8309	9278	17587	17587	17587
R-squared Overall	0.9633	0.7582	0.8448	0.4523	0.3031

This table shows the regression of the dependant variable Cash Holdings on governance measure G-index, constraint measure KZ index, and other control variables – Size, Cash Flow, Q, Leverage, NWC, CAPEX and ACQ. The construction of these variables is detailed in Table 1. 2-digit SIC codes are used as industry dummy in models (1), (2) and (3). The year dummies were considered in order to control for fluctuations on account of passage of time in models (1) and (2). Model (1) considers firm-years 1990-1997 and model (2) reflects results when 1998-2005 firm-years were considered. Model (3) controls for fixed industry effects. Model (4) controls for time variation by using GDP growth factor. Model (5) reflects regression results for firm-years by controlling for industry with mean adjusted values for cash holdings in place of 2-digit SIC dummy.

In model (4) I replace the year dummies with a variable that reflects the macroeconomic condition over the sample period. I consider the GDP growth for every year in the sample period and construct a dummy variable where in the value 1 captures above average growth in GDP and 0 value implies below average growth. Over the sample period the average GDP comes out to 2.96%. Based on the construct of the dummy variable explained above I observe the GDP growth higher than the average for years 1992, 1994, 1996-2000, 2004, and 2005 and vice-versa for the rest of the years. All the results of model (4) regression are consistent with earlier findings. The GDP growth dummy variable is negative and significant meaning that firms decrease cash holdings in years when US economy does better than average. In model (5) the primary regression is run with industry adjusted CH as the dependent variable. The results of this regression agree with the model (3) results. Next, I address the issue if any, with using Q as my proxy for growth opportunities. Since Tobin's q has been used as a proxy in studies of the relationship between insider ownership and market-based performance, I construct another proxy variable for growth opportunities in place of Q and test for robustness of my primary tests. I use the ratio of R&D to total assets as my proxy for growth opportunities. The results are provided in Table 12. All the results of my earlier regression stand even with the new proxy variable for growth opportunities.

The final robustness test for this study is carried out in two separate regressions with two different dependent variables but by including lags of key independent variables. The lag independent variables tested here over the two separate regressions include the governance measure G_{t-1}, the cash holding variable CH_{t-1}, the interaction between the lag cash holding variable and the good governance lag variable(for Panel A

shown in Table 13) and the lag of constraint measure KZ_{t-1} as shown in Panel B of Table 13. In the first regression the dependent variable considered is the financial constraint measure, the KZ index.

Table 12. Robustness Tests: Using R&D / Total Assets as a Proxy Measure for the Growth opportunities in place of Q

Dependant Variable: Cash Holding (Cash / TA)					
	(1)	(2)	(3)	(4)	(5)
G-Index	-0.0002	-0.0004			
	(0.05)	(0.02)			
Strong Governance Dummy			-0.0067	-0.0017	
			(0.00)	(0.433)	
Poor Governance Dummy			-0.0014	-0.0118	
			(0.66)	(0.00)	
E-index					-0.0163
					(0.00)
KZ-Index	-0.0007	-0.0004	-0.0006	-0.0004	-0.0007
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Size	-0.0059	-0.0038	-0.0055	-0.0043	-0.0071
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Cash flow	0.1553	0.1337	0.1542	0.1341	0.1584
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Leverage	-0.0999	-0.2367	-0.0991	-0.2391	-0.0947
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
R&D/TA	0.6333	0. 5066	0.6469	0.5253	0.5631
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
NWC		-0.1317		-0.1346	
		(0.00)		(0.03)	
CAPEX	0.1281	0.1348	0.1328	0.1255	0.1298
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
ACQ	0.0461	0.0021	0.0448	0.0006	0.0590
	(0.00)	(0.00)	(0.00)	(0.95)	(0.00)
Constant	Yes	Yes	Yes	Yes	Yes
Number of Obs.	8551	8551	8551	8551	8551
R-squared Overall	0.8771	0.8680	0.8778	0.8703	0.8630

This table shows the regression of the dependant variable: Cash Holdings (Cash / TA) on governance measures G-index in model (1) and (2). Model (3) and (4) use strong and poor governance dummy by G-Index. Size, Leverage, Cash flow, Net working capital, capital expenditures, Acquisitions, the financial constraint measure KZ index are being used as control variables in this regression. R&D/Total Assets is used as a proxy measure for growth opportunities in place of Q – used in all the earlier tests. The construction of these variables is detailed in Table 1. 2-digit SIC codes are used as industry dummy. Finally the year dummies were also considered in order to control for fluctuations on account of passage of time. Model (5) uses E-index in place of G-index. P-values are shown in parentheses.

Table 13. Robustness Tests: Testing with Lag Variables

		Panel A	Panel B
Dependant Variable		:KZ	: Cash holdings
	G_{t-1}	0.880	-0.0012
		(0.000)	(0.001)
	CH_{t-1}	-22.662	0.4465
		(0.000)	(0.000)
	CH_{t-1}*Good_G_{t-1}	-7.190	
		(0.006)	
	KZ_{t-1}		-0.00004
			(0.003)
	Size	-2.333	-0.0012
		(0.000)	(0.000)
	Leverage	6.451	-0.024
		(0.002)	(0.000)
	Cash flow	-16.906	0.1134
		(0.000)	(0.010)
	Q	-0.047	0.0353
		(0.855)	(0.000)
	NWC	-3.769	-0.054
		(0.000)	(0.000)
	CAPEX	7.077	0.0961
		(0.248)	(0.000)
	ACQ	-1.417	-0.1486
		(0.705)	(0.000)
	Constant	yes	yes
	Number of Obs.	14689	14074
	R-Squared Overall	0.080	0.8149

Panel A of this table shows the regression of the dependent variable KZ index on 1-period lag variables: G-index, Cash holdings, and KZ index and the interaction variable of KZ index and cash holdings in lag form. Size, Leverage, Q, Cash flow, Net working capital, capital expenditures, and Acquisitions, are being used as control variables in this regression. P-values are shown in parentheses.

Panel B of this table shows the regression of the dependant variable: Cash Holdings (Cash / TA) on 1-period lag variables: cash holdings, governance measure G-index, and the financial constraint measure KZ index. Size, Leverage, Q, Cash flow, Net working capital, capital expenditures, and Acquisitions, are being used as control variables in this regression. This regression closely emulates Harford, et al. (2008) test. P-values are shown in parentheses.

The results in Panel A of table 13 indicate that with increase in G index (higher number implying poor governance), the KZ index increases (higher KZ index number implies constrained firm). In other words, well governed firms in the current time period tend to be less financially constrained in the next period. The lag of cash holding variable has a large and significant negative coefficient. This result implies that increase in cash holdings in the current time period significantly decreases the likelihood of firm being financially constrained in the next time period. This result is in agreement with the earlier results shown, and that financially unconstrained firms tend to have higher levels of cash holdings.

The next test variable is the interaction of the lags of cash holdings and good governance variables. The coefficient is negative and significant at 6% level. This significant negative coefficient for the interaction term suggests that well-governed firms with higher cash holdings are less likely to get into financial trouble in the subsequent period. These results in combination with Table 10 results adds to the significant understanding of the role of financial constraints and governance plays in defining the nature of firm cash holdings. Next, as expected – larger firms, firms with increased cash flow and firms with increased net working capital expenditures (negative and significant coefficient) are less financially constrained while firms with more leverage (positive and significant coefficient) are more financially constrained.

In the panel B of Table 13 the regression shown is similar to the Harford et al (2008) regression. The dependent variable here is the cash holdings and the key test variables including itself (cash holdings) are in lag form. The results of this paper are consistent with the results shown in the Harford, et al paper. A negative and significant

coefficient variable for the lag G Index implies that poorly governed firms in the prior time period tend to hold lower level of cash holdings in the following time period. Firms that hold higher level of cash holdings and those that are less financially constrained in the lag period and firms with positive growth opportunities tend to hold higher level of cash holdings in the following period. These results agree with the prior findings of this paper showing that well governed firms, less financially constrained firms, and firms that have better growth opportunities tend to hold higher level of cash holdings.

1. 5 Conclusions

In the presence of capital market imperfections deriving from asymmetric information between managers and capital providers, liquidity can take on a strategic role. The first interesting result that I find in this paper is firms with strong governance tend to hold higher level of cash holdings as compared to poorly governed firms. It appears strong governance firms are able to mitigate agency issues associated with holding cash and lower the marginal costs of holding cash, thus increasing the value of holding cash. The reason for strong governance firms holding more cash is consistent with two benefits of holding cash. One reason for firms with strong governance to hold more cash is when the firm has strong growth opportunities. Holding additional cash provides the firms better opportunities to take advantage of investment opportunities as they arise.

Firms with strong governance are also selective in increasing their cash holdings as firms with limited growth opportunities do not hold higher levels of cash. Another reason for firms with strong governance to hold more cash is to provide financial slack to avoid distress during downturns. Firms with strong governance hold more cash when

financial constraints are low and cash is available. In contrast, poorly governed firms are indifferent to the financial condition of the firm with respect to its level of cash holdings and hold lower levels of cash in either scenario.

Essay 2

Do Management Decisions Matter When Firms Are In Distress?

2.1 Introduction

One aspect of economic theory argues that competitive markets in transition to long-run equilibrium eliminate inefficient firms through the process of bankruptcy and liquidation. James (1995), Hotchkiss (1995), and Kahl (2002) argue that reorganization of firms after bankruptcy filings is pointless, as these firms are simply delaying an inevitable corporate death. Furthermore, White (1989) argues that managers voluntarily choose to keep the firm going instead of liquidating as a self-interested preservation of their own jobs. This evidence seems to paint a dim picture of a firm's ability to eventually work itself out of bankruptcy. In the twelve month period ended December 31, 2007, there were 28,322 businesses that filed for bankruptcy, according to the U.S. federal court data[8]. As alarming as those numbers are, they are small in comparison to the number of firms that are in distress each year.

Previous researchers have attributed manager ineffectiveness, poor timing, and lack of contingency planning (Hambrick and Schecter, 1983; Hofer, 1980; Schendel, Patton and Riggs, 1976) as the leading indicators in the decline of corporate performance leading to financial distress. Several authors have pointed to different areas of the

[8] Of these 28,322 businesses, 78 were publicly trading firms. The five largest bankruptcy filings from this list are real estate / mortgage-related financial companies. Further, the largest filing of 2007 (New Century Financial – Pre-petition assets: $26 billion) made it into the 10 largest bankruptcies of all time. Source: BankruptcyData.com, a division of New Generation Research, Inc.,

business that may increase firm performance while under distress[9]. Financial distress is typically a precursor to bankruptcy as many financially distressed firms appear on future years' list of bankrupt firms. Given the grim picture of bankruptcy, is financial distress any different? Are managerial decisions during distress effective in improving the firm's prospects? Anecdotal evidence shows that many well-known, financially strong firms have at one time been in severe financial distress[10]. Thus, even with the aforementioned dark view of a firm's ability to re-establish itself, many managers manage to pull their firms out of financial distress each year.

In this paper, I look to examine if a firm's success in leaving distress is explained by firm characteristics and manager decisions. I primarily focus on two questions: how do some firms find their way out of distress while others do not, and what impact do managers' decisions have on distress? To answers these questions, I examine the characteristics and manager financing and investing decisions that lead firms out of distress and back to financial stability.

To define manager investing and financing decisions affecting firms' distress status, I start with the bankruptcy model as defined by Beaver (1966). "The firm is viewed as a reservoir of liquid assets, which is supplied by inflows and drained by out flows. The reservoir serves as a cushion or buffer against variations in the flows. The solvency of the firm can be defined in terms of the probability that the reservoir will be exhausted at which point the firm will be unable to pay its obligations as they mature (i.e.

[9] Some of the many are (Bibeault 1982), operational restructuring (Kang and Shivdasani, 1997), asset restructuring on the lines of management buyouts (MBOs) (Kaplan, 1989), asset divestment (Kang and Shivdasani, 1997), asset investment (Bhagat, Moyen and Suh, 2005), acquisitions (Grinyer, Mayes and McKiernan, 1988), and financial restructuring (Slatter, 1984; John, Lang, and Netter 1992)

[10] Xerox Corporation and Eastman Kodak are couple of notable examples. A more detailed discussion is given later.

failure)". Both the current 'type' and 'timing' of inflows and outflows are largely influenced by the management's prior time-period decisions. This being the case, then the current decisions of managers will influence the nature of future cash flows. I analyze managers' decisions ex ante to study what type of decisions help distressed firms to come out of financial distress.

The importance of manager actions under distress is not a brand new idea. Support for diverse management actions when in distress is found in Ofek (1993). Ofek explores the various responses of a firm in distress regarding both its operational and financial conditions, and analyzes why some distressed firms choose certain responses over others. Thus, they look at different management choices but not the success of the choice. Bhagat, Moyen, and Suh (2005) analyze both healthy and distressed firms. They focus on the investment policy for these two groups, and find a significant number of financially distressed firms have negative cash flow sensitivity. These findings suggest that managers of firms in distress invest more than they did in the prior year. However, their study does not examine how these actions influence whether or not distressed firms are able to get out of financial distress. Kane and Richardson (2002) show that firms that are more likely to get out of distress opt to reduce the size of their property, plant, and equipment. I extend this study further by analyzing other changes managers make to increase the probability of getting out of the state of financial distress.

To accomplish this goal, I first compile a sample of distressed firms. From the sample of distressed firms, I differentiate the financial status of a firm into two different state variables (State 1: Not distressed; and State 2: Distressed) in the future. Following Bhagat, Moyen and Suh (2005), I use Ohlson's (1980) probabilistic prediction of

bankruptcy measure to distinguish between the above two mentioned states. Through this analysis, I can identify if firm characteristics and management decisions play a role in firms' exiting financial distress, or if, similar to the results for firms reorganizing after bankruptcy, the managers have no real impact on distress status.

The results show firm characteristics are important in determining the future financial state of the firm. Size, leverage, and income at the time a firm enters financial distress are significant in determining if firms are able to exit distress. More specifically, larger firms with less leverage and higher income at the time they enter distress have a better chance of exiting distress within a three year period. The results on managers' decisions show managers who increase their investment in product refinement by significantly increasing the research and development expenditures help firms to get out of distress. I further explore the role of increase in research and development investment in helping firms successfully turnaround. I find that the increase in R&D helps firms with average and low growth opportunities. For firms with high growth opportunities simple increase in R&D investment does not help firms to exit distress. I infer from this result that distress for high growth firms has less to do with its own product as compared to other factors discussed in literature that cause distress. Firms with average and low growth opportunities are usually found in well established industries and they have a higher leverage to communicate the changes to the product thus positively impacting future cash flows and hence exit distress. Working capital investment is not significantly related to the future financial state of the firm. In support of Kane and Richardson (2002), the findings also show that firms lowering their level of capital expenditures are more likely to exit distress. This evidence is consistent with the argument that cost cutting and

trimming firm operations to provide additional funds for research and development can contribute significantly towards a successful turnaround. The results also show the inability of changes in financing choices to move a firm out of distress. Firms selling common or preferred stock to raise money, as also shown in Bhagat et al. (2005), does not increase the likelihood of firms' exiting distress.

So, why does it matter which firms make it out of distress? In addition to the intuitive answer, the importance of leaving financial distress can be explained in more than one way. As far as the indirect costs of bankruptcy are concerned, the costs keep increasing as a firm sinks deeper into distress and results in the loss of reputation and potential drop in sales due to poor financial performance. I focus on shareholders' primary concern, stock returns. As expected, the returns for the sample of firms remaining in distress are significantly lower than those successfully exiting distress during the three year period. Firms leaving distress have three-year holding period returns around 37 percent points higher than their counterparts unable to make it out of distress.

The remainder of the paper is structured as follows. Section II highlights issues of the macroeconomic conditions from the recent past in regards to firms experiencing performance decline and their attempts at turnaround. Section III details the relevant literature leading up to this study. Section IV presents a discussion of the Ohlson's measure used for distinguishing the distressed versus non distressed samples. Section V offers information on data collection and further identifies the control and the test variables used in the study. Section VI presents a discussion of results and Section VII concludes.

2.2 Background: Firms Exiting Financial Distress

Many firms find their way out distress by making key corporate decisions. Schefenacker, which makes mirrors for carmakers such as BMW and Mercedes, when faced with serious financial distress in late 2006, emerged from a tortuous restructuring, moved their headquarters, downsized its debt by 47%, and its founder gave up three-quarters of his shares to creditors. Downsizing of workforce (General Motors); restructuring of capital structure (Meridian); asset sale (Ford); and change in top management (Citigroup, Merrill Lynch) are a few recent examples of how managements of different firms have reacted to performance declines. The related literature has so far focused on three forms of exit strategies for distressed firms – resolution through bankruptcy filing, voluntary liquidation, and merger and acquisition. These exit strategies invariably result in losses for the stockholders of the firm. White (1983) emphasizes how equity holders always favor continuance since their interest is eliminated if liquidation is chosen. Hence, a sizable number of distressed firms choose alternative strategies to combat distress and continue to keep the owner's control over the firm. This paper analyzes the strategies employed by firm management that have preserved and helped grow shareholder's wealth after the financial distress phase.

2.3 Literature Review

The supporting literature for this paper can be categorized into three distinct themes. The first is the financial distress literature which has focused largely on explaining[11] and measuring the costs of distress[12]. The next significant research area tied

[11] Direct Costs: From the capital structure perspective significant costs on account of financial distress for stockholders in the form of legal and administrative costs of restructuring the firm's debt.

to this paper addresses topics such as turnaround and recovery in the face of declining performance. Turnaround is closely associated with management strategy, as researchers explored various mechanisms employed by managers attempting turnarounds.

2.3.1 Financial Distress

Altman (1983) introduces corporate distress by including with it the legal process of corporate bankruptcy reorganization and liquidation and describes it as "a sobering economic reality reflecting the uniqueness of the American way of corporate death." In contrast, Wruck (1990) states categorically that "financial distress – is not synonymous with corporate death." She finds that firms in financial distress face a variety of situations having very different effects on their values and claimholders. This diversity in conjunction with conflicts of interest among claimholders, leads to an information problem that makes valuing a distressed firm difficult. Interestingly, Wruck (1990) identifies the 'upsides' associated with financial distress. She states that financial distress is often accompanied by comprehensive organizational changes in management, governance and structure. This organizational restructuring can create value by improving the use of resources. Financial distress frees resources to move to higher-valued uses by forcing managers and directors to reduce capacity and to rethink operating policies and strategy decisions. This kind of organizational change is unlikely to occur in an all-equity firm, because without leverage, poor performance does not lead to financial distress. It is financial distress that gives creditors a legal right to demand restructuring.

Indirect costs: The opportunity loss suffered when corporate resources are diverted to debt restructuring process from more productive uses (reviewed by Myers (1984) and Masulis (1988))
Managerial financial distress costs: Gilson (1989) shows that 52% of all sampled firms experience a senior-level management change during the period of financial distress

[12] Warner (1977) measures the direct costs as result of bankruptcy; Ang et al (1982) attempt to measure the administrative costs as a result of Bankruptcy.

Kaplan (1989) analyzes financially distressed firms that subsequently complete management buyouts over the period from 1985 through 1989. They find a higher incidence of default on their debt ex-post the buyout decision. Denis and Denis (1995) analyze the causes and resolutions of financially distressed firms by examining a sample of 29 leveraged recapitalizations completed between 1985 and 1988. Interestingly they do not find a higher rate of asset sales among the distressed firms and, when asset sales do occur, the market participants treat this news as a negative signal.

2.3.2 Management Strategy

Bracker (1980) reviews the historical development of the strategic management concept and discusses the many definitions of strategy offered by various researchers[13], as related to the business world. He states that "The major importance of strategic management is that it gives organizations a framework for developing abilities for anticipating and coping with change." Schendel and Patton (1978) work out a simultaneous equation model of corporate strategy. They refer the strategic concept to multiple levels: the corporate level, the business level, and the functional area level. Hofer (1980) discusses two types of corporate turnaround strategies: strategic and operating. His discussion leads to a conclusion that strategic turnarounds most often involve a significant shift in the nature of the business. Managers adopting operating turnaround strategy refocus their energies on the core business by choosing to emphasize

[13] Few examples: (i) Strategy is a series of *actions* by a firm that are decided on according to the particular *situation*. – Von Neumann & Morgenstern, 1947; (ii) Strategies are *directional* action decisions which are required competitively to achieve the company's *purpose*. – Cannon, 1968; (iii) Strategies are *forward-looking* plans that anticipate change and initiate action to take advantage of *opportunities* that are integrated into the concepts or *mission* of the company – Newman & Logan, 1971; (iv) *Strategy* is concerned with long-range *objectives* and ways of pursuing them that affect the system as a whole. – Ackoff, 1974; (v) Strategy is a meditating force between the organization and its *environment*: consistent patterns in streams of organizational decisions to deal with the *environment* – Mintzberg – 1979.

one of the four following areas: increasing revenues, decreasing costs, decreasing assets, or a combination effort.

2.3.3 Turnarounds

Schendel et al. (1975) studied 54 firms each with four consecutive years of earnings decline and then subsequently four consecutive years of earnings improvement. They use information from business periodicals regarding these firms to study the causes of decline and actions taken for successful turnaround. They subjectively rate the causes for decline and actions taken for turnaround and classify each as either strategic or operating in nature. Hofer (1980) applied similar logic to his research. His analysis of 12 poorly performing firms showed firms that became distressed on account of poor strategic decisions successively had "strategic" turnarounds. Those firms' whose cause of distress resulted from poor operating decisions made "operating" turnarounds. Bibeault (1982) surveyed 81 chief executives who had faced turnaround situations. His discussions with the professionals attempting turnarounds add invaluable insights into issues such as leadership aspects as well as organizational and human issues. In his view, the primary objectives for the financially distressed firm are survival and achievement of a positive cash flow.

Hambrick and Schecter (1983) argued against the dichotomy of classifying turnaround actions as "strategic" and "operational" since the distinction between classifications have blurred. The sample for their study is drawn from PIMS database[14]. The target sample was the available data over four years on all mature industrial-product

[14] Profit Impact of Market Strategies (PIMS) is a large scale statistical study of environmental, strategic, and performance variables of individual business units.

businesses[15] in the PIMS database. A total of 260 businesses met their required criterion for low performance including those that subsequently made performance improvements. Their cluster analysis indicated three primary successful turnaround actions: asset/cost surgery, selective product/market pruning, and a piecemeal strategy. Robbins and Pearce (1992) address the turnaround process in terms of retrenchment and recovery. In the retrenchment phase, they hypothesize firms seek to stabilize declining performance through reductions in costs and fixed assets. In the recovery phase, systematic investments are made to stimulate financial improvement. Their research design constrained their sample to firms that faced reasonably similar operating and competitive conditions. Their sample consisted of firms belonging to a single specific industry (Textile). They concluded that successful turnarounds were often a result of efficiency moves rather than of product-market changes or of market share increases.

Hoshi et al. (1990) find the financially distressed group of firms invest more and sell more than non-group firms in the years following the onset of financial distress; Asquith et al. (1994) analyze firms that issued junk bonds in the 1970s and 80s and subsequently experienced financial trouble. Consistent with Ofek (1993), their study shows that distressed firms undertake restructuring primarily by selling assets. Sharpe (1994) shows a statistically and economically significant relationship between a firm's financial leverage and the cyclicality of its labor force. He shows that firms that experience relatively high opportunity costs of capital during cyclical downturns are prone to reduce employment so as to conserve their working capital at such times. John et

[15] A mature business is defined by PIMS as one in an industry whose real growth is less than 10 percent annually, in which most potential buyers understand the product, and whose set of competitors is well known.

al. (1992) study a sample of large firms (firms with assets exceeding $1 billion) with a performance decline in the sample period (at least one year of negative earnings (1980-1987), followed by at least 3 years of positive earnings). They find strong evidence of changes in operations and investment to these performance shocks. These changes they find are result of voluntary actions by the firm managers and not in reaction to a threat of change in corporate control. Their study suggested that the firms retrenched[16] quickly, and on average concentrated their focus. In the year following negative earnings, average employment fell by about 5% and the average number of business segments declined. The arguments presented by the above two papers and others suggest that firms with declining performance often choose to sell assets as they go through the restructuring process.

Shleifer and Vishny (1992) discuss the nature of asset illiquidity especially in the context of distress firms. They argue that when firms have trouble meeting debt payments and sell assets, the highest valuation potential buyers of these assets are likely to be other firms in the same industry. But with the possibility of a contagion effect, these firms themselves are likely to have trouble meeting their debt payments. The other probable group of buyers of these assets, industry outsiders, would face agency costs of hiring specialists to run these assets and may fear overpaying for lack of proper knowledge of the assets characteristics. Hence when industry buyers cannot buy the assets and industry outsiders face significant costs of acquiring and managing the assets, assets in liquidation fetch prices below value in best use, which is the value when managed by specialist.

[16] Defined as reduction in firm assets and/or costs.

In addition to asset sales and layoffs, capital expenditure reductions also play a role in restructuring of a distressed firm. In examining financially distressed companies that previously issued high yield junk bonds, Asquith et al. (1994) show that eighty-three percent of firms reduce capital expenditures from the year before the onset of distress to the year after. Andrade and Kaplan (1998) examine the investment behavior of financially distressed firms that remain in good economic health. They find that firms in financial distress but in good economic health decrease their capital investment expenditures, sell assets at depressed prices, but do not undertake riskier investment projects.

Kane and Richardson (2002)'s sample of financial distress firms include firms that have high likelihood of impending failure but have not yet filed for bankruptcy protection. They consider such firms to no longer be 'going concerns'. Their focus is primarily on two potentially mitigating actions – growth or contraction of plant investment and the likelihood that either action will lead to emergence from financial distress, thereby reducing the risk of corporate failure. They conclude in favor of contraction stating that disinvestment increases the likelihood of the firm getting out of distress. Cleary et al. (2004) develop a model of a U-shaped relation between investment and internal funds. As is standard, the firm invests less when it faces a decrease in internal funds. For low levels of internal funds, however, the firm must invest more to generate enough revenues to meet its contractual obligations. Investments therefore form a U-shape over all internal fund levels. Moyen (2004) also graphs a U-shaped relation between investment and cash flows for unconstrained firms. In bad conditions, firms

invest more to generate more revenues next period, thereby decreasing the probability of defaulting and paying default costs.

Bhagat et al. (2005) document negative cash flow sensitivity for distressed firms with operating losses and a positive sensitivity for all other firms. They also show that the negative cash flow sensitivity is generated by distressed firms with operating losses that invest more than the previous years. These firms invest more when their cash flows are decreasing. They claim that this additional investment is made on account of funds raised by equity claimants and infer this as evidence of a gamble for resurrection. They also provide evidence consistent with an asset substitution problem only for the subset of financially distressed firms with operating losses that invest more than the previous year.

2.4 The Sample and Variables

2.4.1 The Sample Selection Process

The initial sample consists of all companies drawn from COMPUSTAT during the period 1989 to 2001 that had financial data available for six contiguous fiscal years. Three consecutive years of data is required to compute the measure of distress. The following three consecutive year restriction is needed to test the financial condition three years hence. The returns data is extracted from the CRSP database. Using Ohlson's methodology, probabilistic predictions of bankruptcy are computed for each firm year in the total sample. Following Bhagat, et al. (2005) firms with 50% or greater probability are counted as financially distressed firms. The total sample size of all distressed firms is 18,434 firm-years. The rest of the sample for which the probability of distress is less than 50% is treated as non-distressed firms for the respective years for which the probabilities are computed. The total sample size of all non distressed firms is 30,948 firm-years.

Schendel et al., (1975) provide a concrete definition of upturn as four consecutive years of increasing profits. Among Hofer's (1980) successful turnarounds, the average elapsed time from trough to peak was three years. Bibeault(1982) noted that the time required for a turnaround is a function of the size of the organization: "Altogether, we are talking about anywhere between one and three years, with a $20 million company taking one year and a company the size of Memorex taking three years". For this study, I am considering turnaround as a firm in distress in year t and out of distress t+3 years hence. Thus, for each year the firms are in distress, the measure of distress (O-score) is recomputed for all such firms three years hence. These two steps lead to the formation of my sample of firms that 'remain in distress' and firms that had 'successful turnaround'. This database now reflects each firm's financial position as healthy or in distress after the three year measurement period, identifying if the distress firm made a recovery three years after being classified as distressed. A total of 3,050 firm-years or 16.5% of the total distressed sample successfully completed a turnaround three years after entering distress. The control and test variables were also obtained from COMPUSTAT.

2.4.2 Control Variables

The empirical literature cited earlier with regard to turnaround strategies suggests that suitability and effectiveness of turnaround strategies are dependent on certain intrinsic factors. These factors are relevant to a firm's financial condition and impact the direction and intensity of decline or recovery. They are generally not altered significantly in magnitude by manager's actions in a short duration. Size is computed as log of total assets (Item #6); Leverage is computed as total liabilities divided by total assets (Item #181/#6); Operating Income standardized by total assets (item #13/#6); growth

opportunities for the firm proxied by Tobin's Q – and computed as market value of assets divided by book value of assets ({(#199 * #25) + #6 – (#60 + #74)} / #6) and cash holdings (#1).

2.4.3 Test Variables

The objective of this paper is to observe and identify those distinguishing managerial actions that contribute significantly towards a successful turnaround of a distressed firm. Based on the assumption that significant changes in managerial decisions will be reflected in the financial statements, I compute the changes observed in certain specific variables and analyze their impact on the firm's health three years hence. A time period of three years is allowed to pass by to study the impact of those decisions – a justifiably conservative approach for the manager's actions to work through the firm's operations. These specific factors have been addressed in earlier papers but either have yielded contrary results or have not been explained in regards to recovery from distress. For firms in distress, changes are observed and recorded for these following factors: (i) Change in acquisitions (item #129) ((Grinyer, Mayes and McKiernan, 1988), (ii) Change in capital expenditure (item #128) (Kang and Shivdasani, 1997, Bhagat, Moyen and Suh, 2005), (iii) change in working capital (item #4-#5) (Kang and Shivdasani, 1997), (iv) change in equity (item #216) (Slatter, 1984; John, Lang, and Netter 1992), (v) change in research and development (item # 46) (Guerard et al., 1987)[17] and (vi) change in net income (item #172) (Schendel et al., 1975). Table 14 discusses the variables to be used in this paper.

[17] Guerard et al, (1987) model R&D expenditures as a function of previous years' R&D expenses and hence use the raw changes in R&D expenditures when analyzing the corporate financial policy.

Table 14. Variable Construction

S.No	Variable Notation	Variable Description	Compustat Notation
1.	Size	Natural logarithm of total assets	$Ln(\#6_t)$
2.	Cash	Cash Holdings	$\#1_t$
3.	Tobin's Q	Market value of assets / Book Value of assets	$\{(\#199_t * \#25_t) + \#6_t - (\#60_t + \#74_t)\} / \#6_t$
4.	Leverage	Total Debt / Total Assets	$\#181_t / \#6_t$
5.	Operating Income.	Operating Income/Total Assets	$\#13_t / \#6_t$
6.	O-Score	Y_{it} = -1.32 - .407*(ln(TA)) + 6.03*TLTA – 1.43*WCTA + .757*CLCA – 2.37*NITA – 1.83*FUTL + .285*INTWO – 1.72OENEG - .521*CHIN	
		Ln(TA)	$Ln(\#6_t)$
		TLTA	$\#181_t / \#6_t$
		WCTA	$(\#4_t - \#5_t) / \#6_t$
		CLCA	$\#5_t / \#4_t$
		NITA	$\#172_t / \#6_t$
		FUTL	$\#110_t / \#181_t$
		INTWO	1 if $\#172_t$ & $\#172_{t-1}$ < 0; 0 otherwise.
		OENEG	1 if $\#181_t > \#6_t$; 0 otherwise.
		CHIN	$(NI_t – NI_{t-1})/(\|NI_t\| - \|NI_{t-1}\|)$
7.	Chg in R&D	$R\&D_{t+1} – R\&D_t$	$\#46_{t+1} - \#46_t$
8.	Chg in CAPX	$Capital\ Expenditures_{t+1} – Capital\ Expenditures_t$	$\#128_{t+1} - \#128_t$
9.	Chg in Acq.	$Aquisitions_{t+1} – Acquisitions_t$	$\#129_{t+1} - \#129_t$
10	Chg in WC	$Working\ Capital_{t+1} – Working\ Capital_t$	$(\#5-\#4)_{t+1}–(\#5-\#4)_t$
11.	Chg in Equity	$Shareholders'\ Equity_{t+1} – Shareholders\ Equity_t$	$\#216_{t+1} - \#216_t$
12.	Chg in NI	$Net\ Income_{t+1} – Net\ Income_t$	$\#172_{t+1} - \#172_t$
13.	Returns	Annual returns	CRSP Database

This table details the construction of the distress variable (based on the probabilistic predictions of bankruptcy as derived from Ohlson's score), control variables, and test variables.

2.5 Measures of Financial Distress

The goal is to use a method that reflects decline in performance leading to varying degree of financial distress. Prior research has considered negative net income as a sign of financial trouble with most of them having considered more than one year of negative net income to classify a firm as financially distressed. Some other methods applied to

capture the financial distress status of firms are as follows: Fazzari et al. (1988) consider firms with negative real sales growth as financially distressed firms. Wruck (1990) defines financial distress as a situation where cash flow is insufficient to cover current obligations. Hoshi et al. (1990) assume a firm is approaching distress when the ratio of operating income to interest expense (interest coverage) falls below one. Asquith, Gertner, and Scharfstein (1994) define financial distress in the most fundamental way, i.e., liquidation value of a firm's asset is less than the face value of the firm's liabilities. Ofek (1993) constructs a distressed firm sample by including firms that experience a year of average or above average performance (base year) followed by a year of very poor performance (distress year), defined as annual stock returns in the bottom decile of the market. Opler and Titman (1994) identify industries that have experienced economic distress and differentiate firms in those industries based on their leverage ratios. A 3-digit SIC industry is defined as being economically distressed when its median sales growth is negative and when it experiences median stock returns below -30%. Ciccone (2001) uses proxy for financial distress with a bottom line focus. He considers a firm in financial distress if it has losses, (i.e. $\text{earnings}_t < 0$), and earnings decline (i.e. actual annual $\text{earnings}_t <$ actual annual earnings_{t-1}).

In addition to the above measures a more comprehensive way to classify firms on the continuum is to compute the probability of a firm becoming bankrupt. The two methodologies most commonly applied in the literature are accounting-based measures of distress risk – (i) Z-score (Altman, 1968) and (ii) O-score (Ohlson, 1980). Altman (1968) investigates a set of financial ratios in bankruptcy prediction context using a multiple discriminant statistical methodology. Ohlson (1980) uses maximum likelihood estimation

of the so-called conditional logit model to predict corporate failure as evidenced by the event of bankruptcy. They identify four basic factors as being statistically significant in affecting the probability of failure within one year – (i) size; (ii) measures of financial structure; (iii) measures of performance; and (iv) measures of current liquidity.

In this paper, I use Ohlson's probabilistic prediction of bankruptcy measure very closely imitating Bhagat, Moyen and Suh's (2005) use of the same measure to identify firms in performance decline. This measure is based on Ohlson's predicted bankruptcy probabilities p, where

$$P = 1 / (1 + e^{-Yit})$$

$$Y_{it} = -1.32 - .407*(\ln (TA)) + 6.03*TLTA – 1.43*WCTA + .757*CLCA –$$

$$2.37*NITA – 1.83*FUTL + .285*INTWO – 1.72OENEG - .521*CHIN$$

Where TA is total assets (COMPUSTAT #s in parentheses) (#6); TLTA is total liabilities to total assets (#181/#6); WCTA is the ratio of working capital to total assets [(#4 - #5) / #6]; CLCA is the current liabilities to current assets ratio (#5/#4); NITA is net income to total assets ratio (#172/#6) and FUTL is fund from operations to total liabilities ratio (#110/#181). INTWO = 1 if net income (#172) is negative in previous two years or zero otherwise; ONEEG = 1 if total liabilities (#181) is greater than total assets (#6), 0 otherwise and CHIN is the ratio of the difference in net income of the current period with the previous period over the absolute value of the difference. $(NI_t – NI_{t-1})/ (|NI_t| - |NI_{t-1}|)$.

Table 15A. Non-Distressed vs. Distressed Firms - Summary Statistics

	Non-Distressed Firms		Distressed Firms		
Variable	Obs.	Mean	Obs.	Mean	Difference
Total Assets	30,948	5.4176	18,434	4.3947	1.0229***
Leverage	30,948	0.3911	18,434	0.6976	-0.3065***
Operating Income / TA	30,948	0.1239	18,434	-0.0429	0.1668***
Q	30,948	2.1071	18,434	2.3176	-0.2104
Cash	30,948	186.0336	18,434	51.9170	134.12***
O-Score	30,948	-1.9044	18,434	1.3788	-3.2832***

Ohlson's probabilistic prediction of bankruptcy measure is used to distinguish between healthy or distressed status. The measure predicts bankruptcy probabilities p, where
$P = 1 / (1 + e^{-Yit})$
Y_{it} = -1.32 - .407*(ln(TA)) + 6.03*TLTA – 1.43*WCTA + .757*CLCA – 2.37*NITA – 1.83*FUTL + .285*INTWO – 1.72OENEG - .521*CHIN
Wherein TA is total assets (COMPUSTAT #s in parentheses) (#6); TLTA is total liabilities to total assets (#181/#6); WCTA is the ratio of working capital to total assets [(#4 - #5) / #6]; CLCA is the current liabilities to current assets ratio (#5/#4); NITA is net income to total assets ratio (#172/#6) and FUTL is fund from operations to total liabilities ratio (#110/#181). INTWO = 1 if net income (#172) is negative in previous two years or zero otherwise; ONEEG = 1 if total liabilities (#181) is greater than total assets (#6), 0 otherwise and CHIN is the ratio of the difference in net income of current period with previous period over the absolute value of the difference. $(NI_t – NI_{t-1})/(|NI_t| - |NI_{t-1}|)$.

Size is computed as log of total assets (Item #6); Leverage is computed as total liabilities divided by total assets (Item #181/#6); Operating Income standardized by total assets (item #13/#6); Growth opportunities for the firm proxied by Tobin's Q – and computed as market value of assets divided by book value of assets ({(#199 * #25) + #6 – (#60 + #74)} / #6), Cash holdings (#1).

Following Bhagat, et al. (2005), this measure is obtained from a variant of Ohlson's bankruptcy probability model. Because the FUTL variable greatly restricts the sample size, pseudo-bankruptcy probabilities, ˜p, are calculated by ignoring the effect of FUTL in predicting bankruptcy probabilities:

$\tilde{p} = 1/ (1 + e^{-Y_{it}})$

Firms with declining performance and facing financial distress include firm-year observations with pseudo-bankruptcy probabilities greater than or equal to 50%. Panel A

of Table 15 compares the distressed sample used in this paper to a sample of non-distressed firm. This table justifies the choice of the distress measure (O-score) used in this paper in determining and labeling firms' financial condition as distressed or not distressed. I look at some important firm variables and see if the O-score appears to predict firms with distressed characteristics. By comparing the sample of firms not considered in distress with the firms that are considered in distress, we see the distressed sample appears to be accurately predicted by O-score. I further examine control variable to identify differences between a typical firm in distress as compared to a firm not in distress. Total asset size is a key variable in determining the distress level of firms, as shown by Gilchrist and Himmelberg (1995). The size of the firm is a proxy for both the flexibility and internal slack available to the declining firm. The firms in distress are expected to be of smaller size and this is observed using a measure of size, which is the natural log of total assets. Leverage is also a key determinant in distress level (Kaplan and Stein, 1993). It is expected that firms with higher leverage, on average, to be in distress more often. Consistent with this prediction the firms in distress have doubled the amount of leverage as compared to non-distressed firms in the sample.

Operating income is also an important determinant in figuring out firm distress level (Ciccone, 2001). Firms with lower and especially negative operating income on average will find themselves in distress. Consistent with the idea, firms identified as distressed have a negative operating income on average, while the non-distressed firms in the sample have positive operating income. A firm's Q, as a proxy for investment opportunities, does not appear to affect the firm's distress level (Opler and Titman, 1993).

Table 15B. Non-Distressed vs. Distressed Firms – Industry Concentration

	Distressed Firms		Non-Distressed Firms	
	SIC Code	% of sample	SIC Code	% of sample
Business Services	73	10.89%	73	9.15%
Chemicals and Allied Products	28	7.27%	28	9.38%
Electric, Gas and Sanitary Services	49	6.85%	49	3.64%
Electronic And Other Electrical Equipment And Components, Except Computer Equipment	36	6.72%	36	9.92%
Industrial And Commercial Machinery And Computer Equipment	35	6.34%	35	7.75%
Measuring, Analyzing, And Controlling Instruments; Photographic, Medical And Optical Goods; Watches And Clocks	38	5.92%	38	8.04%
Oil And Gas Extraction	13	4.94%	13	3.53%
Communications	48	4.36%	48	2.43%
Wholesale Trade-durable Goods	50	2.80%	50	2.68%
Eating And Drinking Places*	58	2.59%	-	-
Food And Kindred Products*	-	-	20	3.01%

The industry concentration for the top ten industries of distressed and non-distressed firms, respectively, are measured and reported here. A total of 18,434 firm-year sample size of distress firms and 30,948 firm-year non-distressed firm sample size is considered for the sample period of 1989-2004. Industry classification and description information is gathered from U.S. Department of Labor Occupational Safety & Health administration website manual. http://www.osha.gov/pls/imis/sic_manual.html

* Only top ten industries for distressed and non-distressed firms shown here.

Specifically, distressed firms have higher investment opportunities as defined by Q but not by a significant amount. Distressed firms hold a fraction of the cash as firms not in distress. John (1993) argues that firms hold more cash as avoidance to financial distress. Panel B of Table 15 examines the industry concentration of firms not in distress versus the industry concentration of firms that are in distress. The panel demonstrates that some industries have a higher probability of having firms in distress. The industry SIC

code with the highest concentration for the distressed sample is SIC code 73 (Business Services). This SIC code makes up almost 11 percent of the total distressed sample, while making up approximately 9 percent of the total non-distressed sample. In contrast, SIC code 36 (Electronics and other Electrical Equipment Components) makes up 6.72 percent of the distressed sample but almost 10 percent of the non-distressed sample. These results demonstrate the variation among different industries and the different levels of risk among industries (Hou and Robinson, 2006). Certain industries have a higher probability of firms entering distress than others. This highlights the need for industry controls.

2.6 Empirical Results

2.6.1 Sample Statistics and Univariate Tests

Table 16 examines the sample statistics for the whole sample of firms in distress for the given year, the firms that made it out of distress in a three year period and the sample of firms that did not make it out of distress in three years. The sample of firms that made it out of distress represents about 15% of the entire sample of firms in distress, while the remainder are firms that did not exit distress in the three year period. I compare the difference between the variables for the two types of firms to examine if these variables appear to estimate the successful exit from distress.

The results indicate firms making it out of distress in the three year period have significant differences on average than firms remaining in distress. Firms getting out of distress in a three year time period are larger in size as measured by total assets, have less leverage, and have higher cash holdings.

Table 16. Sample Statistics

Variable	Full Sample	Out of Distress	Still in Distress	Difference
Observations	18,434	3,055	15,379	-12,324
Size	4.3947	4.5577	4.3624	0.1953***
Leverage	0.6976	0.6204	0.7129	-0.0924***
Oper. Income / TA	-0.0429	-0.0152	-0.0484	0.0332**
Q	2.3176	2.1014	2.3604	-0.2590
Cash	51.9170	77.6547	46.8130	30.841***
Chg in R&D	0.8920	3.4126	0.2509	3.1617**
Chg in CAPX	0.5504	-5.3226	2.0408	-7.3634***
Chg in Acq.	-3.0196	-2.8534	-3.0618	0.2085
Chg in WC	8.7819	12.0342	7.9548	4.0795***
Chg in Equity	-1.3049	0.0682	-1.6542	1.7223
Chg in NI	18.6210	39.4163	13.3320	26.084***

Ohlson's probabilistic prediction of bankruptcy measure is used to distinguish between healthy or distressed firm status. The measure predicts bankruptcy probabilities p, where $P = 1 / (1 + e^{-Yit})$

$Y_{it} = -1.32 - .407*(\ln(TA)) + 6.03*TLTA – 1.43*WCTA + .757*CLCA – 2.37*NITA – 1.83*FUTL + .285*INTWO – 1.72OENEG - .521*CHIN$

Wherein TA is total assets (COMPUSTAT #s in parentheses) (#6); TLTA is total liabilities to total assets (#181/#6); WCTA is the ratio of working capital to total assets [(#4 - #5) / #6]; CLCA is the current liabilities to current assets ratio (#5/#4); NITA is net income to total assets ratio (#172/#6) and FUTL is fund from operations to total liabilities ratio (#110/#181). INTWO = 1 if net income (#172) is negative in previous two years or zero otherwise; ONEEG = 1 if total liabilities (#181) is greater than total assets (#6), 0 otherwise and CHIN is the ratio of the difference in net income of current period with previous period over the absolute value of the difference. $(NI_t – NI_{t-1})/(|NI_t| - |NI_{t-1}|)$.

Size is computed as log of total assets (Item #6); Leverage is computed as total liabilities divided by total assets (Item #181/#6); Operating Income standardized by total assets (item #13/#6); Growth opportunities for the firm proxied by Tobin's Q – and computed as market value of assets divided by book value of assets ({(#199 * #25) + #6 – (#60 + #74)} / #6), Cash holdings (#1).

The change variables are all computed as a first difference year (t+1) – (t). The year t is the year in which firm is identified as being in distress. The change variables are computed for Change in acquisitions (item #129); Change in capital expenditure (item #128); change in working capital (item #4-#5); change in equity (item #216); change in research and development (item # 46); and change in net income (item #172)

The next set of variables focus on changes made in the first year after a firm enters distress. The average change in R&D is significantly higher for firms getting themselves out of distress during the three year period. Thus, this finding suggests that distressed firms that increase their investment in R&D have a greater incidence of turnaround. Changes in other types of investments do not share this positive relation with successfully exiting distress. For example, changes in capital expenditures (CAPEX) are negative, as firms leaving the distress group have lower capital expenditures on average. Acquisitions do not appear to affect firms' ability to get out of distress, as change in acquisition level is not significantly different for the two samples. Working capital measures the firm's net position in liquid assets. Change in working capital is much higher for firms getting out of distress (Fazzari and Petersen, 1993). Selling equity does not appear to be different among the two groups, as they do not have a significant difference in changes in equity. The change in yearly net income is much greater for firms getting out of distress.

Table 17 provides a correlation matrix for all variables to be used in the regressions. This table examines the correlation between the independent variables. I find that the correlation coefficient between most of the variables is fairly low. One coefficient that does provide some concern is the relation of leverage and operating income standardized by assets. This variable has a correlation coefficient of 0.4225. This high correlation may cause issues in the regressions, so I run the main regression with and without both variables at the same time. Variance Inflation Factor (VIF) test were also run to analyze further if any multicollinearity existed among independent variables.

Table 17. Correlation Matrix

	Size	Leverage	Income/TA	Q	Chg in R&D	Chg in CAPX	Chg in Acq.	Chg in WC	Chg in Equity	Chg in NI
Size	1									
Leverage	0.0015	1								
	(0.8343)									
Income/TA	0.2095	-0.4225	1							
	(0.0000)	(0.0000)								
Q	-0.0954	0.1056	-0.1657	1						
	(0.0000)	(0.0000)	(0.0000							
Chg in R&D	0.0269	0.0031	0.0077	0.0006	1					
	(0.0008)	(0.7001)	(0.3386)	(0.9440						
Chg in CAPX	0.0100	0.0013	0.0042	0.0005	0.2959	1				
	(0.2151)	(0.8769)	(0.6047)	(0.9470	(0.0000)					
Chg in Acq.	-0.0491	-0.0024	-0.0007	0.0032	0.0154	0.0156	1			
	(0.0000)	(0.7632)	(0.9319)	(0.6931	(0.0560)	(0.0538)				
Chg in WC	0.0348	0.0047	0.0047	0.0009	0.1017	-0.1982	-0.0589	1		
	(0.0000)	(0.5593)	(0.5563)	(0.9081	(0.0000)	(0.0000)	(0.0000)			
Chg in Equity	-0.0151	-0.0074	0.0031	-0.0017	-0.0379	0.0537	0.1801	-0.0589	1	
	(0.0608)	(0.3573)	(0.6994)	(0.8341	(0.0000)	(0.0000)	(0.0000)	(.0139)		
Chg in NI	0.0997	0.0133	0.0006	-0.0024	0.1137	-0.1750	0.0175	0.2041	-0.0620	1
	(0.0000)	(0.0989)	(0.9417)	(0.7696)	(0.0000)	(0.0000)	(0.0000)	(0.0356)	(0.0000)	

This table provides data on the correlations between certain variable measures. The dataset is comprised of 30,948 firm year observations covering the period 1989 through 2004. Size is computed as log of total assets (Item #6); Leverage is computed as total liabilities divided by total assets (Item #181/#6); Operating Income standardized by total assets (item #13/#6); Growth opportunities for the firm proxied by Tobin's Q – and computed as market value of assets divided by book value of assets ({(#199 * #25) + #6 – (#60 + #74)} / #6), Cash holdings (#1). The change variables are all computed as a first difference year (t+1) – (t). The year t is the year in which firm is identified as being in distress. The change variables are computed for Change in acquisitions (item #129) capital expenditure (item #128); working capital (item #4-#5); equity (item #216); research and development (item # 46); and net income (item #172)

The largest VIF measure[18] was observed for the operating income variable (1.47) and the over-all mean VIF was 1.17.

2.6.2 Multivariate Tests

Table 18 shows a probit model measuring whether the firm has remained in distress, equaling zero, or if the firm has exited distress, equaling one. I use this probit model to measure the likelihood of the independent variables to explain which firms are more likely to exit distress. I find that many different ex ante variables measuring the condition of the firm and changes the firm makes over their first year of distress are significant in predicting the success of firms exiting distress. In the first column, I measure the condition of the firm with several controls and examine changes in assets and changes in financing. The regression coefficient for size, as measured by the natural log of total assets, is positive and statistically significant. Larger firms are more likely to get out of distress as compared to smaller firms. Leverage is negative and statistically significant in the regression with a coefficient of -0.6167. Firms with higher amounts of leverage are much less likely to come out of distress. High fixed payments make it extremely hard for firms to overcome distress. The coefficient for income over assets is negative and statistically significant and the coefficient for Q is insignificant in the regression.

The next set of variables measure changes that occur in the first year of distress to see if these changes increase or decrease the probability of the firm exiting distress. The change variables proxy the managers' 'turnaround' decisions in reaction to the financial distress. The first three variables measure if the firm's use of resources in the first year of

[18] Variance inflation factor (VIF) measures the impact of collinearity among the independent variables' in a regression model on the precision of estimation. Typically a VIF value greater than 10 is of concern.

distress impacts the distress status of the firm. Consistent with the univariate evidence, change in R&D is positive and significant. Firms that increase their R&D spending increase the likelihood of getting out of distress. Support for this result can be traced back to the arguments presented by Hofer (1980). Hofer categorizes turnaround strategies into two broad types: 'operating' and 'strategic'. 'Operating' turnaround strategies place emphasis on increasing revenues, decreasing costs, decreasing assets or a combination of these. 'Strategic' turnarounds involve either changing strategy for competing in the same line of business or calls for entering a new business. Hofer states that employing turnaround strategies to 'save' the existing business involves emphasis on functional area by increasing investments in marketing, production, and/or engineering. The observed increase in R&D spending by firms leading to successful turnaround can be attributed to 'strategic' turnaround technique employed by the management. The change in CAPEX coefficient is negative and significant, indicating that an increase in spending on capital expenditures decreases the likelihood of exiting distress. This result is consistent with the main results of Kane and Richardson (2002). The coefficient for change in acquisitions is insignificant, as the level of acquisitions by firms under distress does not impact distress status of the firm.

The next two variables measure if financing activities of the firm matter to the distress status of the firm. The coefficient of the change in working capital variable is insignificant. The coefficient for change in the amount of common or preferred stock is also insignificant. These variables display the irrelevance of a few of the financing activities of firms.

Table 18. Multivariate Tests: Probit Analysis

	(1)	(2)
Total Assets	0.0968	0.0920
	(0.00)	(0.00)
Leverage	-0.6167	-0.6172
	(0.00)	(0.00)
Income / TA	-0.0937	
	(0.02)	
Q	-0.0025	0.003
	(0.51)	(0.93)
Chg in R&D	0.0003	0.0003
	(0.05)	(0.05)
Chg in CAPX	-0.0002	-0.0002
	(0.01)	(0.01)
Chg in Acq.	0.0000	0.0000
	(0.97)	(0.99)
Chg in WC	0.0000	0.0000
	(0.89)	(0.87)
Chg in Equity	0.0000	0.0000
	(0.98)	(0.97)
Chg in NI	0.0001	0.0001
	(0.03)	(0.02)
Year Dummies	Yes	Yes
Industry Dummies	Yes	Yes
Constant	-0.4607	-0.4437
	(0.00)	(0.00)
Number of Obs.	14649	14649
Pseudo R-squared	0.055	0.054

The probit model measures whether the firm has remained in distress, equaling *zero*, or if the firm has exited distress, equaling *one*. A total of 18,434 distressed firm-year sample size is considered for the sample period of 1989-2004. Of these, 18,434 distressed firm-year sample size 3,040 firm-years exit financial distress condition over three year time period. Size is computed as log of total assets (Item #6); Leverage is computed as total liabilities divided by total assets (Item #181/#6); Operating Income standardized by total assets (item #13/#6); Growth opportunities for the firm proxied by Tobin's Q – and computed as market value of assets divided by book value of assets ({(#199 * #25) + #6 – (#60 + #74)} / #6), Cash holdings (#1). The change variables are all computed as a first difference year (t+1) – (t). The year t is the year in which firm is identified as being in distress. The change variables are computed for Change in acquisitions (item #129); Change in capital expenditure (item #128); change in working capital (item #4-#5); change in equity (item #216); change in research and development (item # 46); and change in net income (item #172).

Change in net income looks to capture if year one performance has an impact on the firm distress status. This variable is positive and statistically significant as a good first year in terms of better income will increase the likelihood of firms getting out of distress. Both year and industry dummies were used in this regression.

Given a potential issue with multicollinearity I drop operating income to total assets in column (2) of the regression to ensure that the earlier results are accurate. Dropping this variable does not change any of the major results in column (1). After illustrating the predictive ability of distress I then focus my attention on why that is important.

The previous result showing increased investment in R&D is associated with greater likelihood of turnaround seems plausible for higher growth firms for which investments in technology can add value to the firm. It is of interest to investigate whether the R&D finding is driven by high growth firms, or whether increased investment in R&D assists in turnaround for non high growth firms as well. Thus, to further understand the role of increased R&D expenditures in aiding distressed firms' recovery , the probit model was run after dividing the sample into three distinct groups. Using the Q values, firms were differentiated into high, average and low growth firms. Firms with Q values greater than 2 were categorized as high growth firms. Firms with Q value between 1 and 2 were categorized as average growth firms and finally firms with Q value less than 1 were place in low growth category. 3,739 firm-years (25%), 7,749 firm-years (51%), and 3695 firm-years (24%) respectively was the each sub-group sample size. The results of this probit regression are shown in Table 19. The findings are similar

to that of the total sample regression of table 18. For all three groups, I observe that probability of turnover increases with size and decreases with increase in leverage.

Table 19. Multivariate Tests: Sample Differentiated by Growth Opportunities

	Hi_Growth	Avg_Growth	Lo_Growth
Total Assets	0.0523	0.1288	0.1344
	(0.001)	(0.000)	(0.000)
Leverage	-0.2013	-1.2018	-1.4735
	(0.000)	(0.000)	(0.000)
Income / TA	0.0345	0.1640	0.1258
	(0.008)	(0.069)	(0.100)
Q	0.0028	0.0697	0.0773
	(0.493)	(0.299)	(0.683)
Chg in R&D	0.00001	0.00025	0.00020
	(0.294)	(0.077)	(0.039)
Chg in CAPX	-0.0011	-0.0001	-0.0007
	(0.065)	(0.005)	(0.061)
Chg in Acq.	0.00007	0.00002	0.00008
	(0.948)	(0.766)	(0.850)
Chg in WC	0.00004	0.00002	0.00002
	(0.807)	(0.756)	(0.761)
Chg in Equity	-0.00008	-0.00009	-0.00002
	(0.281)	(0.366)	(0.472)
Chg in NI	0.00022	0.00003	0.00003
	(0.012)	(0.057)	(0.030)
Year Dummies	Yes	Yes	Yes
Industry Dummies	Yes	Yes	Yes
Constant	-0.688	-0.4437	-0.3740
	(0.003)	(0.017)	(0.096)
Number of Obs.	3739	7749	3695
Pseudo R-squared	0.055	0.0770	0.0734

The probit model measures whether the firm has remained in distress, equaling *zero*, or if the firm has exited distress, equaling *one*. The sample size is 18,434 distressed firm-year for the period of 1989-2004. Of these 3,040 firm-years exit financial distress condition over three year time period. The sample here is separated into three groups by their growth ranking. Firm-years with Q greater than 2 are grouped under "Hi-Growth", between 1 and 2 Q value firms are considered here as average growth and firms with Q less than 1 are the Low Growth firms. Size Ln(Item #6); Leverage (Item #181/#6); Operating Income standardized by total assets (item #13/#6); Growth opportunities for the firm proxied by Tobin's Q – and computed as market value of assets divided by book value of assets ({(#199 * #25) + #6 – (#60 + #74)} / #6), Cash holdings (#1). The change variables are all computed as a first difference year (t+1) – (t). The year t is the year in which firm is identified as being in distress. The change variables are computed for Change in acquisitions (item #129); Change in capital expenditure (item #128); change in working capital (item #4-#5); change in equity (item #216); change in research and development (item # 46); and change in net income (item #172).

Increase in operating income increases the probability of successful turnover and hence I observe positive and significant coefficient for all three sub-groups. The important test variable, the change in R&D expenditures, shows a positive coefficient for all three groups but is significant only for average and low growth firms at 8% and 4% level, respectively. These findings suggest that firms with low to average growth opportunities who increase their investments in R&D may be able to recover from distress by focusing on product innovations or by improving the efficiency of their operations by investments in technology (e.g., through automating aspects of the production process). . The benefit of increasing R&D for high growth firms is not as distinct, perhaps because the degree of R&D spending in more rapidly growing firms is already relatively high.

While it is expected that firms that are able to exit distress will perform better than firms that remain in a distress state, it is still of interest to measure the value of exiting distress from a shareholder wealth perspective. Are the returns for firms out of distress significantly higher than those for firms that linger in a distress state, or is the difference in performance only marginal? Table 20 (Panel A) measures the three year return for the group of firms able to get out of distress and the firms still in distress for each individual year. The results of this table demonstrate the importance of exiting distress. For the entire sample, firms that can make it out of distress perform significantly better in terms of three-year returns as compared to the firms unable to emerge from distress. The difference in three-year returns between the out of distress versus the sample remaining in distress is around 37 percentage points. I also examine the three-year return for each year individually. I find the same result holds over each individual year over the

whole sample period. I do notice a variation of the return difference over time but each year is significantly greater for sample of firms that are able to make it out of distress. Each year is significant at the 1% level with the exception of 1996, which is significant at the 10% level.

Table 20A. Comparison of 3-Year Returns for the two Samples and Over Time

Time Period	Out of Distress	Still in Distress	Difference
Full Sample	1.0787	0.7049	0.3738***
1989	1.1809	0.4948	0.6861***
1990	1.5521	1.1512	0.4009***
1991	0.9219	0.6272	0.2947***
1992	0.8561	0.5541	0.302***
1993	0.9388	0.4425	0.4963***
1994	1.0273	0.6923	0.3358***
1995	1.0470	0.3851	0.6619***
1996	0.7796	0.6381	0.1415*
1997	1.0935	0.4496	0.6439***
1998	1.1967	0.7292	0.4675***
1999	0.8825	0.1967	0.6858***
2000	1.4593	1.0235	0.4358***
2001	1.2478	0.9472	0.3006***

The returns are acquired from CRSP database. A total of 18,434 distressed firm-year sample size is considered for the sample period of 1989-2004. Of the 18,434 firm-year 3,040 firm-years exited out of distress. The returns shown here are *three-year* returns. The *'out of distress'* column tabulates *three-year* returns for the total sample for firms that were in distress at certain point in time and three years hence had a successful turnaround. The *'still in distress'* column lists *three-year* returns of firms that were in distress at certain point in time and continued to be in financial distress post three years.

Further panel B of Table 20 uses abnormal returns computed over three year period using market adjusted returns. It is observed that the interpretation of panel A continues to hold even when abnormal returns are used in place of three-year buy and hold returns. The results for the three-year returns provide two findings for the paper.

Table 20B. Comparison of 3-year Abnormal Returns for the two Samples and Over Time

Time Period	Out of Distress	Still in Distress	Difference
Full Sample	0.4124	0.1703	0.2421***
1989	0.6809	0.1403	0.5406***
1990	0.3060	0.1989	0.1070
1991	0.2640	0.1572	0.1069
1992	0.1301	0.0096	0.1205*
1993	0.3801	0.0800	0.3001***
1994	0.3286	0.0793	0.2492***
1995	0.5599	0.0754	0.4845***
1996	0.1341	0.1313	0.0028
1997	0.2967	0.1860	0.1106*
1998	0.4052	0.0480	0.3573***
1999	0.7537	0.2189	0.5348***
2000	0.6187	0.3995	0.2193*
2001	0.7764	0.5764	0.2000**

The returns are acquired from CRSP database. A total of 18,434 distressed firm-year sample size is considered for the sample period of 1989-2004. Of the 18,434 firm-year observations 3,040 firm-years exited out of distress. The returns shown here are *three-year* abnormal returns. The *'out of distress'* column tabulates *three-year* abnormal returns for the total sample for firms that were in distress at certain point in time and three years hence had a successful turnaround. The *'still in distress'* column lists *three-year* abnormal returns of firms that were in distress at certain point in time and continued to be in financial distress three years hence.

First, the market seems to agree with the O-score identification that these firms are indeed doing better than firms still in distress. So, three-year returns and the corresponding abnormal returns are much higher for firms exiting distress. Also, in table 20 I define predictable ex-ante firm characteristics that can help us explain whether or not a firm increases their likelihood of getting out of distress. These predictable characteristics could help us identify firms, which are more likely to exit distress and have strong three-year returns. This could possibly increase the risk-return tradeoff for investors looking to find investment on riskier firms that are currently in distress.

2.7 Conclusions

In this paper, I find firm turnaround is predictable with ex ante variables. Both firm characteristics and investment decision affect a firm's likelihood to exit financial distress. Size, leverage, and income level at the time of distress all impact firm distress level. The primary result of the paper suggests that firms can take timely actions in response to distress. Investments in product development through research and development spending increase the probability of a firm making a successful turnaround. Further, I find that this increased R&D investment is even more important for firms with average and low growth opportunities. Other results, such as the relationship between capital expenditure reductions and recovery from distress, are consistent with previous studies. The finding suggest that firms may be able to increase the likelihood of exiting distress by reducing capital expenditures and making investments in research and development which can lead to increased production efficiency or product innovations. Financial decisions do not have a significant effect on successful firm turnaround, suggesting that financing strategies during distress are not important in determining the success of a turnaround.

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