THREE ESSAYS IN CORPORATE FINANCE

THREE ESSAYS IN CORPORATE FINANCE

by

UMAR REHAN BUTT, B.A., M.P.A, M.B.A.

A Thesis

Submitted to the School of Graduate Studies

in Partial Fulfilment of the Requirements

for the Degree of

DOCTOR OF PHILOSOPHY

McMaster University

DOCTOR OF PHILOSOPHY (2012) McMaster University

(Business Administration - Finance) Hamilton, Ontario

Title: Three Essays in Corporate Finance

Author: Umar Rehan Butt, B.A. (University of the Punjab), M.P.A. (University of the Punjab), M.B.A. (West Texas A&M University)

Supervisors: Professor Trevor Chamberlain

Professor Sudipto Sarkar

Professor Jiaping Qiu

Number of Pages: x, 186

Abstract

This thesis focuses on three important topics in corporate finance: corporate governance, management efforts to avoid debt covenant violations and the cost of such violations. The thesis adds to these aspects of the finance literature and the findings are reported in chapters two, three and four.

The second chapter focuses on the role of corporate governance in determining the interactions between financial leverage and profits and attests to the validity of the trade-off theory of capital structure. It examines management's financing choice behaviour in distinctly different corporate governance settings to ascertain the effect of governance mechanisms on such behavior. The estimation methodology allows for financial leverage, profits and governance to be determined jointly, using an instrumental variable approach. The results of the paper demonstrate that leverage is increasing in profits when controlled for agency problems, and good governance firms exhibit the results predicted by the trade-off theory of capital structure.

The third chapter examines management's earnings manipulation activities around debt covenant violation through accrual manipulation and real earnings management. Covenant restrictions are expected to influence these activities in the quarters surrounding and the quarter of the violation. Cross-sectional analyses reveal the use of such strategies to report higher earnings in the periods

surrounding the covenant violation. The results also show disparity in the use of accrual based and real earnings management techniques.

The fourth chapter investigates the relation between debt covenant violation and the cost of new borrowing from three different aspects: the incidence of violation, the timing of violation and the frequency of violation. The results show that there are significant benefits to not violating a debt covenant and violators are penalized by the creditors for not upholding the contractual restrictions.

Acknowledgements

I would like to thank my thesis supervisor, Dr. Trevor W Chamberlain, for providing constant guidance, support and encouragement that made it possible for me to complete my doctoral program. I was fortunate to have a supervisor who led me through the whole process. It was indeed a pleasure working under his supervision.

I would also like to thank my PhD committee members, Dr. Sudipto Sarkar and Dr. Jiaping Qiu. This thesis would not be in its present form without their constant guidance and recommendations. I have benefitted immensely from their vast expertise and invaluable comments and would like to acknowledge their timely feedback on methodology and substance of the papers.

A very special thanks to my friends and classmates in the PhD program: Rahman Khokhar, Hesam Shahariari and Andrew Carrothers. I truly appreciate their support in discussing research topics, attending my seminars and providing assistance with research methodology, statistical techniques and use of statistical software. I have learned a lot from them, and their company and support made things easier in the journey of my doctoral studies.

Finally I would like to extend my gratitude towards my family. I would like to thank my daughter, Mishaal, for understanding why I missed parent-teacher meetings at her school; my son, Mohammad, for jumping with joy after seeing me at the end of the day; and my wife, Shumaila, for surviving my mood

swings as a result of the pressures of the PhD program and for giving direction to my life. I would have never been able to finish the program without my family.

Contents

List of Tables

List of Figures

Chapter 1

1. Introduction

This thesis focuses on three important topics in corporate finance: corporate governance, management efforts to avoid debt covenant violations and the cost of such violations. It comprises three essays that document the importance of governance mechanisms in testing for the validity of the trade-off theory of capital structure, manipulation of accounting based and operational activities to avoid debt covenant violation and the cost of violating contractual obligations in debt contracts.

The first essay investigates the validity of the trade-off theory of capital structure and examines the importance of different corporate governance mechanisms on the financing choices of the firm to fund its operations. This study relies on prior research on the savings obtained for shareholders as a result of the tax deductibility of interest. Graham (2000) and Binsenbergen et al (2010) estimate these tax savings as accounting for 9.7 percent and 10.4 percent of firm value respectively. The main objective of the essay is to test the trade-off theory of capital structure, which has been rejected in earlier research, for example, by Myers (1993) and Fama and French (2002), in different governance settings. It builds on later research, for example, by Frank and Goyal (2009), who suggest that prior authors may have misinterpreted their results. The essay follows Florackis and Ozkan (2009), who proposed a positive relationship between

effective governance and financial leverage, and provide empirical evidence of the trade-off theory of capital structure.

Early research on the trade-off theory of capital structure implicitly assumed that agency problems do not exist, and that the nature of the principal-agent relationship does not influence a firm's choice of external financing. However, management's inadvertent inefficiency[1] or deliberate decisions[2] may be the reason for the limited use of debt financing and a subsequent rejection of the trade-off theory of capital structure. Management also tends to avoid fixed payments as they limit its discretion over the use of the firm's resources (Donaldson, 1963; Myers, 1977). Additionally, debt covenants reduce management's discretion over resources (Nini et al, forthcoming).

This study builds on the assumption that managers who operate in a good governance environment, where their interests are aligned with those of shareholders, are inclined to issue more debt to save taxes for the shareholders. Hence, an increase in the debt ratio as a result of an increase in profits would support the trade-off theory of capital structure. Following Fama and French (2002) and Frank and Goyal (2009), this study tests for the validity of the trade-off theory of capital structure and identifies endogeneity concerns, which have

[1] Myers (1977) suggested that management may be following the established financing patterns of the firm and that this has resulted in the limited use of debt financing

[2] Titman and Wessels (1988) proposed that managers may be intentionally using equity financing to avoid the discipline provided by debt financing in the form of limited consumption of excessive perquisites.

been overlooked in the existing literature. This essay contributes to the literature in the following ways.

First, this is the first study to provide evidence that good governance firms signify a positive relationship between profits and financial leverage and that once controlled for feedback from dictatorship firms, the relationship between profits and financial leverage is positive for all firms. The results are robust to a number of tests including instrumental and interaction variable regressions and are further strengthened by the finding that good governance firms are more active in debt issuance and retirement. Second, the paper highlights profits, in addition to governance, as an endogenous variable and provides a methodology to control for endogeneity issues arising from profits, governance and the interaction of profits and governance. Third, the paper identifies the difference in management's varying use of size and tangible assets, to obtain debt financing, for firms operating in different governance settings. After exploring the data and incorporating corporate governance, the essay concludes that the trade-off theory of capital structure is valid once controlled for agency problems.

The second essay examines both accrual based and real earnings management activities around debt covenant violation. Earlier research (e.g. Watts and Zimmerman, 1986) suggest that management makes income-increasing choices to avoid covenant violations and that these choices center around the period of covenant violation. Managers manipulate earnings through the use of accruals and engage in activities such as cost allocation to avoid auditor scrutiny.

Accrual based earnings management focuses on the use of total and working capital accruals to shift earnings to the quarter of covenant violation to avoid breaking contractual agreements. The accounting choices made by managers to avoid such violations persist, at least in the short run, to avoid suspicion from auditors (Sweeney, 1994). Real earnings management focuses on activities such as reducing discretionary expenses, spreading overhead costs over a higher level of inventory to reduce production costs and accelerating sales through the use of price discounts or lenient credit term. Graham et al (2005) and Cohen et al (2008) find that managers prefer real earnings management to accrual-based earnings management since real earnings management is less likely to be observed by auditors, particularly in the post Sarbanes-Oxley Act period. Despite recent interest in real earnings management, the literature has not focused on whether firms engage in such activities around the covenant violation period. This essay contributes to the literature in the following ways.

First, this is the first study to use ex post knowledge of debt covenant violation to test the debt covenant hypothesis. Due to the cost of accessing actual debt covenant violation information, related research (e.g. Begley, 1990) has generally used a proxy for the violation of covenants. The most frequently used proxy is the leverage ratio and researchers have tested a debt/equity hypothesis instead of the debt covenant hypothesis. Second, this is the first study to provide evidence of real earnings manipulation around the period of covenant violation.

Third, this paper also provides evidence on the disparity of such activities around the period of debt covenant violation.

To observe manipulation of earnings through accrual based earnings management, following Jones (1991) and DeFond and Jiambalvo (1994), the study calculated abnormal levels of total and working capital accruals. The results indicate that managers engage in accrual based earning management in the period preceding, the period of and the period following a covenant violation. The findings, in accordance with expectations, suggest a positive manipulation in accruals and highlight positive total and working capital accruals in the three periods.

To observe manipulation of income through real earnings management activities, following Roychowdhury (2006), the study estimates abnormal levels of discretionary expenses, production costs and operating cash flows. The results indicate that management engages in real earnings management in the period surrounding covenant violation. However the manipulation is limited by the discretion managers have over the type of real earnings management technique employed[3]. The abnormal levels of discretionary expenses are found to be negative in the period prior to, the period of and the period following a covenant violation. The abnormal levels of production costs are positive in the period of the covenant violation and then reverse in the period following the violation. The results indicate that management has less discretion over this real earnings

[3] For example, managers may have more discretion over reducing discretionary expenses than over increasing production costs, thereby reducing cost of goods sold, over subsequent quarters.

management technique because overproducing for a subsequent period will inflate inventory levels and arouse suspicion. The abnormal levels of operating cash flows are found to be negative (as per expectations), though insignificant, in the period of covenant violation. The abnormal levels are positive and significant in the period following the violation. Evidence suggests that there is disparity in the use of accrual based and real earnings management as management enjoys different levels of discretion over these activities.

The third essay investigates debt covenant violation and provides the first explicit estimates of the cost of such violations. Earlier research (for example, Beneish and Press, 1993; DeFond and Jiambalvo, 1994) find that the cost of debt covenant violation is substantial, and show that firms go to great lengths to avoid such violations. The reporting of a violation also prompts creditors to intervene and suggest remedial changes. The costs of such an intervention are often substantial and may lead to the accelerated repayment of debt (Dichev and Skinner, 2002). This essay contributes to the literature by exploring three aspects of covenant violation and estimating their impact on the cost of a new bond issue.

First, the study explores the difference in the cost of debt between new bond issues by firms that violated debt covenants and firms that did not violate debt covenants. The underlying premise is that violating firms will have a higher cost of debt than non-violating firms. Second, the emphasis is focused on the timing of the bond issue with respect to the violation of a covenant. There are two expectations with respect to the timing of debt covenant violation. Firms which

violate a debt covenant in the quarter of the bond issue are expected to have a higher cost of debt compared to firms that did not violate a debt covenant. Additionally, firms that violate a covenant in the quarter preceding the bond issuance likely have an even higher cost of debt than firms that either did not violate a debt covenant or violated a debt covenant in the quarter of the bond issue. Third, the paper looks at the frequency of covenant violation and centers on three outcomes. First, firms that violate one debt covenant are expected to have a higher cost of debt than firms that do not violate a debt covenant. Second, firms that violate covenants more than once will likely have a cost of debt that is higher than firms that do not violate a debt covenant or violate a debt covenant only once. Third, the study documents the increase in the cost of debt as a result of an increase in the number of violations.

The results indicate that debt covenant violations are associated with significant increases in the costs of new borrowing. First, violating firms are found to have a higher cost of borrowing than non-violating firms and the results are robust to alternative definitions of the cost debt. Second, the timing of a covenant violation is important with respect to the cost of debt. In particular, firms that report a covenant violation in the quarter of the bond issue have a cost of debt that is higher than firms that do not report a covenant violation. Additionally, firms that violate a debt covenant in the quarter preceding the quarter of the violation have a cost of debt that is not only higher than that of non-violating

firms, but also higher than that of firms that violate a debt covenant in the quarter of the bond issue.

The results also indicate that the frequency of debt covenant violation influences the cost of debt as follows: Firms that violate a debt covenant once have a higher cost of debt than firms that do not violate a debt covenant. In addition, firms that violate debt covenants frequently have a cost of debt that is not only higher than that of firms that do not violate a debt covenant but also higher than that of firms that violate a debt covenant once. The results also indicate that the cost of debt increases proportionally with the number of violations reported. The study concludes that there are substantial costs to debt covenant violation and market participants penalize firms for not meeting their contractual obligations.

References

Begley, J. (1990): Debt covenants and accounting choice, *Journal of Accounting and Economics* 12, pp. 125-139

Beneish, Messod D., and Eric Press (1993): Costs of Technical Violations of Accounting-Based Debt Covenants, *Accounting Review* 68, pp. 233-257

Binsebergen, Jules H. van, John R. Graham, and Jie Yang (2010): The Cost of Debt, *Journal of Finance* 65, pp. 2089-2136

Cohen, D.A., A. Dey and T. Lys (2008): Real and accrual based earnings management in the Pre and Post Sarbanes Oxley period, *Accounting Review* 83, pp. 757-787

DeFond, M.L., and J. Jiambalvo (1994): Debt Covenant Violation and Manipulation of Accruals, *Journal of Accounting and Economics* 17, pp. 145-176

Dichev, Ilia D. and Douglas J. Skinner (2002): Large-Sample Evidence on the Debt Covenant Hypothesis, *Journal of Accounting Research* 40, pp. 1091-1122

Donaldson, G. (1963): Financial Goals: Management vs. Stockholders, *Harvard Business Review* 41, pp. 116-129

Fama, Eugene F., and Kenneth R. French (2002): Testing Trade-Off and Pecking Order Predictions about Dividends and Debt, *Review of Financial Studies* 15, pp. 1-33

Florackis, Chrisostomos, and Aydin Ozkan (2009): Managerial incentives and corporate leverage: Evidence from the United Kingdom, *Accounting & Finance* 49, pp. 531-553

Frank, Murray Z., and Vidhan K. Goyal (2009): Capital Structure Decisions: Which Factors are Reliably Important?, *Financial Management* 38, pp. 1-37

Graham, John R. (2000): How Big are the Tax Benefits of Debt? *Journal of Finance* 55, pp. 1901-1941

Graham, John R., C.R. Harvey and S. Rajgopal (2005): The economic implications of corporate financial reporting, *Journal of Accounting and Economics* 40, pp. 3-73

Jones J. (1991): Earnings management during import relief investigations, *Journal of Accounting Research* 29, pp. 193-228

Myers, Stewart C. (1977): Determinants of Corporate Borrowing, *Journal of Financial Economics* 5, pp. 147-175

Myers, Stewart C. (1993): Still Searching for Optimal Capital Structure, *Journal of Applied Corporate Finance* 6, pp. 4-14

Nini, Greg, David C. Smith and Amir Sufi (forthcoming): Creditor Control Rights, Corporate Governance, and Firm Value, *Review of Financial Studies*

Roychowdhury, S. (2006): Earnings management through real activities manipulation, *Journal of Accounting and Economics* 42, pp. 335-370

Sweeney, A.P. (1994): Debt-covenant violations and managers' accounting responses, *Journal of Accounting and Economics* 17, pp. 281-308

Titman, Sheridan, and Roberto Wessels (1988): The Determinants of Capital Structure Choice, *Journal of Finance* 43, pp. 1-19

Watts, R.L. and J.L. Zimmerman (1986): Positive Accounting Theory, Englewood Cliffs, NJ: Prentice Hall

Chapter 2

Profits, Financial Leverage and Capital Structure

2.1. Introduction

The question of how firms finance their operations and the reasons for using alternate sources of financing are longstanding questions in the finance literature. Prior research suggests that the use of debt yields tax savings, which accrue to shareholders (Modigliani and Miller, 1963; Baxter, 1967). Graham (2000) and Binsebergen et al (2010) estimate these tax benefits as accounting for 9.7 percent and 10.4 percent of firm value respectively. If taxes are the only factor considered, the deductibility of income taxes by corporations should result in debt converging to nearly one hundred percent of capital (Solomon, 1963). This is not observed in practice as bankruptcy costs limit the use of debt, though Miller (1977) contends that the existence of unlevered firms is hard to fathom even with the presence of bankruptcy costs. This entails that a profitable firm should have debt in its capital structure and even in the presence of bankruptcy costs firms should increase their debt in line with profits to save taxes for the shareholders. Besides saving taxes, financial leverage acts as an internal governance mechanism to reduce the costs of agency conflict (Jensen and Meckling, 1976). Despite the apparent attractiveness of debt, earlier studies suggested that there was a negative relationship between profits and financial leverage, and this discredited the trade-off theory of capital structure (Myers, 1993; Fama and French, 2002). Given the theoretical advantages

of debt, the empirical negative relationship between profits and financial leverage needs to be addressed.

The most important assumption among the existing theories of capital structure has been the non-existence of an agency problem, even though the nature of the principal-agent relationship may determine a firm's choice of capital structure. Managers may not actively seek the optimal use of debt in the capital structure and this lower than expected use of debt may be associated with management inefficiency. Miller (1977) argued that firms fall into financial patterns[4] that have no material effect on the value of the firm, and that such 'neutral mutations', which serve no function but do no harm either, can persist indefinitely. In the presence of information asymmetry and a costly agency problem, the use of better corporate governance practices reduces the cost of debt (Cremers et al, 2005; Klock et al, 2005), leading to a positive relationship between effective corporate governance and financial leverage (Florackis and Ozkan, 2009). Therefore the governance structure of a firm plays an important role in determining its choice of capital structure.

The objective of this paper is to investigate the interactions between profits and financial leverage in distinctly different external corporate governance settings. I investigate the role of corporate governance in analyzing the sources of financing used by managers and hypothesize that these governance mechanisms act as incentives to encourage managers to act in the best interests of shareholders

[4] Miller defined "financial patterns" as a firm's use of debt and equity for its financing needs.

by issuing debt when the profits of the firm increase. The contribution of this paper is that it identifies corporate governance as the factor that affects financing choices and provides insight for further research on the trade-off theory of capital structure in a corporate governance environment.

The main objection to the trade-off theory has been the negative empirical relationship between profits and financial leverage observed by Myers (1993) and Fama and French (2002). In this paper, I contend that this relationship is a result of management's reluctance to commit to fixed interest payments as it tends to avoid contracts that bind the firm to making a fixed cash outlay. Additionally, debt covenants also reduce management discretion over resources, and managers are therefore inclined to use either internally generated funds or outside equity for future investment prospects. This leads to the assertion that empirical evidence of a negative relationship between profits and financial leverage would not be found in the case of firms that have an adequate governance mechanism in place. I hypothesize that firms with strong corporate governance mechanisms, henceforth referred to as democratic firms, will display a positive relationship between financial leverage and profits, whereas firms with weak corporate governance mechanisms, henceforth referred to as dictatorship firms, will exhibit a negative relationship between financial leverage and profits.

In particular, I investigate how agency problems affect the use of debt to fund the financing requirements of the firm. The empirical analyses of this paper are conducted in two environments and two stages. The environments encompass

the governance structures in which the firms operate. To create a proxy for governance, I use an index of shareholder rights, developed by Gompers, Ishii, and Metrick (2003), referred to hereafter as the G-Index. The data are segregated into democratic and dictatorship portfolio firms using the bottom and top deciles of the G-Index following Gompers et al (2003). I find that firms experience a significant change in the leverage ratio as a result of a change in the G-Index, suggesting that corporate governance has an impact on the capital structure of the firm. The variation in the governance structures result in a leverage ratio that is approximately sixty-six percent higher for good governance firms than poor governance firms, when controlled for profits.

In the first stage of the analysis, I investigate the use of leverage by democratic and dictatorship firms and hypothesize that in the presence of agency costs, the use of better corporate governance practices leads to more use of debt when profits are standardized for the two classifications of firms (democratic and dictatorship firms). The relationship is not hypothesized to be strictly monotonic in profit as managers would only issue debt, instead of using internally generated funds, when the benefits from debt outweigh the cost of debt issuance. Additionally, I expect a strong link between financial leverage and profits in line with prior literature, but expect the corporate governance settings to steer the nature of the relationship. I predict that the relationship between financial leverage and profits is positive at low values of the G-Index (democratic firms) and negative at high values of the G-Index (dictatorship firms). These predictions

are based on the view that a strong governance structure leads to a better alignment of the interests of the managers and shareholders and vice versa. This is because managers are expected to avoid increasing leverage in an attempt to minimize the discipline provided by debt, and good governance structures are expected to diminish such agency costs.

In the second stage of the analysis, I address endogeneity concerns and adopt methods to control for endogenous feedback from the regressors. I note that the association between financial leverage and profits identified earlier raises the question of simultaneity and hence needs to be dealt with. Prior literature has identified profits as a determinant of financial leverage; however, the argument for saving taxes (thereby increasing profits) as a result of using debt suggests that profitability is endogenous (in the form of reverse causality). Another reason for potentially biased estimators is the endogeneity of corporate governance. For example, it could be that a third factor could drive both the governance environment and the relationship between financial leverage and profits (missing variables bias). I attempt to control for the potential problem of endogeneity using an instrumental variables technique. The instruments were used for profits, governance and the interaction of profits and governance. The relationship was also tested using interaction variables, and the results are robust to instrumental variable and interaction variable specifications.

The results indicate that democratic firms exhibit a significant positive relationship between profits and financial leverage while dictatorship firms

exhibit an inverse relation. The results also indicate that once controlled for the feedback from dictatorship firms, profits exhibit a significant positive relationship with financial leverage. The results are robust to a number of tests, including tests aimed at mitigating concerns about endogeneity between governance, leverage and profits, including regressions that employ an instrumental variables technique and an interaction variables approach. Overall, the results suggest that governance structures play an instrumental role in determining the choice of external financing used by managers.

After analyzing the long term debt issuance and retirement data I find that the magnitude and frequency of debt issuance by democratic firms is far greater than that of dictatorship firms and that the mean value of year-to-year debt issues by democratic firms is significantly greater than the mean value of dictatorship firms. I also find that democratic firms retire debt more frequently than dictatorship firms and that the mean value of year-to-year debt retirement by democratic firms is significantly greater than that of dictatorship firms. This supports the notion that democratic firms issue and retire more debt compared to dictatorship firms, suggesting that managers of democratic firms appropriate benefits from debt to increase shareholder wealth by actively adjusting the debt ratio. It is further supported by the fact that democratic firms issue more net debt (debt issued net of debt retired) as compared with dictatorship firms.

The goal of this paper, as stated above, is to validate the trade-off theory of capital structure by demonstrating that previous studies, which found a

negative relationship between profits and financial leverage, did not take into account agency conflicts, and that the observed negative relationship is a subset of management inefficiency.

The remainder of the paper is organized as follows. Section 2.2 describes the hypothesis development for this study. Section 2.3 outlines data sources, corporate governance variables, profits and leverage, control variables and descriptive statistics and explains the treatment of potential endogeneity issues. Section 2.4 discusses the univariate as well as multivariate results of the empirical tests of the relationship between profits and financial leverage. Section 2.5 describes the issuance and retirement of debt instruments by democratic and dictatorship firms. Section 2.6 presents the conclusion. The appendices (2.1 and 2.2) contain the definitions of the variables used in the study and report results for non-standardized control variables.

2.2. Hypothesis Development

Earlier studies have often given an incomplete and inconsistent empirical account of the relationship between financial leverage and profitability. Previous empirical analyses indicated a negative relationship between profits and financial leverage. This differs from the implicit assumption of the trade-off theory of capital structure that more profitable firms are expected to have more debt in their capital structure owing to the deductibility of interest. These studies however did not take

into account the possibility that managers might not be acting in the best interests of shareholders and, without appropriate governance mechanisms in place, would not actively seek a change in the already developed financing patterns of the firm. Subsequently they would not be inclined to replace equity with debt to seek the benefits that would ultimately create value for the shareholders.

To investigate this I construct and test a set of hypotheses related to the control of agency conflicts and the use of debt in the capital structure. The main hypothesis for the study is followed by two subsidiary hypotheses which describe the influence of corporate governance on other agency costs that may limit the use of debt.

2.2. A. Governance Hypothesis: Managers do not want to commit to fixed payments or limit their discretion over resources and hence are not disposed to use debt (Donaldson, 1963; Myers, 1977)[5]. Shareholders on the other hand would want to maximize the value of the firm and issuing debt instead of equity reduces corporate income taxes. They would therefore want to increase debt to take advantage of the interest tax shield when profits increase. Firms in the democratic portfolio in this case should exhibit a positive relationship between

[5] The following observations have been made in prior literature

- Donaldson (1963) remarks that stockholders are expected to push for more debt and for a more continuous use of debt than management prefers
- Myers (1977) suggests that managers avoid high debt ratios in an attempt to protect their jobs and stabilize their personal wealth
- Titman and Wessels (1988) observe that managers of highly levered firms will be less able to consume excessive perquisites since bondholders (or bankers) are inclined to closely monitor such firms

profitability and leverage; a result that would attest to the validity of the trade-off theory of capital structure. Firms in the dictatorship portfolio are expected to display an inverse relationship between financial leverage and profits for two reasons. First, the result would be in line with earlier studies that found an inverse relationship between financial leverage and profits. Second, it would attest to the fact that managers of dictatorship firms do not actively seek avenues to maximize shareholders' wealth but are only reactive to events, such as a decline in profits. They therefore do not issue debt to take advantage of the interest tax shield when profits go up but would issue debt, to save taxes and mitigate the decline in earnings, when profits decrease. This would suggest that the governance mechanism plays an important role in determining the choice of financing tool used by management and that this choice is an indication of management efficiency.

2.2. B. Subsidiary Hypotheses: I propose two augmenting hypotheses that would support the notion that good governance mechanisms mitigate agency costs. These hypotheses are not constructed to test the validity of the trade-off theory of capital structure but examine the use of collateralizable assets and size (denoted by total assets) of the firm by managers in democratic and dictatorship firms to increase debt. They are included for two reasons. First, the availability of collateralizable assets and the relative size of the firm make it easier for the managers to acquire debt financing. Second, earlier research (e.g. Faulkender and Petersen, 2006 and Frank and Goyal, 2009) found opposing slopes for the

coefficients for collateralizable assets and size and Binsebergen et al (2010) concluded that the influence of size varies in different settings and samples. I propose that these conflicting results are an outcome of the governance environments in which firms operate, and construct the following two hypotheses.

2.2. B.1. Tangibility Hypothesis: Tangibility proxies for the ability of the assets of the firm to borrow more money using physical assets (Titman and Wessels, 1988). I would expect the managers of democratic firms to borrow more money if more collateralizable assets are available to the firm, while I do not expect the managers of dictatorship firms to issue more debt. The relationship between leverage and collateralizable assets for democratic firms would be expected to be positive while the same would not be true for firms in the dictatorship portfolio.

2.2. B.2. Empire Building Hypothesis: The relative size of the firm is important in determining the strength of the firm to borrow money. Self-interested managers create empires to hide agency costs such as the loss of tax savings (Zwiebel, 1996; Morellec, 2004)[6]. This however would not be the case for firms in the democratic portfolio and I consequently hypothesize that firms in the democratic portfolio would exhibit a positive relationship between financial leverage and size. This relationship is expected to be negative for firms in the dictatorship portfolio as managers would not actively use size to increase debt.

[6] The following observations have been made in prior literature

- Zwiebel (1996) suggests that the entrenchment of empire building managers is difficult to dislodge.
- Morellec (2004) argues that empire-building induces managers to issue less debt than is optimal.

The implications of the governance hypothesis are as follows: It would extend the existing literature by identifying corporate governance as an integral part of management's choice of financing instrument and in doing so validate the trade-off theory of capital structure. The tangibility and empire building hypotheses lend support to the claims made in the governance hypothesis and would confirm that the good governance reduces agency costs by making use of available resources to issue more debt.

2.3. Data Description and Variables

2.3. A. Data Sources

The study utilizes two databases: The Risk Metrics database[7] and the Compustat Industrial Annual database. The Risk Metrics database provides annual data for the years 1990, 1993, 1995, 1998, 2000, 2002, 2004 and 2006 on corporate antitakeover provisions. The data also includes the G-index, developed by Gompers et al (2003), used to measure the balance of power between shareholders and managers. For the years falling between the Risk Metrics surveys I assume that the G-Index value is the same as the prior year, in line with earlier studies by Cremers and Nair (2005) and Bebchuk, Cohen and Ferrell (2009). The G-Index does vary over time (approximately thirteen percent of the firms have a change in their G-Index), but it rarely changes dramatically (approximately three percent of

[7] I would like to thank Anna Danielova, Assistant Professor, DeGroote School of Business, McMaster University for providing access to the Risk Metrics database.

the firms have a change of two or more in their G-Index value over the time period studied)[8].

Finally the study follows Gompers et al (2003) in that it focuses on the extremes, the first and tenth deciles as outlined by them. The data confirm that firms in the democratic portfolio do not move to the dictatorship portfolio during the period under study and vice versa.

The Compustat database is used to collect firm-specific financial information such as tangibility, total assets, sales, market value of equity and long-term debt. These data will be used later to define the firm-specific control variables, which are an important part of this study. The data have been winsorized at the 0.5 percent and 99.5 percent level to deal with outliers.

To include a firm-year observation in the analysis, the G-Index data must be present in the Risk Metrics data set to match with the firm specific information available on the Compustat database. Regulated utilities and financial institutions were omitted from the data set as the regulation of profits and inflated leverage ratios respectively can skew the results. Merging the databases and appropriating the requirements outlined above results in a data set of 23,526 firm-year observations for 2,299 firms for the years 1990-2009.

[8] There are at least forty four measures of governance described in the literature. The G-Index was chosen since Baber et al (2012) suggest that external governance measures help improve internal governance as well. G-Index is an external measure of governance and it also provides very precise measures of good and poor governance firms with firms in the middle range of governance as well, as outlined by Gompers et al (2003). It helps in conducting the analysis for firms operating in distinctly different governance environments. The G-Index also allows for controlling for feedback from poorly governed firms.

The corporate governance index, often referred to as the G-Index, is the main segregation variable used in this study to test the relationship between leverage and profits. The G-index was developed to study the impact of the balance of power between shareholders and managers. It is essentially an aggregation of antitakeover governance rules for a total of twenty-four possible provisions. These provisions are principally designed to slow down a hostile bidder, insure officers and directors against liability, refer to shareholders rights in elections, state specific anti-takeover protections for firms, among other things. The index uses a point scale, ranging from one to twenty four, which adds one point for every provision that increases managerial power and consequently restricts shareholder rights. Accordingly, firms with the highest index value have the greatest (lowest) management (shareholder) power and firms with the lowest index value have the greatest (lowest) shareholder (management) power[9].

This study segregates the data into democratic and dictatorship firm portfolios based on the G-Index to identify the direction of the relationship between profits and financial leverage in distinctly different governance environments. For this purpose I define financial leverage (LEV) as the ratio of the book value of long term debt to the market value of the assets of the firm ($\frac{LTD}{MVA}$), where the market value of the firm (MVA) equals the book value of total debt plus the market value of equity and measure profits (PRFT) as the ratio of net

[9] For a complete description of the construction of the G-Index, see Gompers, Ishii and Metrick (2003)

income to the market value of the firm ($\frac{NI}{MVA}$)[10]. This is done to identify the market return and to see if the relationship is positively (negatively) significant for democratic (dictatorship) firms as hypothesized by the trade-off theory.

To test for the subsidiary hypotheses, I use a measure of the tangible collateralizable assets of the firm (COL) and the size of the firm (TA). COL and TA form the basis of the tangibility and empire building hypotheses respectively and are used to explain the slope of the leverage ratio for democratic and dictatorship firms. COL is computed as the ratio of property, plant and equipment to the market value of the firm ($\frac{PPE}{MVA}$). TA is measured as the log of total assets.

2.3. B. Control Variables

To test for the hypotheses developed in this study, I need to identify a number of control variables that affect capital structure. The variables are firm-specific controls motivated by Opler et al (1999) and Frank and Goyal (2009). These include total sales (LTS), market-to-book ratio of assets (Q), capital expenditures (ETA), a measure of the intangible assets (INTANG), the cash flow generated (CF), a measure of the volatility of the cash flows (SD), the industry median leverage (MED), net working capital (NWC) and taxes (TAX). All control variables are standardized (i.e., they have zero mean and one standard deviation) so that the respective coefficients have a one standard deviation interpretation.

[10] See Appendix 2.1 for a complete description of the variables

LTS is measured as the log of the sales of the firm. Q is measured as the ratio of the market value of assets to the book value of assets ($\frac{MVA}{BVA}$). INTANG is measured as a ratio of intangible assets to the market value of assets ($\frac{INTANG}{MVA}$). ETA is measured as the ratio of capital expenditure to total assets ($\frac{CAPX}{TA}$). CF is computed as the ratio of earnings before interest, taxes, depreciation, and amortization to total assets ($\frac{EBITDA}{TA}$). SD is computed using the standard deviation of cash flows for the past three years. NWC is the ratio of working capital to total assets ($\frac{NWC}{TA}$). TAX is the ratio of taxes paid to the earnings before taxes ($\frac{TAXES}{EBIT-INTEREST}$). Another important aspect of capital structure decisions is that managers tend to identify and follow[11] industry standards when setting goals and are likely to follow the same capital structure practices as followed by their peers. This could influence the analysis and consequently this study attempts to regulate for the effect of industry leverage ratios by using MED as a control variable. The reason for the normalization of these variables is to convert relatively biased descriptive numbers to meaningful ratios that can be used to conduct cross-sectional analysis. Finally, I include industry dummy variables to control for

[11] The following observations have been made in earlier literature

- Scott (1972) states that if the financing decision is critical with respect to the valuation of the firm, then decision makers in various industry groups will have recognized this fact and will develop financial structures suited to their particular business risk.
- Scott and Martin (1975) indicate that industry class cannot be ignored as a determinant of financial structure.

possible industry effects. Though not reported here, this paper also estimates all models using the unadjusted variables and finds similar results.

2.3. C. Endogeneity

Prior literature has extensively researched the relationship between leverage and profitability. The most general specification has been to use lagged profitability as one of the regressors in the leverage equation. It may however be prior or contemporaneous use of debt that is driving changes in the profits of the firm (in the form of tax savings). This implies that leverage and profits could have been jointly determined (reverse causality) and the study should therefore account for this problem. Earlier work (e.g. Himmelberg et al, 1999; Wintoki et al, 2007) also suggests that the causality between governance and profitability is more likely to be influenced by the firm's governance structure than vice versa. Bhagat and Bolton (2008) identified missing variable bias as a source of endogeneity for the relationship between corporate governance and financial leverage. This would suggest that profits, governance and the interactions between profits and governance are endogenous to the study and hence should be addressed.

One common approach to dealing with endogenous regressors is to use the two-stage least squares estimator (2SLS). However, the validity and sensitivity of 2SLS is related to the ability to identify exogenous variables in the first stage that are not correlated with the disturbance term in the original equation. Prior work

(e.g. Black, 2001; Durnev and Kim, 2005) overlooked concerns on the endogenous relationship between overall firm governance and performance. To address concerns regarding endogeneity, instrumental variables that are correlated with the regressor but do not affect the dependent variable through any direct channels are needed. These instrumental variables are required to account for the endogenous feedback from three sources: profits, governance and the interactions of profits and governance.

Unfortunately, prior empirical and theoretical work on financial leverage and profitability leaves us with little insight in determining potential instrumental variables. Bhagat and Bolton (2008) suggest that a firm is most likely to buy back its stock when it believes the stock to be underpriced relative to where the managers think the price should be. Thus, the level of treasury stock should be correlated with firm performance and the ratio of treasury stock to total assets should be a good instrument. Alternatively, I use the ratio of operating expenses to the market value of the firm as another instrument for profitability, since operating expenses should be correlated with profits but not with financial leverage[12].

To control for endogeneity of governance, I require instrumental variables that are exogenous and identify three instrumental variables that have been used in prior literature. John and Knyazeva (2006) use the industry medians of their governance variables as instrumental variables. They reason that industry

[12] The Stock and Yogo test indicates that instruments for profitability are not weak.

structure is unique to each industry and therefore is expected to be exogenous. Thus, I use the industry median of the G-Index as the first instrument for governance in this paper. Hermalin and Weisbach (1998) and Coles et al (2008) use the lagged values of the identified endogenous governance as instrumental variables. Listokin (2008) identifies the old governance choices of a firm as an instrument for its current governance choices. Accordingly I use the lagged value of the G-Index as the second instrument for governance. Dittmar and Mahrt-Smith (2007) replace the slowly but potentially endogenously changing governance variable by its initial value. They argue that governance changes only slowly over time, the initial value is clearly exogenous to future firm value and it is reasonable to expect that a firm with bad governance to begin with is likely to make few changes that lead to meaningfully improved governance (especially compared to other firms). The two properties of their argument are relevant to the G-Index, since it evolves slowly over time and there are no firms that jump from a democratic to dictatorship portfolio in the data. Therefore, I use the initial value of the G-Index as the third instrument for governance.

The interaction between governance and profits can be a third source of endogeneity. I create an interaction variable between the two and reason that it is an endogenous regressor since it is an interaction of two endogenous variables. As there are two instruments for profitability and three for governance, I interact them to create six instrumental variables for the interaction of profitability and governance.

2.3. D. Descriptive Statistics

Table 2.1 provides summary statistics for the variables used in the analysis. These include the main data segregation variable (G-Index), the chief variables of my analysis (LEV, PRFT, COL and TA) and the control variables (LTS, Q, ETA, INTANG, CF, SD, MED, NWC, TAX). The G-Index has a mean (median) of 8.94 (9). The mean (median) G-index for the lowest and highest deciles is 4.42 (5) and 14.58 (14) respectively. A low value of the G-Index means that a firm has strong shareholder rights and a high value indicates that a firm has weak shareholder rights. LEV has a mean (median) of 0.26 (0.17) for all firms. The mean (median) LEV for the lowest and highest deciles is 0.23 (0.15) and 0.26 (0.22) respectively. This indicates that democratic firms have lower leverage ratios. The mean (median) PRFT of the entire sample is 0.084 (0.04). The mean (median) PRFT of the democratic firm is 0.03 (0.035) and the mean (median) PRFT for firms in the dictatorship portfolio is 0.05 (0.041). The difference in profits is significant at the 1% level. Democratic firms exhibit lower profits compared to dictatorship firms in line with earlier studies (see e.g. Klock et al, 2005), lending some insight into the LEV ratio reported earlier, which was higher for dictatorship firms when compared with democratic firms. For a uniform comparison the paper looks at leverage per unit of profit (LEV_N) and observes that the leverage ratios for democratic firms are approximately sixty-six percent

higher than the comparable normalized financial ratios for dictatorship firms[13]. The difference in the leverage ratios was tested for significance and the results are reported in section 2.4.A. COL has a mean (median) of 0.26 (0.12) for all firms, a mean (median) of 0.21 (0.12) for democratic firms and a mean (median) of 0.25 (0.18) for dictatorship firms. The difference is significant at the 1% level. TA has a mean (median) of 2.09 (2.11) for all firms, a mean (median) of 3.04 (2.97) for democratic firms and a mean (median) 3.43 (3.45) for dictatorship firms. The difference in size (TA) is not significant. Overall the statistics report that firms in the dictatorship portfolio have a high proportion of collateralizable assets as compared to firms in the democratic portfolio, and are also comparatively large organizations (though size is not significantly different), both properties providing them with more borrowing capacity. The rest of the variables are controls and the respective observed statistics before standardization have been reported in Table 2.1.

Table 2.2 reports the changes in its antitakeover provisions, which will lead to a change in the G-Index from one period to the other. The data are drawn from the period 1990-2009 and indicate that 5.47, 1.2 and 0.74 percent of the sample had an increase of one, two and more than two provisions in the index,

[13] The following calculations were done to compute the leverage per unit of profit (LEV_N) for democratic and dictatorship firms

$\text{LEV\_N}_{\text{(democratic firms)}} = \frac{PRFT}{LEV} = \frac{0.2341}{0.0251} = 9.33$

$\text{LEV\_N}_{\text{(dictatorship firms)}} = \frac{PRFT}{LEV} = \frac{0.2637}{0.047} = 5.61$

respectively and 2.51, 0.33 and 0.26 percent of the firms had a decrease of one, two and more than two provisions in the index. The majority of the sample however remained unchanged, with 89.49 percent of the firms having an unchanged governance index. These results suggest close to twelve percent of the firms have changed provisions from one period to the next and more companies added antitakeover provisions (7.41 percent) compared to those that removed them (3.1 percent). This indicates that more firms were wary of the takeover threat from competitors and thus acted to reduce shareholder power.

Table 2.3 provides the industry distribution sample for the normalized mean and normalized median leverage ratio based on the Fama and French 48 industry classifications. The ratios have been normalized by PRFT to observe the leverage ratio per unit of profit. Financial institutions (FF code 44 – 47) and regulated utilities (FF code 31) were excluded from the sample because they are subject to idiosyncratic leverage ratios and profit regulation respectively. The normalized industry-wide mean (LEV_N (mean)) leverage ratios are reported for democratic and dictatorship portfolio firms. Not surprisingly, the leverage ratios differ significantly based on industry and governance classification at a 5% level. Industries observing a negative ratio displayed a mean loss during the time period under study, and such numbers should be interpreted accordingly. A total of forty-three industries have been reported with twelve industries having no firm in the dictatorship portfolio and two industries having no firm in the democratic portfolio. After accounting for the eleven industries that have reported negative

financial leverage, the study compared the remaining eighteen industries and found that democratic firms have higher financial leverage ratios in twelve industries while dictatorship firms have higher financial leverage ratios in six industries. The financial leverage ratios for democratic firms are higher than those of dictatorship firms at the 5% level.

Table 2.4 provides the Pearson correlation coefficients among financial leverage, profitability and various firm and industry specific control variables for all firms. The correlation coefficient for PRFT and LEV is negatively significant at 1%, a finding consistent with earlier studies of the relationship between profits and financial leverage. LEV is significantly positively correlated with MED at 1%. In general, LEV is negatively correlated with COL, Q, ETA and NWC and is positively correlated with TA, LTS, INTANG, CF, SD and TAX at varying significance levels. Overall the analysis indicates that all the control variables are significantly correlated with LEV and have an impact on the use of financial leverage in the capital structure of the firm.

2.4. Profits, Capital Structure and G-Index

2.4. A. Univariate Analysis

The paper examines the varying levels of financial leverage used by democratic and dictatorship firms. Table 2.5 shows the results of the tests for a significant difference in the mean leverage ratios for democratic and dictatorship firms. Panel

A of Table 2.5 indicates that there was a significant change in the mean LEV of all firms as a result of an increase in the G-index. It shows the results when the G-index went up for a firm (that is, the firm moved towards a more dictatorship governance mode). The change in mean LEV was significant at 1% indicating that the leverage ratio changed as a result of a change in the governance index. Panel B of Table 2.5 exhibits the results of a change in LEV as a result of a decrease in the G-index (that is, the firm moved towards a more democratic governance mode). The change in mean LEV is significant at 1%, indicating that the financial leverage ratio changed significantly as a result of a change in the G-Index. Panel C of Table 2.5 shows the results of testing whether the mean LEV for democratic and dictatorship firms is the same. The results indicate that the mean LEV for firms in the democratic and dictatorship portfolios is not the same at the 5% significance level. As observed earlier (Table 2.1) the LEV for dictatorship firms was greater than the LEV for democratic firms and the PRFT for dictatorship firms was higher than that for democratic firms. To test jointly for the difference between the financial leverage ratios of democratic and dictatorship firm given the difference in the respective profits, I normalize the LEVs for the deciles by the respective PRFT ratios. Panel D of Table 2.5 shows the result of this normalization and after controlling for the effects of profits the mean leverage for democratic firms is greater than that for dictatorship firms at the 1% level. This is an important result from the perspective of this study and supports the hypothesis that managers of democratic firms will take on more debt to maximize

shareholders' wealth when profits go up. It also suggests that more managerial control can result in the managers making either non-value adding decisions or decisions that result in a decrease in the value of the firm.

The results for Panel D of Table 2.5 are further supported by the progression of the normalized leverage ratios for the two classifications of firms in the time series as displayed in Figure 2.1. The result demonstrates two important pieces of information. First, it shows that democratic firms had higher leverage ratios than dictatorship firms in all but one year. This finding is consistent with earlier results that per unit of profit, democratic firms have a higher leverage ratio as compared to dictatorship firms. Second, the results demonstrate that while the normalized leverage ratio for democratic firms has remained fairly constant over time, the leverage ratio for dictatorship firms has steadily declined. This demonstrates that democratic firms have been consistent in their use of debt per unit of profit but dictatorship firms have steadily decreased their use of debt. This result is helpful in the later findings which conclude that democratic firm issue more debt compared to dictatorship firms.

2.4. B. Multivariate Analysis

In this section I examine the empirical relationship between financial leverage and profits using various control variables. Earlier studies (for example, Fama and French, 2002) have found a relationship that is negative and significant. This

study examines the relationship in a multivariate setting using a cross-sectional time series model. The data are segregated using the G-Index, thereby creating the top and bottom decile portfolios, comprising democratic and dictatorship firms respectively. All regressions are performed with a lag of one except for the industry median leverage and include industry dummies to control for industry effects. The general specification is as follows:

$$LEV_{i,t} = \alpha + \beta_1 \text{ x } PRFT_{i,t-1} + \beta_2 \text{ x } COL_{i,t-1} + \beta_3 \text{ x } TA_{i,t-1} + \beta_{4,\ldots,n} \text{ x } FirmSpecific_{i,(t,t-1)} + \varepsilon_{i,t},$$

with

$$FirmSpecific_{i,(t,t-1)} = LTS_{i,t-1}, Q_{i,t-1}, ETA_{i,t-1}, INTANG_{i,t-1}, CF_{i,t-1}, SD_{i,t-1}, MED_{i,t}, NWC_{i,t-1}, TAX_{i,t}$$

and

$\varepsilon_{i,t}$ = error term, (2.1)

where α is the intercept and β_1, β_2, β_3 the coefficients for PRFT, COL and TA respectively. Since it is important to control for other explanatory variables, which might result in changes to LEV, the model uses firm-specific regressors. These firm-specific controls are modelled at time t-1 except for MED which is modelled at time t, and have all been standardized as explained above. The hypotheses

identify the expected signs for $\beta_1, \beta_2, \beta_3$ to be positive (negative) for democratic (dictatorship) firms.

For comparison purposes I examine the primary specification relationship on the non-segregated (UNSEG) data set and use a variety of specifications to identify an inverse relationship between LEV and PRFT, as has been evidenced in earlier research (e.g. Fama and French, 2002). For completeness, the analysis also examines the primary specification using the top and bottom deciles. Since governance and profits are endogenous to the model specification, there is a need to account for it in the specification for the deciles. The controls (FirmSpecific) in that case would include the G-Index, the interaction of profits and G-Index (Inter) and the instrumental variables. The specification for control variables would thus be as follows:

$$\begin{aligned} \text{FirmSpecific}_{i,(t,t-1)} = \; & LTS_{i,t-1}, Q_{i,t-1}, ETA_{i,t-1}, INTANG_{i,t-1}, CF_{i,t-1}, SD_{i,t-1}, \\ & MED_{i,t}, NWC_{i,t-1}, TAX_{i,t}, \text{G-Index}, \text{Inter} \\ & (IP_{1-2}, IG_{1-3}, IPG_{1-6}), \end{aligned} \tag{2.2}$$

where Inter is the interaction of profits and governance, IP_{1-2} are the two instruments for profits, IG_{1-3} are the three instruments for governance and IPG_{1-6} are the six instruments for the interaction term.

The paper attempts to answer the question of whether firms with strong shareholder rights exhibit a direct relationship between profits and financial

leverage and, likewise, whether firms with strong management authority exhibit a negative relationship between these variables. A negative sign on β_1 for all firms would indicate that the results are consistent with earlier studies, a finding that has cast doubt on the validation of the trade-off theory of capital structure. After segregating the data based on the G-Index into the top and bottom deciles a positive sign for β_1 for democratic firms would support the hypothesis that strong shareholder rights result in an increase in the debt ratio as profits increase, hence validating the trade-off theory of capital structure.

Further support for this would be provided by positive signs for β_2 *and* β_3. Collateralizable assets and size have displayed varying relationships with financial leverage in previous studies. Frank and Goyal (2009) found that after segregating the data by decades, financial leverage had a mixed relationship with collateralizable assets while it had a positive relation with size. Faulkender and Petersen (2006) and Binsbergen et al (2010) found that financial leverage had a negative relation with size. The differing collateralizable assets and size implications documented in various capital structure papers imply that the influence of size and collateralizable assets on the financial leverage of the firm varies among different settings and samples. For the UNSEG data the directionality of the coefficient for COL is ambiguous given the results of the previous studies. For democratic firms, I would expect a positive coefficient since managers are expected to take advantage of these tangible assets to borrow, thereby saving more taxes. Hence, COL is expected to have a positive (negative)

relationship with LEV for democratic (dictatorship) firms. Similarly, the expected sign of the coefficient for TA is unclear in the UNSEG data, given the mixed results in previous studies, but for democratic (dictatorship) firms I would expect a positive (negative) relationship to hold between LEV and TA, since managers of democratic (dictatorship) firms would be (would not be) inclined to utilize more debt as the size of the firm goes up. The remaining are firm-specific standardized controls and the expected relationship with financial leverage has been discussed in Table 2.6. The results are generally consistent with prior studies.

2.4. B.1. Pre G-Index Sample Analysis

Table 2.7 provides the analysis of the relationship between LEV and PRFT using three different specifications reported in Models 1, 2 and 3. The models are tested using both ordinary least squares and firm fixed effects and are used to compare results with previous studies, which showed a significant negative relationship between profits and leverage. All the models use PRFT, COL and TA in their specifications. The adjusted R-squares across the various specifications tend to increase as more control variables are added.

The results are generally consistent across the different specifications, in line with previous studies (Fama and French, 2002; Frank and Goyal 2009), and indicate that financial leverage and profits are significantly negatively related. The magnitude of the coefficient for profitability varies from -0.00002 to -0.0005 and

is significant for all specifications. The models also provide evidence on the relationship of financial leverage with control variables, as specified earlier. COL has a negative coefficient ranging from -0.0001 to -0.0002 and is significant at the 1% level across all specifications. I find a positive coefficient for the size of the firm that is statistically significant at 1% for all specifications except the OLS regression for Model 3, which displays a negative coefficient significant at 1%. However, after controlling for firm fixed-effects, the results display a positive coefficient, which is significant at the 1% level. LTS is positively related to capital structure at a 1% significance level. Q is negatively related at the 1% level but the significance disappears after controlling for fixed effects. The results indicate a positive (negative) insignificant (significant) relationship between financial leverage and capital expenditure in the OLS (FE) regression for Model 1 and a positive relationship, significant at 1% in Model 3. INTANG has a positive (negative) insignificant (significant) coefficient in the OLS (FE) regression in Model 3. The result for CF is negative (positive) and significant in the FE (OLS) regression in Model 1 (Model 3). As expected, I find that the coefficients for cash flow volatility are negatively significant at 1% across the various specifications and after controlling for fixed-effects. Predictably, MED is positive and significant with a high coefficient and low standard errors across the two specifications at a 1% significance level. NWC is negatively related to leverage, indicating that the more liquid the firm, the less debt it will utilize. The magnitude

of the coefficients for net working capital range from -0.007 to -0.026, and are all significant at the 1% level. TAX has a positive but insignificant coefficient[14].

Using the estimated fixed effects (FE) coefficients from the panel specification in Model 3 of Table 2.7, the financial leverage ratio for any particular firm i at time t can be computed by[15]

$$LEV_{i,t} = \alpha + \beta_1 \text{ x } PRFT_{i,t-1} + \beta_2 \text{ x } COL_{i,t-1} + \beta_3 \text{ x } TA_{i,t-1} + \theta_{i,(t,t-1)},$$

with

$$\alpha = \quad 0.13$$

$$\theta_{i,(t,t-1)} = \quad 0.015\ LTS_{i,t-1} - 0.01\ Q_{i,t-1} + 0.002\ ETA_{i,t-1} - 0.001\ INTANG_{i,t-1} + 0.004\ CF_{i,t-1} - 0.006\ SD_{i,t-1} + 0.12\ MED_{i,t} - 0.013\ NWC_{i,t-1} + 0.0002\ TAX_{i,t}$$

and

$$\beta_1 = \quad -0.0005$$

$$\beta_2 = \quad -0.0002$$

$$\beta_3 = \quad -0.06 \qquad (2.3)$$

Each of the control variables in $\theta_{i,(t,t-1)}$ is standardized (demeaned and divided by the respective standard deviations) to have a mean of zero and a standard deviation of one. Equation (2.3) provides a linear approximation for

[14] The models were also tested on the non-standardized control variables and show similar results. The results are reported in Appendix A.2.2.1.

[15] Model 3 employs all the control variables used in this study and is used to report the results.

leverage ratios. To be more specific the relationship also requires the value for the error term specified in equation (1). Equation (2.3) assumes that $\varepsilon_{i,t}$ is zero and can be used to estimate the financial leverage ratio for firms at any given level of profits, collateralizable assets and size. The general slope of the relationship is negative for an average firm with all the control variables specified in $\theta_{i,(t,t-1)}$ having a mean of zero.

2.4. B.2. Governance Index Segregated Analysis

Table 2.8 provides the regression results for equation (2.2) when the data are segregated between the democratic (G-Index 1 - 5) and dictatorship (G-Index 14 - 18) portfolio firms. The specifications include industry dummies. My main variable of interest, PRFT, has a positive coefficient significant at 1% for democratic firms, and a negative coefficient for dictatorship firms, significant at 1%. The coefficient for dictatorship firms, though negative, is not significant for the fixed effects and instrumental variables models [16]. A valid concern is whether the failure to find statistically significant results for dictatorship firms in the fixed effects case means that such effects exist, but the standard errors are so large as to obscure them. After adjusting for a finite population the standard errors make the coefficient significant only at the 20% level. The results are in line with the governance hypothesis and suggest that managers of democratic firms increase

[16] The instrumental variable regression reports the results for the second stage least square (2SLS) in Table 2.8 and Table 2.9. The results for the first stage least square (1SLS) are reported in Appendix A 2.2.4.

the use of debt as profits increase, in order to capitalize on the benefits derived from tax savings. As expected, I find that COL has a positive coefficient for democratic firms, significant at 1%, and a negative significant coefficient for dictatorship firms in the OLS and IV models. The coefficient for dictatorship firms is positive but insignificant for the FE model. The results for democratic firms provide strong support for the tangibility hypothesis and are consistent with the argument that mangers of democratic firms borrow more when tangible assets are available to help reduce the cost of borrowing. The results support the tangibility hypothesis for dictatorship firms as well. Consistent with the expectations regarding size, the study finds that for democratic firms, TA has a positive relationship with LEV, which is significant at 10% for OLS, 1% for FE and 5% for the IV model. The coefficient is negative (positive) for the OLS and IV (FE) models for dictatorship firms. These results lend strong support to the empire building hypothesis regarding the relationship between financial leverage and the size of the firm for democratic firms. The results for the empire building hypothesis for dictatorship firms are weak as the coefficient is significant and positive for the FE model. The coefficient for the OLS and IV models are negative and significant at the 1% level. This might be explained by the fact that the G-Index is calculated for large firms that are visible to the stakeholders and such informal governance mechanisms (being visible) motivate managers to act in the shareholders' interest.

Sales (LTS) are negatively related to financial leverage and the coefficients are significant for democratic and dictatorship firms. The coefficient for Q is negative for both democratic and dictatorship firms. The significance for democratic firms disappears in the FE and IV models. The coefficient for ETA is mainly positive for democratic and dictatorship firms, though the coefficient is negative and insignificant for the OLS specification for democratic firms. Intangibility (INTANG) is positively related to the financial leverage of the firm, suggesting that intangible assets support the use of more debt as well. The coefficients are significant at the 1% level. The results for cash flow are a little surprising as I expected a positive coefficient for both groups of firms. The results however mainly indicate a negative coefficient for both the democratic and dictatorship portfolios. Cash flow volatility has an insignificant relationship with financial leverage for democratic firms, but has negative and significant coefficients for dictatorship firms. Industry median leverage has a positive coefficient for both democratic and dictatorship firms and is significant at 1% in both classifications. Net working capital has a negative coefficient, which is significant at 1% for both the dictatorship and democratic portfolios. Taxes have positive coefficients for democratic firms and negative coefficients for dictatorship firms, though the coefficients are not significant for either classification[17].

[17] The models were also tested on the non-standardized control variables and showed similar results. The results are reported in Appendix A 2.2.2

Using the estimated instrumental variable (IV) coefficients from the panel specification in Table 2.8 for democratic firms, the financial leverage ratio for any firm i at time t can be computed by

$$LEV_{i,t} = \alpha + \beta_1 \text{ x } PRFT_{i,t-1} + \beta_2 \text{ x } COL_{i,t-1} + \beta_3 \text{ x } TA_{i,t-1} + \theta_{i,(t,t-1)},$$

with

$$\alpha = \quad 0.818$$

$$\theta_{i,(t,t-1)} = \quad -0.114\, LTS_{i,t-1} - 3.99\, Q_{i,t-1} - 0.133\, ETA_{i,t-1} + 2.52\, INTANG_{i,t-1} - 2.31\, CF_{i,t-1} + 0.016\, SD_{i,t-1} + 0.126\, MED_{i,t} - 23.92\, NWC_{i,t-1} + 0.004\, TAX_{i,t}$$

and

$$\beta_1 = \quad 0.03$$

$$\beta_2 = \quad 0.102$$

$$\beta_3 = \quad 0.063 \qquad (2.4)$$

The slopes of the relationship between financial leverage and profit, collateralizable assets and size are positive, indicating that an increase in these three variables results in an increase in the use of debt by the firm. Equation (2.4) is specific to democratic firms, reports standardized control variable results and assumes that the error term $\varepsilon_{i,t}$ is zero. For an average firm in the sample the financial leverage can be estimated based on profitability, collateralizable assets and size, as all the other control variables have a mean of zero.

For dictatorship firms, the financial leverage ratio can be computed by

$$LEV_{i,t} = \alpha + \beta_1 \text{ x } PRFT_{i,t-1} + \beta_2 \text{ x } COL_{i,t-1} + \beta_3 \text{ x } TA_{i,t-1} + \theta_{i,(t,t-1)},$$

with

$$\alpha = \quad 0.014$$

$$\theta_{i,(t,t-1)} = \quad -0.307\, LTS_{i,t-1} - 19.63\, Q_{i,t-1} + 0.01\, ETA_{i,t-1} + 2.105\, INTANG_{i,t-1} - 4.32\, CF_{i,t-1} - 0.061\, SD_{i,t-1} + 0.1\, MED_{i,t} - 11.25\, NWC_{i,t-1} - 0.004\, TAX_{i,t}$$

and

$$\beta_1 = \quad -0.03$$

$$\beta_2 = \quad -0.011$$

$$\beta_3 = \quad -0.072 \qquad (2.5)$$

Financial leverage has a negative relationship with profits, collateralizable assets and size for dictatorship firms. This indicates that as the magnitudes of these three variables increase, the relative use of debt by the firm decreases. Based on the sign and magnitude of the coefficients one might be inclined to state that the slopes of the democratic and dictatorship firms do not intersect; however, given the relative scale of the intercepts, this cannot be stated unambiguously[18].

[18] Though not reported, the data were also tested on the OLS specification with a zero intercept. The profitability-financial leverage relationship for democratic firms was found not to intersect with the profitability-financial leverage relationship for dictatorship firms.

2.4. B.3. Robustness Test

To check for robustness I control for the effect of dictatorship firms on the interactions between financial leverage and profit by creating a dummy variable that equals one for dictatorship firms and zero otherwise (i.e., the dummy variable was zero for firms with a G-Index of 1 – 13). This is done to create interaction variables (dummy multiplied by variable) for profitability (i_PRFT), collateralizable assets (i_COL) and size (i_TA), to control for feedback coming from dictatorship firms. The results are reported in Table 2.9, with three specifications for each of the two different samples. The first sample (Democratic/Dictatorship firms) uses only firms that are in the top and bottom deciles of the G-Index. The coefficients support the robustness of the results reported in Table 2.8. The results show that the evidence for the governance hypothesis is robust to interaction and instrumental variable approaches. PRFT has positive coefficients and i_PRFT has negative coefficients, which are statistically significant across all specifications. The results for collateralizable assets also confirm the robustness of the earlier results as COL has significant positive coefficients and i_COL has significant negative coefficients across all specifications. The results for the empire building hypothesis are mixed at best, as the coefficient for the instrumental variable is negative for TA and i_TA. A possible explanation for this is that the G-Index is calculated only for large firms and the variation in size between democratic and dictatorship firm is negligible

and insignificant. This coupled with the fact that big firms are more visible to stakeholders reduces the variations in the way size is treated by managers.

The second sample (All Firms) includes all the firms that are present in the data set and the G-Index range is 1 – 18. The results for this sample not only indicate the robustness of the results reported earlier, but also give insight into the interactions of financial leverage and profits after controlling for the feedback from poorly governed firms. The validity of the governance hypothesis is verified again as PRFT has positive coefficients and i_PRFT has negative coefficients, which are all statistically significant across all three specifications. This supports the evidence that once controlled for the feedback from poor governance firms, financial leverage and profits exhibit a positive relationship. The results for the tangibility hypothesis are robust to this estimation methodology as well since COL has positive coefficients and i_COL has negative coefficients, which are all statistically significant across all specifications. The results for the empire building hypothesis are again mixed with TA and i_TA having positive coefficients for all specifications. This reaffirms the results that even firms in the dictatorship portfolio use size to their advantage to issue debt. Overall these results indicate the robustness of the earlier results for the governance and tangibility hypotheses, but not for the empire building hypothesis[19].

[19] The data were tested on the non-standardized control variables and produced similar results. The results are reported in Appendix A 2.2.3.

Since the coefficient of profitability is statistically similar for the ordinary least squares, fixed effects and instrumental variable regressions, it is reasonable to assume that the instrumental variables and control variables capture a large portion of the firm-specific heterogeneity.

Using the estimated instrumental variables (IV) coefficients from the panel specification in Table 2.9 for all firms, the financial leverage ratio for any firm i at time t can be computed by

$$LEV_{i,t} = \alpha + \beta_1 \text{ x } PRFT_{i,t-1} + \beta_2 \text{ x } COL_{i,t-1} + \beta_3 \text{ x } TA_{i,t-1} + \theta_{i,(t,t-1)},$$

with

$\alpha =$ 0.142

$$\theta_{i,(t,t-1)} = - 0.02\ LTS_{i,t-1} - 15.05\ Q_{i,t-1} - 0.06\ ETA_{i,t-1} + 1.12\ INTANG_{i,t-1} - 4.65\ CF_{i,t-1} - 0.016\ SD_{i,t-1} + 0.1\ MED_{i,t} - 3.03\ NWC_{i,t-1} - 0.0001\ TAX_{i,t} - 0.08\ i\_PRFT - 0.07\ i\_COL + 0.013\ i\_TA - 0.004\ Dummy - 0.001\ G\text{-}Index - 0.04\ Inter$$

and

$\beta_1 =$ 0.01

$\beta_2 =$ 0.01

$\beta_3 =$ 0.05 (2.6)

The control variables as specified earlier have been standardized. The variable Dummy is a binary variable with value {0, 1}. While equations (2.4) and (1-4) are specific to democratic and dictatorship firms, equation (2.6) provides a linear approximation for the firm-specific financial leverage ratios, assumes that $\varepsilon_{i,t}$ is zero and controls for the feedback coming into the model from dictatorship firms. Therefore, equation (2.6) is true for all the firms that fall in the G-Index range of one to eighteen, can be used to estimate firms' capital structures and attests to the validity of the trade-off theory of capital structure[20].

2.5. Debt Issuance and Retirement

To finance business operations firms use three main sources of financing: retained earnings, debt issues and new equity issues. I focus specifically on the issuance and retirement of debt and compare democratic and dictatorship firms. Table 2.10 shows the results of debt issuance and retirement by democratic and dictatorship firms in the sample. Panel A indicates that the frequency of debt issue by democratic firms is much larger than that of dictatorship firms. On average, however, firms in the two portfolios issued debt at almost the same frequency (democratic firms issued debt an average of 5.7 times and dictatorship firms issued debt an average of 5.6 times). The magnitude of mean debt issue by democratic firms however far outweighs that of dictatorship firms and on average

[20] As observed in Table 2.4, NWC and CF are highly correlated. The data were tested by first eliminating only NWC from the regression models and then eliminating only CF from the regression models. The results are similar to those observed in Tables 2.7, 2.8 and 2.9.

democratic firms issued more debt ($1,002.2 million) compared to firms in the dictatorship portfolio ($723.4 million). The mean debt issued by democratic firms is significantly higher than that of dictatorship firms at the 1% level. This is in line with the earlier argument that given the tax deductibility of interest and the implementation of adequate governance mechanisms, firms would opt to issue more debt. Panel B of Table 2.10 summarizes the number of times debt was retired by democratic and dictatorship firms and the average size of the debt retirement. The number of times debt is retired by democratic firms is greater than that of dictatorship firms. However, on average a democratic firm retired debt 5.8 times while dictatorship firms retired debt 7.2 times. Democratic firms retire more debt ($793.8 million) as compared to dictatorship firms ($671.4 million). Panel C of Table 2.10 documents the difference between the debt issuance and debt reduction activity of firms in the democratic and dictatorship portfolios. The mean difference for democratic portfolio firms is significantly higher at $173.34 million than that of dictatorship portfolio firms at $51 million at the 1% level.

These findings strengthen the results that firms in the democratic portfolio not only issue more debt but also are more active in debt issuance and retirement. It is also strengthened by the fact that net debt issuance by democratic firms is far greater than that of dictatorship firms. This supports the assertion that managers of democratic firms will take advantage of the tax deductibility of debt to maximize shareholder wealth.

2.6. Conclusion

The results of this study provide evidence on how a firm's governance structure affects its usage of debt. The paper started by arguing that firms with adequate governance mechanisms will use more debt compared with firms with poor governance structures. While the managers of democratic firms actively execute decisions to capture opportunities that increase shareholders' wealth, the managers of dictatorship firms are content with modest increases in the wealth of shareholders. This forms the basis of agency conflicts between management and shareholders, which gradually transcend into Miller's "neutral mutations" that neither reduce nor increase the value of the firm. The paper contends that these agency conflicts play a vital role in determining the sources of financing used by management.

The results for the relationship between profits and financial leverage for all firms appear to be consistent with prior literature and indicate that an empirically significant negative relationship exists. This helps in developing the hypothesis concerning firm behaviour with respect to the governance structure of the firm as represented by the G-Index. Prior research on the validity of the trade-off theory of capital structure has produced mixed results for the relationship between profits and financial leverage. The introduction of a governance mechanism yields interesting interpretations as a strong governance mechanism would be expected to result in an increase in the value of the firm and managers

would be expected to act in the interest of shareholders. The analysis provides justification to these interpretations and lends support to the hypothesis that with strong governance structures in place, management will rely on more debt when profits increase, while the same would not be true of firms with inadequate governance structures. This outcome is further augmented by results that provide support for the tangibility and empire building hypotheses for democratic firms. Together these results support the trade-off theory of capital structure and identify the importance of strong corporate governance structures as a factor motivating managers to issue increasingly more debt. Further tests using instrumental and interaction variables for profitability, size and tangibility lend robustness to the findings and provide support for the three hypotheses examined in this study. The findings of the study also suggest that earlier literature on the trade-off theory of capital structure has missed an important variable (corporate governance) and that in firms with adequate governance mechanisms the trade-off theory of capital structure holds true.

References

Baber, William R., Lihong Liang, and Zinan Zhu (2012): Associations between Internal and External Corporate Governance Characteristics: Implications for Investigating Financial Accounting Restatements, *Accounting Horizons* 26, pp. 219-237

Baxter, Nevins D. (1967): Leverage, Risk of Ruin and the Cost of Capital, *Journal of Finance* 22, pp. 395-403

Bebchuk, Lucian, Alma Cohen, and Allen Ferrell (2009): What Matters in Corporate Governance?, *Review of Financial Studies* 22, pp. 783-827

Bhagat, Sanjai, and Brian Bolton (2008): Corporate Governance and Firm Performance, *Journal of Corporate Finance* 14, pp. 257-273

Binsebergen, Jules H. van, John R. Graham, and Jie Yang (2010): The Cost of Debt, *Journal of Finance* 65, pp. 2089-2136

Black, B. (2001): The corporate governance behaviour and market value of Russian firms, *Emerging Markets Review* 2, pp. 89-108

Coles, J., N. Daniel, and L. Naveen (2008): Boards: does one size fit all? *Journal of Financial Economics* 87, pp. 329-356

Cremers, K., and Vinay B. Nair (2005): Governance Mechanisms and Equity Prices, *Journal of Finance* 60, pp. 2859-2894

Dittmar, Amy, and Jan Mahrt-Smith (2007): Corporate Governance and the Value of Cash Holdings, *Journal of Financial Economics* 83, pp. 599-634

Donaldson, G. (1963): Financial Goals: Management vs. Stockholders, *Harvard Business Review* 41, pp. 116-129

Durnev, Artyom, and E. Han Kim (2005): To Steal or Not to Steal: Firm Attributes, Legal Environment, and Valuation, *Journal of Finance* 60, pp. 1461-1493

Fama, Eugene F., and Kenneth R. French (2002): Testing Trade-Off and Pecking Order Predictions about Dividends and Debt, *Review of Financial Studies* 15, pp. 1-33

Faulkender, Michael, and Mitchell A. Petersen (2006): Does the source of capital affect capital structure?, *Review of Financial Studies* 19, pp. 45-79

Florackis, Chrisostomos, and Aydin Ozkan (2009): Managerial incentives and corporate leverage: Evidence from the United Kingdom, *Accounting & Finance* 49, pp. 531-553

Frank, Murray Z., and Vidhan K. Goyal (2009): Capital Structure Decisions: Which Factors are Reliably Important?, *Financial Management* 38, pp. 1-37

Gompers, Paul, Joy Ishii, and Andrew Metrick (2003): Corporate Governance and Equity Prices, *Quarterly Journal of Economics* 118, pp.107-155

Graham, John R. (2000): How Big are the Tax Benefits of Debt, *Journal of Finance* 55, pp. 1901-1941

Hermalin, Benjamin E., and Michael S. Weisbach (1998): Endogenously Chosen Boards of Directors and Their Monitoring of the CEO, *American Economic Review* 88, pp. 96-118

Himmelberg, C., R.G. Hubbard, and D. Palia (1999): Understanding the determinants of managerial ownership and the link between ownership and performance. *Journal of Financial Economics* 53, pp. 353-384.

Jensen, Michael C., and William H. Meckling (1976): Theory Of The Firm: Managerial Behaviour, Agency Costs and Ownership Structure, *Journal of Financial Economics* 3, pp. 305-360

John, K., and A Knyazeva (2006): Payout policy, agency conflicts, and corporate governance, Working paper, New York University

Klock, Mark S., Sattar A. Mansi, and William F. Maxwell (2005): Does Corporate Governance Matter to Bondholders?, *Journal of Financial and Quantitative Analysis* 40, pp. 693-719

Listokin, Yair (2008): Interpreting Empirical Estimates of the Effect of Corporate Governance, *American Law and Economics Review* 10, pp. 90-109

Miller, Merton H. (1977): Debt and Taxes, *Journal of Finance* 32, pp. 261-275

Modigliani, Franco, and Merton H. Miller (1963): Corporate Income Taxes and the Cost of Capital: A Correction, *American Economic Review* 53, pp. 433-443

Morellec, E (2004): Can Managerial Discretion Explain Observed Leverage Ratios?, *Review of Financial Studies* 17, pp. 257-294

Myers, Stewart C. (1977): Determinants of Corporate Borrowing, *Journal of Financial Economics* 5, pp. 147-175

Myers, Stewart C. (1993): Still Searching for Optimal Capital Structure, *Journal of Applied Corporate Finance* 6, pp. 4-14

Opler, Tim, Lee Pinkowitz, Rene Stulz, and Rohan Williamson (1999): The determinants and implications of corporate cash holdings, *Journal of Financial Economics* 52, pp. 3-46

Scott, David F., Jr. (1972): Evidence of the Importance of Financial Structure, *Financial Management* 1, pp. 45-50

Scott, David F., Jr., and John D. Martin (1975): Industry Influence on Financial Structure, *Financial Management* 4, pp. 67-73

Solomon, Ezra (1963): Leverage and the Cost of Capital, *Journal of Finance* 18, pp. 273-279

Titman, Sheridan, and Roberto Wessels (1988): The Determinants of Capital Structure Choice, *Journal of Finance* 43, pp. 1-19

Turnbull, Stuart M. (1979): Debt Capacity, *Journal of Finance* 34, pp. 931-940

Wintoki, M.B., J.S. Linck, and J.M. Netter (2007): Endogeneity and the dynamics of corporate governance, Working paper (University of Georgia)

Zwiebel, Jeffrey (1996): Dynamic Capital Structure under Managerial Entrenchment, *American Economic Review* 86, pp. 1197-1215

Table 2.1

Summary Statistics

This table provides the summary statistics for the sample. The data set (excluding the governance index) has been winsorized at 0.5 and 99.5 percentiles and does not included financial institutions and regulated utilities. The data set comprises 23,527 firm-year observations for 2,299 firms in the All Firms category, 2,528 firm-year observations in the Democratic Firms category and 1,091 firm-year observations in the Dictatorship Firms category, covering the period 1990-2009.

	All Firms			Democratic Firms (Governance Index: 1 - 5)			Dictatorship Firms (Governance Index: 14 - 18)		
Variable	Mean	Median	SD	Mean	Median	SD	Mean	Median	SD
G- Index	8.9408	9	2.7193	4.4244	5	0.7936	14.5848	14	0.7810
LEV †	0.2569	0.1677	0.2692	0.2341	0.1475	0.2546	0.2637	0.2225	0.1981
PRFT †	0.084	0.0394	0.4648	0.0251	0.0346	0.2365	0.047	0.0409	0.1967
COL †	0.2581	0.1181	0.3541	0.2062	0.1176	0.2491	0.2521	0.1819	0.2659
TA †	2.0908	2.1103	1.1766	3.0416	2.9713	0.8002	3.4326	3.4472	0.5745
LTS †	1.9235	1.9471	1.1649	2.8612	2.8148	0.7344	3.3191	3.3014	0.5190
Q †	2.7953	1.0915	8.8995	1.7299	1.2120	1.9943	2.9702	1.0748	9.9491
ETA †	0.0628	0.0336	0.0893	0.0508	0.0330	0.0600	0.0644	0.0331	0.0929
INTANG †	0.0911	0.0102	0.1782	0.1083	0.0353	0.1724	0.1786	0.0055	0.1786
CF †	-0.1479	0.0693	1.1863	0.1114	0.1144	0.1549	0.1238	0.1276	0.1693
SD †	45.838	4.0302	184.541	99.985	19.334	289.715	34.588	2.982	161.074
MED †	0.2116	0.1647	0.1966	0.2161	0.1733	0.1937	0.2338	0.2009	0.1671
NWC †	-0.0443	0.1918	2.078	0.2679	0.2568	0.2291	0.1786	0.1729	0.1785
TAX †	0.175	0.052	0.297	0.298	0.283	0.308	0.284	0.251	0.279
N	23,527			2,528			1,091		

† See appendix 2.1 for the definition of the variables

Table 2.2

Change in Governance Index

This table provides the details of a change in the governance index for the data on a year to year basis. The data comprise 23,527 firm-year observations for 2,299 firms covering the period 1990 to 2009. A total of 21,226 observations are included excluding the starting G-Index value.

Activity	Number of Observations	Percentage of Sample
Index increases by more than two	157	0.74%
Index increases by two	255	1.20%
Index increases by one	1,161	5.47%
Unchanged	18,996	89.49%
Index decreases by one	532	2.51%
Index decreases by two	70	0.33%
Index decreases by more than two	55	0.26%
TOTAL	21,226	100.00%

Table 2.3

Fama-French Industry-Wide Leverage

The table presents the Fama and French industry classification and the normalized mean/median leverage ratios across democratic and dictatorship portfolio firms. The mean/median leverage ratios (LEV) have been normalized by profits (PRFT). The data comprise 23,526 firm-year observations for 2,299 firms covering the period 1990 to 2009. Financial institutions (FF code 44 – 47) and regulated utilities (FF code 29, 31) have been excluded from the sample because of inflated leverage ratios and regulation of profits.

FF Code	Title of Industries	LEV_N‡ (Mean)	LEV_N‡ (Median)	LEV_N‡ (Mean)	LEV_N‡ (Median)
1	Agriculture	462.56	-23.24	.	.
2	Food Products	13.63	4.45	12.12	8.87
3	Candy and Soda	14.02	10.45	.	.
4	Beer and Liquor	4.94	2.26	.	.
5	Tobacco Products	2.33	3.65	.	.
6	Recreation	4.40	1.27	2.42	2.34
7	Entertainment	-2.12	0.00	.	.
8	Printing and Publishing	12.88	4.88	5.42	5.35
9	Consumer Goods	18.36	2.13	1.80	3.48
10	Apparel	0.14	0.00	4.47	2.73
11	Healthcare	2.35	1.80	3.93	9.29
12	Medical Equipment	7.40	2.94	-0.84	2.30
13	Pharmaceutical Products	0.16	0.00	0.82	8.11
14	Chemicals	-6.17	2.65	3.90	3.28
15	Rubber and Plastic Products	.	.	9.66	4.86
16	Textiles	2.54	11.39	.	.
17	Construction Materials	3.62	1.56	4.18	2.71
18	Construction	35.40	12.62	11.35	12.48
19	Steel Works	-3.01	0.79	3.35	3.50
20	Fabricated Products	.	.	-1.16	0.80
21	Machinery	12.56	0.11	-1.17	4.41
22	Electrical Equipment	7.06	-0.33	-2.41	5.51
23	Automobiles and Trucks	13.38	0.24	14.25	7.70
24	Aircraft	2.99	5.27	-15.66	4.22
25	Shipbuilding, Railroad Equipment	4.30	0.82	.	.
26	Defense	0.01	0.00	.	.
27	Precious Metals	-2.83	0.00	.	.
28	Non-Metallic and Industrial Metal Mining	3.35	3.24	.	.

Table 2.3
Continued

FF Code	Title of Industries	LEV_N‡ (Mean)	LEV_N‡ (Median)	LEV_N‡ (Mean)	LEV_N‡ (Median)
29	Coal	65.04	1.48	.	.
30	Petroleum and Natural Gas	-1.35	2.69	11.49	3.50
32	Communication	19.82	1.82	2.10	7.91
33	Personal Services	-4.65	0.00	1.43	1.25
34	Business Services	1.54	0.05	6.39	5.98
35	Computers	1.39	0.00	1.27	1.33
36	Electronic Equipment	-0.05	0.00	7.04	2.50
37	Measuring and Control Equipment	1.81	0.78	0.00	0.00
38	Business Supplies	10.61	5.67	17.31	3.13
39	Shipping Containers	28.94	5.21	.	.
40	Transportation	-1.12	3.68	5.80	5.78
41	Wholesale	9.38	1.68	9.74	7.07
42	Retail	-12.73	1.07	-0.49	1.38
43	Restaurants, Hotels, Motels	53.21	0.34	16.61	11.53
48	Miscellaneous (Other)	49.27	44.41	9.95	8.25

(a) Missing values imply no observations were recorded.

(b) The normalized means for democratic and dictatorship firms are significantly different at the 5% level.

(c) The means for democratic firms are significantly higher at the 5% level than those of dictatorship firms when controlled for profits.

‡ LEV_N = LEV†/PRFT† (leverage normalized by profits)

† See Appendix 2.1 for the definition of the variables

Table 2.4

Pearson Correlations

This table provides the data on the correlations between the various variables of interest and the control variables used in the analysis. The mean/median has been normalized by standard deviation. The data set comprises 23,526 firm-year observations for 2,299 firms covering the period 1990 to 2009.

	LEV †	PRFT †	COL †	TA †	LTS †	Q †	ETA †	INTANG †	CF †	SD †	MED †	NWC †	TAX †
LEV †	1.000												
PRFT †	-0.049***	1.000											
COL †	0.181***	-0.396***	1.000										
TA †	0.313***	0.0322***	-0.026***	1.000									
LTS †	0.139***	0.029***	0.029***	0.84***	1.000								
Q †	-0.154***	0.003	-0.065***	-0.176***	0.127***	1.000							
ETA †	-0.074***	0.008	0.180***	0.056***	0.041***	0.025***	1.000						
INTANG †	0.076***	0.008	-0.021***	0.357***	0.322***	-0.021***	-0.06***	1.000					
CF †	-0.025**	0.015***	0.002	0.05***	0.064***	-0.762***	-0.023***	0.001	1.000				
SD †	0.14***	-0.000	0.007	0.331**	0.276***	-0.017	-0.016**	0.329***	-0.000	1.000			
MED †	0.6***	0.003	0.154***	0.281***	0.133***	-0.147***	-0.008	0.033***	0.001	0.029***	1.000		
NWC †	-0.039***	0.008	-0.006	0.045***	0.040***	-0.0826	-0.003	-0.006	0.96***	-0.004	0.008	1.000	
TAX †	0.025***	-0.45***	0.148***	-0.016***	-0.014***	-0.001	-0.004	-0.004	0.008*	0.000	0.001	-0.004	1.000

*** p<0.01 ** p<0.05 * p<0.1

† See Appendix 2.1 for the definition of the variables

UNIVARIATE ANALYSIS

Table 2.5

T tests

This table presents the results of the analysis while testing for a change in leverage with respect to a change in the governance index and tests for a difference in the leverage ratios across democratic and dictatorship firms. The data set comprises 23,526 firm-year observations for 2,299 firms covering the period 1990 to 2009.

Δ in mean LEV with respect to Δ in G-Index

Panel A	***Panel B***
H_O: Δ LEV † = 0 when G-Index increases	H_O: Δ LEV † = 0 when G-Index decreases
Hα: Δ LEV $^{\dagger} \neq 0$ when G-Index increases	Hα: Δ LEV $^{\dagger} \neq 0$ when G-Index decreases
LEV† before increase in G-Index = 0.212	LEV† before decrease in G-Index = 0.223
LEV† after increase in G-Index = 0.197	LEV† after decrease in G-Index = 0.226
p-value = 0.0000	p-value = 0.0000
Significant level: 1% (Reject H_O)	Significant level: 1% (Reject H_O)

Mean LEV of Democratic vs. Dictatorship Firms

Panel C	***Panel D***
H_O: LEV $^{\dagger}_{\text{(democratic firms)}}$ = LEV $^{\dagger}_{\text{(dictatorship firms)}}$	H_O: LEV_N $^{\ddagger}_{\text{(democratic firms)}}$ = LEV_N$^{\ddagger}_{\text{(dictatorship firms)}}$
Hα: LEV $^{\dagger}_{\text{(democratic firms)}} \neq$ LEV $^{\dagger}_{\text{(dictatorship firms)}}$	Hα: LEV_N $^{\ddagger}_{\text{(democratic firms)}}$ > LEV_N$^{\ddagger}_{\text{(dictatorship firms)}}$
LEV $^{\dagger}_{\text{(democratic firms)}}$ = 0.236	LEV_N $^{\dagger}_{\text{(democratic firms)}}$ = 9.41
LEV $^{\dagger}_{\text{(dictatorship firms)}}$ = 0.265	LEV_N $^{\dagger}_{\text{(dictatorship firms)}}$ = 4.74
p-value = 0.000	p-value = 0.0000
Significant level: 1% (Reject H_O)	Significant level: 1% (Reject H_O)

† See Appendix 2.1 for the definition of the variables

‡ LEV_N = LEV/PRFT (leverage normalized by profits)

MULTIVARIATE ANALYSIS

Table 2.6

This table presents the expected relationship of control variables (Firm Specific) with financial leverage (LEV).

Control Variables	Unseg Expected	Democratic Expected	Dictatorship Expected	Explanation for Expected Results
LTS	Positive	?	?	Consistent with Frank and Goyal (2009), I expect a positive relationship to hold for UNSEG data. The relationship is unclear with respect to democratic and dictatorship portfolio firm.
Q	Negative	Negative	Negative	Q represents the growth opportunities available to the firm and the covenants imposed by debt makes borrowing more costly for high growth firms. A negative relationship is expected for all three sets of data.
ETA	Positive	?	?	Consistent with Frank and Goyal (2003), ETA is expected to be positively related to financial leverage for the UNSEG data. The relationship for democratic and dictatorship firms is ambiguous.
INTANG	Positive	Positive	Positive	Intangibility is expected to have a positive relationship with financial leverage for all three sets of data as observed in earlier studies.
CF	Positive	?	?	Cash flows are expected to be positively related to financial leverage for the UNSEG data but given the expected results for profits, the anticipation for democratic and dictatorship firms is ambiguous.
SD	Negative	Negative	Negative	Volatility of cash flows is expected to be negatively related to financial leverage for the three sets of data as cash flow uncertainty acts as a hurdle in borrowing money.
MED	Positive	Positive	Positive	Managers follow industry standard in setting up leverage ratios and industry median leverage is expected to be positively related to financial leverage.
NWC	Negative	Negative	Negative	Net working capital is expected to be negatively related to financial leverage as it represents the short term liquidity of the firm.

Table 2.7

Leverage and Profitability: Regression Results

This table presents the results for equation (1) for all firms before the implementation of the governance index. The data comprise 220,478 firm-year observations for 23,977 firms covering the period 1990 to 2009. Leverage (LEV) at time t is the dependent variable and lagged (one period) profitability (PRFT), collateralizable assets (COL) and size (TA) are the independent variables, subject to a number of control variables. All control variables are lagged by one period except for industry median leverage (MED). The control variables have been standardized to have a mean of zero and standard deviation of one [0,1]. Robust clustered standard errors are reported in the parentheses. The results for ordinary least squares (OLS) regression results and fixed effects (FE) are reported for Model 1, 2 and 3, which differ in their specifications.

	LEV_t †					
	(1)		(2)		(3)	
	OLS	FE	OLS	FE	OLS	FE
$PRFT_{t-1}$ †	-0.0002**	-0.0004***	-0.0003***	-0.0004***	-0.0004***	-0.0005***
	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)
COL_{t-1} †	-0.0001**	-0.0002***	-0. 0001***	-0.0002***	-0. 0002***	-0.0002***
	(0.00003)	(0.00002)	(0.00003)	(0.00002)	(0.00004)	(0.00003)
TA_{t-1} †	0.039***	0.071***	0. 012***	0.068***	-0.0049***	0.06***
	(0.0010)	(0.0010)	(0.0010)	(0.0010)	(0.0010)	(0.0020)
LTS_{t-1} †	.	.	.	.	0.018***	0. 015***
					(0.0010)	(0.0020)
Q_{t-1} †	.	.	.	.	-0.052***	-0.01
					(0.0100)	(0.0080)
ETA_{t-1} †	0.001	-0.001***			0.004***	0.002
	(0.0005)	(0.0003)			(0.0040)	(0.0040)
$INTANG_{t-1}$ †	.	.	.	.	0.0006	-0.001**
					(0.0005)	(0.0004)
CF_{t-1} †	0.003	-0.002*	.	.	0.011***	0. 004
	(0.0020)	(0.0010)			(0.0050)	(0.0040)

Table 2.7
Continued

	LEV_t †					
	(1)		(2)		(3)	
	OLS	FE	OLS	FE	OLS	FE
SD_{t-1} †	-0.02***	-0.004***	-0.013***	-0.003***	-0. 011***	-0.006***
	(0.0020)	(0.0010)	(0.0010)	(0.0010)	(0.0010)	(0.0010)
MED_t †			0. 15***	0.12***	0.14***	0.12***
			(0.0010)	(0.0010)	(0.0010)	(0.0010)
NWC_{t-1} †	-0.013***	-0. 007***	-0.01***	-0. 01***	-0.026***	-0. 013***
	(0.0020)	(0.0010)	(0.0010)	(0.0010)	(0.0020)	(0.0020)
TAX_t	.	.	.	.	0.0003	0.0002
					(0.0010)	(0.0020)
Constant	0.15	0.085	0.24	0.12	0.28	0.13
	(0.0020)	(0.0020)	(0.0010)	(0.0020)	(0.0030)	(0.0040)
R^2	0.0255	0.024	0.22	0.1752	0.2153	0.1614
Industry Dummy	Included	Included	Included	Included	Included	Included
Fixed Effects	n/a	Yes	n/a	Yes	n/a	Yes
N	104,605	104,605	105,823	105,823	90,199	90,199

*** p<0.01 ** p<0.05 * p<0.1 † See Appendix 2.1 for the definition of the variables

Table 2.8

Leverage and Profitability: Regression Results

This table presents the results for equation (1) using the firm fixed effects model. The data comprise 23,526 firm-year observations for 2,299 firms covering the period 1990 to 2009. Leverage (LEV) at time t is the dependent variable and lagged (one period) profitability (PRFT), collateralizable assets (COL) and size (TA) are the independent variables, subject to a number of control variables. All control variables are lagged by one period except for industry median leverage (MED). The control variables have been standardized to have a mean of zero and standard deviation of one [0, 1]. Robust clustered standard errors are reported in the parentheses. The results for ordinary least squares (OLS), fixed effects (FE) and instrumental variable (IV) regressions are reported for democratic and dictatorship firms. Robust clustered standard errors are reported in the parentheses.

	LEV_t †					
	Governance Index					
	1 - 5 (Democratic firms)			14 - 18 (Dictatorship Firms)		
	OLS	FE	IV	OLS	FE	IV
$PRFT_{t-1}$ †	0.0341***	0.0291***	0.0301***	-0.076***	-0.01	-0.03
	(0.005)	(0.005)	(0.007)	(0.031)	(0.011)	(0.024)
COL_{t-1} †	0.132***	0.132***	0.102***	-0.011***	0.003	-0.011***
	(0.031)	(0.029)	(0.034)	(0.004)	(0.005)	(0.005)
TA_{t-1} †	0.0531*	0.180***	0.0624**	-0.078***	0.235***	-0.072***
	(0.028)	(0.033)	(0.030)	(0.017)	(0.037)	(0.017)
LTS_{t-1} †	-0.110***	-0.111***	-0.114***	-0.266***	-0.284***	-0.307***
	(0.036)	(0.038)	(0.038)	(0.073)	(0.079)	(0.072)
Q_{t-1} †	-5.661**	-1.547	-3.987	-16.06*	-16.81**	-19.63**
	(2.440)	(2.275)	(2.633)	(8.460)	(7.882)	(8.394)
ETA_{t-1} †	-0.159	0.318***	0.133	0.039	0.163	0.009
	(0.103)	(0.098)	(0.110)	(0.183)	(0.178)	(0.181)
$INTANG_{t-1}$ †	2.389***	0.775**	2.517***	2.066***	3.426***	2.105***
	(0.342)	(0.346)	(0.588)	(0.783)	(0.760)	(0.778)
CF_{t-1} †	-4.226*	-5.821***	-2.312	-12.46	4.519	-4.317
	(2.322)	(1.995)	(2.495)	(9.154)	(9.014)	(9.195)

Table 2.8
Continued

	LEV_t †					
	Governance Index					
	1 - 5 (Democratic firms)			14 - 18 (Dictatorship Firms)		
	OLS	FE	IV	OLS	FE	IV
SD_{t-1} †	0.015	-0.004	0.016	-0.0557**	-0.0323	-0.0607**
	(0.014)	(0.013)	(0.014)	(0.028)	(0.027)	(0.027)
MED_t †	0.126***	0.0905***	0.126***	0.0824***	0.0737***	0.0802***
	(0.011)	(0.009)	(0.012)	(0.010)	(0.009)	(0.010)
NWC_{t-1} †	-26.30***	-8.458***	-23.92***	-16.28**	-14.93**	-11.25*
	(3.218)	(3.036)	(3.503)	(6.766)	(6.595)	(6.804)
TAX_t	0.005	0.003	0.004	-0.004	-0.001	-0.004
	(0.007)	(0.005)	(0.007)	(0.016)	(0.015)	(0.016)
G-Index	.	.	-0.006	.	.	-0.0279***
			(0.009)			(0.010)
Inter	.	.	0.203***	.	.	0.184***
			(0.049)			(0.065)
Constant	1.063	0.00626	0.818	-0.154	-0.169	0.014
Industry Dummy	Included	Included	Included	Included	Included	Included
Fixed Effects	.	Yes	.	.	Yes	.
R^2	0.661	0.231	0.623	0.717	0.289	0.729
N	1,402	1,402	1,402	653	653	653

*** p<0.01 ** p<0.05 * p<0.1 † See Appendix 2.1 for the definition of the variables

Table 2.9

Leverage, Profitability, Size and Tangibility: Interaction Variables Regression

This table presents the results for equation (1). The data comprise 23,526 firm-year observations for 2,299 firms covering the period 1990 to 2009. Leverage (LEV) at time t is the dependent variable and lagged (one period) profitability (PRFT), collateralizable assets (COL) and size (TA) are the independent variables, subject to a number of control variables. All control variables are lagged by one period except for industry median leverage (MED). The control variables have been standardized to have a mean of zero and standard deviation of one [0, 1]. Dummy equals one for dictatorship firms and zero otherwise. Robust clustered standard errors are reported in the parentheses.

	LEV_t †					
	Democratic/Dictatorship Firms			All Firms		
	OLS	FE	IV	OLS	FE	IV
$PRFT_{t-1}$ †	0.0406***	0.0293***	0.0424***	0.014***	0.01***	0.01***
	(0.005)	(0.005)	(0.005)	(0.001)	(0.001)	(0.001)
i_PRFT †	-0.0820*	-0.0385*	-0.077**	-0.105***	-0.04**	-0.077**
	(0.044)	(0.025)	(0.040)	(0.025)	(0.025)	(0.037)
COL_{t-1} †	0.164***	0.119***	0.163***	0.0249***	0.00824***	0.00891***
	(0.027)	(0.028)	(0.027)	(0.002)	(0.002)	(0.003)
i_COL †	-0.161***	-0.111***	-0.176***	-0.0440***	-0.0302**	-0.0677***
	(0.029)	(0.030)	(0.030)	(0.012)	(0.011)	(0.013)
TA_{t-1} †	0.0712***	0.200***	0.0792***	0.0475***	0.111***	0.0496***
	(0.024)	(0.029)	(0.024)	(0.007)	(0.009)	(0.007)
i_TA †	0.0297	-0.0235	0.0046	0.00906	-0.00071	0.0126**
	(0.021)	(0.029)	(0.022)	(0.006)	(0.004)	(0.006)
Dummy	-0.0891	0	0.258**	-0.00592	-0.0036	-0.00434
	(0.066)	0.000	(0.109)	(0.018)	(0.015)	(0.019)
LTS_{t-1} †	-0.0907***	-0.149***	-0.0976***	-0.0302***	-0.0454***	-0.0234***
	(0.030)	(0.033)	(0.030)	(0.008)	(0.011)	(0.008)
Q_{t-1} †	-6.761***	-2.798	-5.542**	-14.69***	-6.460***	-15.05***
	(2.165)	(2.114)	(2.196)	(0.701)	(0.649)	(0.723)
ETA_{t-1} †	-0.245***	0.265***	-0.221**	-0.0710**	0.0295	-0.0629**
	(0.089)	(0.085)	(0.090)	(0.030)	(0.029)	(0.031)
$INTANG_{t-1}$ †	2.601***	1.353***	2.930***	1.891***	1.348***	1.117***
	(0.296)	(0.306)	(0.441)	(0.114)	(0.109)	(0.130)

Table 2.9
Continued

	LEV_t †					
	Democratic/Dictatorship Firms			All Firms		
	OLS	FE	IV	OLS	FE	IV
CF_{t-1} †	-5.846***	-6.200***	-5.745***	-6.146***	-2.302***	-4.646***
	(2.036)	(1.868)	(2.037)	(0.663)	(0.617)	(0.690)
SD_{t-1} †	-0.00283	-0.0137	0.000634	-0.0123***	-0.00511**	-0.0158***
	(0.012)	(0.011)	(0.012)	(0.002)	(0.002)	(0.002)
MED_t †	0.109***	0.0843***	0.106***	0.105***	0.102***	0.0990***
	(0.008)	(0.007)	(0.008)	(0.003)	(0.002)	(0.003)
NWC_{t-1} †	-25.32***	-11.86***	-24.30***	-2.705***	-1.542***	-3.028***
	(2.795)	(2.686)	(2.858)	(0.219)	(0.178)	(0.227)
TAX_t	-0.00546	-0.00336	-0.00475	-0.000844	-0.00263	-0.000155
	(0.006)	(0.005)	(0.006)	(0.003)	(0.002)	(0.003)
G-Index	.	.	-0.009	.	.	-0.000616
			(0.010)			(0.001)
Inter	.	.	-0.030	.	.	-0.0436***
			(0.019)			(0.003)
Constant	0.566	0.076	0.654	0.432	(0.087)	0.142
Industry Dummy	Included	Included	Included	Included	Included	Included
Fixed Effect	.	Yes	.	.	Yes	.
R^2	0.641	0.232	0.642	0.478	0.215	0.447
N	2,055	2,055	2,055	15,206	15,206	15,198

*** p<0.01 ** p<0.05 * p<0.1 † See Appendix 2.1 for the definition of the variables

Table 2.10

Debt Issuance and Retirement

This table shows the total number of times debt instruments were issued/retired by democratic and dictatorship firms. It also gives the mean/median of debt/equity issues/retirements by these firms over the period 1990 to 2009.

Panel A: The results for the **Debt Issuance** by All Firms, Democratic Firms and Dictatorship firms are provided below.

	All Firms	Democratic Firms	Dictatorship Firms
Number of Debt Issues	21,521	2,339	630
Number of Firms	2,232	410	112
Mean Debt Issue *(in millions)*[(a)]	788.338	1,002.20	723.371
Median Debt Issue *(in millions)*	20	5.21	60
Standard Deviation	5,007.92	4,941.13	5,385.20
Minimum Debt issue *(in millions)*	0	0	0
Maximum Debt issue *(in millions)*	210,151	74,540	113,427.55

(a) The year-to-year mean debt issue for democratic firms is significantly higher than the year-to-year mean debt issue for dictatorship firms at the 1% level.

Panel B: The results for the **Debt Retirement** by All Firms, Democratic Firms and Dictatorship firms are provided below.

	All Firms	Democratic Firms	Dictatorship Firms
Number of Debt Reductions	20,985	2,279	809
Number of Firms	2,232	396	112
Mean Debt reduction *(in millions)* [(b)]	636.324	793.833	671.378
Median Debt reduction *(in millions)*	27.331	12.761	71.078
Standard Deviation	4,028.78	3,923.64	5,433.21
Minimum Debt reduction *(in millions)*	0	0	0
Maximum Debt reduction *(in millions)*	198,801	66,260	113,140.51

(b) The year-to-year mean debt reduction for democratic firms is significantly higher than the year-to-year mean debt issue for dictatorship firms at the 1% level.

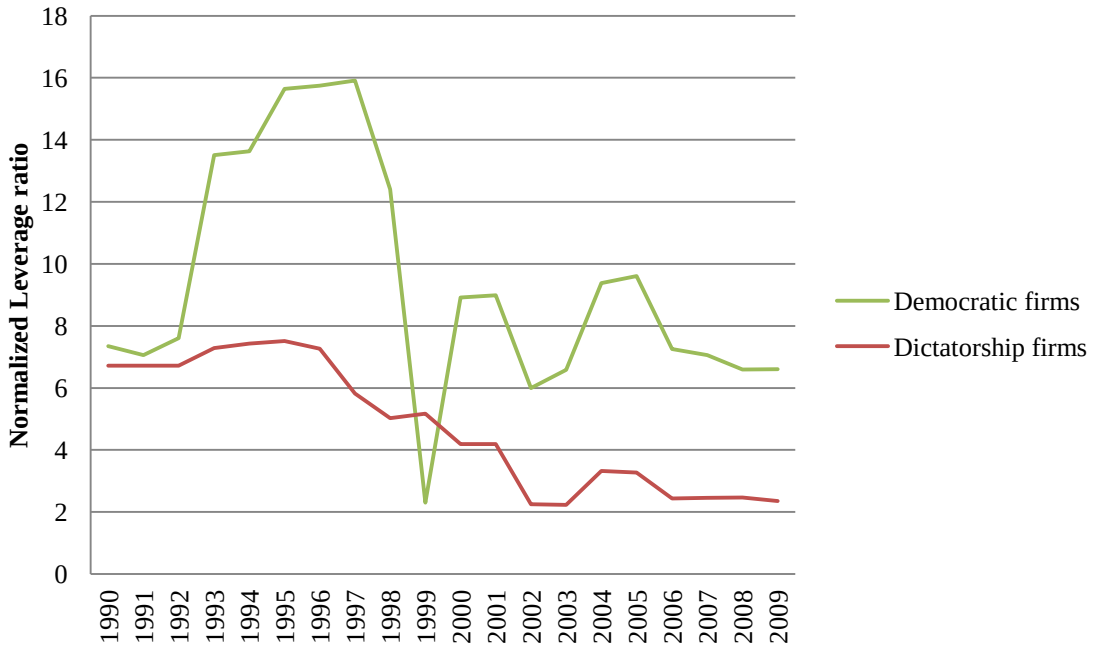
Table 2.10
Continued

Panel C: The results for the **Net Debt Issuance (Debt Issue – Debt Retirement)** by All Firms, Democratic Firms and Dictatorship firms are provided below.

	All Firms	Democratic Firms	Dictatorship Firms
Number of Firms	2,251	845	129
Net Debt Issue (mean) *(in millions)* [(c)]	165.363	173.338	51.0003
Net Debt Issue (median) *(in millions)*	0	0	-1.558
Standard Deviation	2165.67	1665.78	418.712
Minimum Difference *(in millions)*	-13,798	-13,798	-2,152
Maximum Difference *(in millions)*	111,666.50	21,657	2,905

(c) The year-to-year mean difference (net debt issue) for democratic firms is significantly greater than the year-to-year mean difference (net debt issue) for dictatorship firms at the 1% level

Figure 2.1


Normalized Leverage ratio
18
16
14
12
10
8
6
4
2
0
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
Democratic firms
Dictatorship firms

Appendix 2.1

Definition of variables

- G-Index: Corporate Governance Index created by Gompers, Ishii and Metrick (2003). The index has a theoretical (practical) range of 1 – 24 (1 – 18).
- Democratic Firms: Firms that fall in the G-Index range of 1 – 5 (maximum shareholder power).
- Dictatorship Firms: Firms that fall in the G-Index range of 14 – 18 (maximum management power).
- MVA: The total market value of assets, computed as the sum of the book value of debt plus the market value of equity.
- LEV: The ratio of long term debt and long term debt in current liabilities to the market value of the total assets of the firm.
- PRFT: The ratio of the net income to the market value of the total assets of the firm.
- COL: The ratio of the property, plant and equipment to the market value of the total assets of the firm.
- TA: The log of the total assets of the firm.
- LTS: The log of the total sales of the firm.
- Q: The ratio of the market value to the book value of the firm.
- ETA: The ratio of the total expenditures to the total assets of the firm.
- INTANG: The ratio of the intangible assets to the market value of the firm

- CF: The ratio of the total cash flows to the total assets of the firm.
- SD: Standard deviation of the annual cash flows for the past 3 years, following Klock et al (2005).
- MED: The year-to-year industry median leverage.
- NWC: The ratio of the net working capital to the total assets of the firm.
- TAX: The ratio of taxes paid to the earnings before taxes
- Dummy: Binary variables that equals 1 if it is a dictatorship firm and 0 otherwise.
- i_PRFT: The dummy variable multiplied by the ratio of the net income to the market value of the total assets of the firm.
- i_COL: The dummy variable multiplied by the ratio of the property, plant and equipment to the market value of the firm.
- i_TA: The dummy variable multiplied by the log of the total assets of the firm.

Appendix 2.2
A 2.2.1
Leverage and Profitability: Regression Results

This table presents the results for equation (1) for all firms before the implementation of the governance index. The data comprise 220,478 firm-year observations for 23,977 firms covering the period 1990 to 2009. Leverage (LEV) at time t is the dependent variable and lagged (one period) profitability (PRFT), collateralizable assets (COL) and size (TA) are the independent variables, subject to a number of control variables. All control variables are lagged by one period except for industry median leverage (MED). The control variables have not been standardized. The results for ordinary least squares (OLS) regression results and fixed effects are reported for Model 1, 2 and 3, which differ in their specification. Robust clustered standard errors are reported in the parentheses.

	LEV_t †					
	(1)		(2)		(3)	
	OLS	FE	OLS	FE	OLS	FE
$PRFT_{t-1}$ †	-0.0002** (0.00008)	-0.0004*** (0.00005)	-0.0003*** (0.00007)	-0.0004*** (0.00005)	-0.0004*** (0.0001)	-0.0005*** (0.00006)
COL_{t-1} †	-0.0001** (0.00003)	-0.0002*** (0.00002)	-0. 0001*** (0.00003)	-0.0002*** (0.00002)	-0. 0002*** (0.00004)	-0.0002*** (0.00003)
TA_{t-1} †	0.0389*** (0.0006)	0.0707*** (0.0011)	0. 0124*** (0.0005)	0.0675*** (0.001)	-0.0049*** (0.0013)	0.0643*** (0.0019)
LTS_{t-1} †					0.015*** (0.0012)	0. 0129*** (0.0017)
Q_{t-1} †					-0.00006*** (000001)	-0.00001 (0.00001)
ETA_{t-1} †	0.0005 (0.0005)	-0.0011*** (0.00037)			0.005*** (0.0045)	0.0018 (0.004)
$INTANG_{t-1}$ †					0.00004 (0.00003)	-0. 00005** (0.00002)
CF_{t-1} †	0.00004 (0.00003)	-0.00001* (0.00005)			0.0002*** (0.00007)	0. 0001 (0.00006)
SD_{t-1} †	-0.00005*** (0.0000)	-0.00001*** (0.000002)	-0.00003*** (0.000002)	-0.00001*** (0.000003)	-0. 00003*** (0.000003)	-0.00001*** (0.000003)
MED_t †			0. 743*** (0.003)	0.619*** (0.005)	0.731*** (0.0038)	0.6211*** (0.005)
NWC_{t-1} †	-0.00014*** (0.00001)	-0. 00008*** (0.00001)	-0.0001*** (0.00001)	-0. 00009*** (0.00001)	-0.0003*** (0.00002)	-0. 0001*** (0.00002)
TAX_t	. 	. 	. 	. 	0.0003 (0.001)	0.0002 (0.002)
Constant	0.152 (0.0012)	0.086 (0.002)	0.0831 (0.001)	-0.0096 (0.003)	0.0932 (0.0014)	-0.0301 (0.003)
R^2	0.0255	0.0240	0.22	0.1752	0.2153	0.1614
Industry Dummy	Included	Included	Included	Included	Included	Included
Fixed Effects	.	Yes	.	Yes	.	Yes
N	104,605	104,605	105,823	105,823	90,199	90,199

*** p<0.01 ** p<0.05 * p<0.1 † See Appendix 2.1 for the definition of the variables

A 2.2.2
Leverage and Profitability: Regression Results

This table presents the results for equation (1) using the firm fixed effects model. The data comprise 23,526 firm-year observations for 2,299 firms covering the period 1990 to 2009. Leverage (LEV) at time t is the dependent variable and lagged (one period) profitability (PRFT), collateralizable assets (COL) and size (TA) are the independent variables, subject to a number of control variables. All control variables are lagged by one period except for industry median leverage (MED). The control variables have not been standardized. Robust clustered standard errors are reported in the parentheses.

	LEV_t †					
	Democratic/Dictatorship Firms			All Firms		
	OLS	FE	IV	OLS	FE	IV
$PRFT_{t-1}$ †	0.0341***	0.0291***	0.0301***	-0.076***	-0.01	-0.03
	(0.005)	(0.005)	(0.007)	(0.031)	(0.011)	(0.024)
COL_{t-1} †	0.132***	0.132***	0.102***	-0.011***	-0.003	-0.011***
	(0.031)	(0.029)	(0.034)	(0.004)	(0.005)	(0.004)
TA_{t-1} †	0.0531*	0.180***	0.0624**	0.292***	0.236***	-0.072***
	(0.028)	(0.033)	(0.030)	(0.058)	(0.064)	(0.017)
LTS_{t-1} †	-0.0932***	-0.0946***	-0.0964***	-0.226***	-0.241***	-0.261***
	(0.030)	(0.032)	(0.032)	(0.062)	(0.067)	(0.062)
Q_{t-1} †	-0.00698**	-0.00191	-0.00492	-0.0198*	-0.0207**	-0.0242**
	(0.003)	(0.003)	(0.003)	(0.010)	(0.010)	(0.010)
ETA_{t-1} †	-0.167	0.334***	-0.14	0.0407	0.171	0.00941
	(0.108)	(0.103)	(0.115)	(0.192)	(0.187)	(0.190)
$INTANG_{t-1}$ †	0.155***	0.050s1**	0.163***	0.134***	0.222***	0.136***
	(0.022)	(0.022)	(0.038)	(0.051)	(0.049)	(0.050)
CF_{t-1} †	-0.0639*	-0.0881***	-0.035	-0.188	0.0684	-0.0653
	(0.035)	(0.030)	(0.038)	(0.139)	(0.136)	(0.139)
SD_{t-1} †	0.000	0.000	0.000	-0.000126**	0.000	-0.000137**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
MED_t †	0.643***	0.460***	0.642***	0.419***	0.375***	0.408***
	(0.056)	(0.045)	(0.059)	(0.052)	(0.048)	(0.052)
NWC_{t-1} †	-0.270***	-0.0870***	-0.246***	-0.167**	-0.154**	-0.116*
	(0.033)	(0.031)	(0.036)	(0.070)	(0.068)	(0.070)
TAX_t	0.000	0.000	-0.000326	0.000	0.000	-0.000309
	(0.001)	(0.000)	(0.001)	(0.001)	(0.001)	(0.001)
G-Index	.	.	-0.00576	.	.	-0.0279***
			(0.009)			(0.010)
Inter	.	.	0.203***	.	.	0.184***
			(0.049)			(0.065)
Constant	0.631	-0.148	0.435	-0.0385	0.188*	-0.0283
Industry Dummy	Included	Included	Included	Included	Included	Included
Fixed Effects	.	Yes	.	.	Yes	.
R^2	0.661	0.231	0.623	0.717	0.289	0.729
N	1,402	1,402	1,402	653	653	653

*** p<0.01 ** p<0.05 * p<0.1 † See Appendix 2.1 for the definition of the variables

A 2.2.3

Leverage, Profitability, Size and Tangibility: Interaction Variables Regression

This table presents the results for equation (1). The data comprise 23,526 firm-year observations for 2,299 firms covering the period 1990 to 2009. Leverage (LEV) at time t is the dependent variable and lagged (one period) profitability (PRFT), collateralizable assets (COL) and size (TA) are the independent variables, subject to a number of control variables. All control variables are lagged by one period except for industry median leverage (MED). The control variables have not been standardized. Dummy equals one for dictatorship firms and zero otherwise. Robust clustered standard errors are reported in the parentheses.

	LEV_t †					
	Democratic/Dictatorship Firms			All Firms		
	OLS	FE	IV	OLS	FE	IV
$PRFT_{t-1}$ †	0.0406***	0.0293***	0.0424***	0.014***	0.01***	0.01***
	(0.005)	(0.005)	(0.005)	(0.001)	(0.001)	(0.001)
i_PRFT †	-0.0820*	-0.0385*	-0.077**	-0.105***	-0.04**	-0.077**
	(0.044)	(0.025)	(0.040)	(0.025)	(0.025)	(0.037)
COL_{t-1} †	0.164***	0.119***	0.163***	0.0249***	0.00824***	0.00891***
	(0.027)	(0.028)	(0.027)	(0.002)	(0.002)	(0.003)
i_COL †	-0.161***	-0.111***	-0.176***	-0.0440***	-0.0302**	-0.0677***
	(0.029)	(0.030)	(0.030)	(0.012)	(0.011)	(0.013)
TA_{t-1} †	0.0712***	0.200***	0.0792***	0.0475***	0.111***	0.0496***
	(0.024)	(0.029)	(0.024)	(0.007)	(0.009)	(0.007)
i_TA †	0.0297	-0.0235	0.0046	0.00906	-0.00071	0.0126**
	(0.021)	(0.029)	(0.022)	(0.006)	(0.004)	(0.006)
Dummy	-0.0891	0	0.258**	-0.00592	-0.0036	-0.00434
	(0.066)	0.000	(0.109)	(0.018)	(0.015)	(0.019)
LTS_{t-1} †	-0.0771***	-0.127***	-0.0829***	-0.0257***	-0.0386***	-0.0199***
	(0.025)	(0.028)	(0.025)	(0.007)	(0.009)	(0.007)
Q_{t-1} †	-				-	
	0.00834***	-0.00345	-0.00684**	-0.0181***	0.00797***	-0.0186***
	(0.003)	(0.003)	(0.003)	(0.001)	(0.001)	(0.001)
ETA_{t-1} †	-0.256***	0.278***	-0.232**	-0.0745**	0.0309	-0.0659**
	(0.094)	(0.089)	(0.094)	(0.032)	(0.030)	(0.033)
$INTANG_{t-1}$ †	0.168***	0.0875***	0.190***	0.122***	0.0872***	0.0723***
	(0.019)	(0.020)	(0.029)	(0.007)	(0.007)	(0.008)
CF_{t-1} †	-0.0885***	-0.0938***	-0.0869***	-0.0930***	-0.0348***	-0.0703***
	(0.031)	(0.028)	(0.031)	(0.010)	(0.009)	(0.010)
SD_{t-1} †				-		-
	-0.00001	-0.00003	0.00000	0.00003***	-0.00001**	0.00004***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
MED_t †	0.552***	0.429***	0.541***	0.535***	0.520***	0.504***
	(0.042)	(0.034)	(0.042)	(0.016)	(0.012)	(0.017)
NWC_{t-1} †	-0.260***	-0.122***	-0.250***	-0.0278***	-0.0159***	-0.0311***
	(0.029)	(0.028)	(0.029)	(0.002)	(0.002)	(0.002)
TAX_t	-0.0004	-0.0003	-0.0004	-0.0001	-0.0002	0.0000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
G-Index	.	.	-0.0259***	.	.	-0.0006
			(0.007)			(0.001)
Inter	.	.	-0.0179***	.	.	-0.0436***
			(0.006)			(0.003)
Constant	0.034	-0.061	0.685	0.428	-0.107	0.160
Industry Dummy	Included	Included	Included	Included	Included	Included
Fixed Effect	.	Yes	.	.	Yes	.
R^2	0.641	0.232	0.642	0.478	0.215	0.447
N	2,055	2,055	2,055	15,206	15,206	15,198

*** p<0.01 ** p<0.05 * p<0.1 † See Appendix 2.1 for the definition of the variables

A 2.2.4

This table shows the results of the first stage least square (1SLS) for Table 2.8 and Table 2.9.

Table 2.8

	LEV_t	
	Democratic Firms	Dictatorship Firms
	1SLS	1SLS
$PRFT_{t-1}$ †	0.144*	-4.427***
	(0.860)	(0.649)
COL_{t-1} †	1.893***	-1.084***
	(0.377)	(0.159)
TA_{t-1} †	-5.137***	-3.505***
	(0.274)	(0.470)
LTS_{t-1} †	6.035***	4.666***
	(0.311)	(0.516)
Q_{t-1} †	-209.121***	-270.484***
	(34.977)	(66.454)
ETA_{t-1} †	-5.970***	4.732**
	(1.243)	(2.037)
$INTANG_{t-1}$ †	-13.302*	9.883
	(7.376)	(8.874)
CF_{t-1} †	-135.084***	91.177
	(30.427)	(99.033)
SD_{t-1} †	(0.127)	(0.032)
	(0.175)	(0.382)
MED_t †	0.146	0.225*
	(0.106)	(0.123)
NWC_{t-1} †	2.703	66.520
	(39.250)	(51.715)
TAX_t	0.0003	-0.000
	(0.000)	(0.000)
R^2	0.981	0.521
N	1,402	653

Table 2.9

	LEV_t	
	Democratic / Dictatorship Firms	All Firms
	1SLS	1SLS
$PRFT_{t-1}$ †	0.157*	-0.289***
	(0.094)	(0.025)
i_PRFT †	-2.927***	1.226
	(1.037)	(0.870)
COL_{t-1} †	2.354***	-0.015
	(0.440)	(0.042)
i_COL †	-3.609***	-1.401***
	(0.479)	(0.222)
TA_{t-1} †	-7.579***	-3.593***
	(0.301)	(0.091)
i_TA †	0.975***	0.272***
	(0.280)	(0.098)
Dummy	-2.355	-0.319
	(1.456)	(0.321)
LTS_{t-1} †	8.861***	4.434***
	(0.327)	(0.103)
Q_{t-1} †	-344.137***	-103.832***
	(40.046)	(10.334)
ETA_{t-1} †	-5.195***	-3.411***
	(1.419)	(0.435)
$INTANG_{t-1}$ †	-25.783***	-29.076***
	(7.669)	(1.946)
CF_{t-1} †	-309.729***	-18.895***
	(36.330)	(9.636)
SD_{t-1} †	-0.115	-0.096**
	(0.208)	(0.039)
MED_t †	0.269 **	0.240
	(0.111)	(0.033)
NWC_{t-1} †	-36.089	-9.350**
	(42.862)	(4.062)
TAX_t	-0.0005	0.0001
	(0.000)	(0.005)
R^2	0.953	0.773
N	2,055	15,198

***p<0.01 **p<0.05 *p<0.1
† See Appendix 2.1 for the definition of the variables

Chapter 3

Accrual Manipulation and Real Earnings Management Activities around Debt Covenant Violation

3.1. Introduction

In this paper I examine both real and accrual-based earnings management activities around the time of debt covenant violations. Positive accounting theory suggests that firms approaching debt covenant violations will make income-increasing choices to loosen their debt constraints (Watts and Zimmerman, 1986). Early research (e.g. Jones, 1991) suggests that managers may rely on cost allocations rather than accruals to manage earnings. DeFond and Jiambalvo (1994) provide evidence that debt covenant restrictions influence accounting choices and managers engage in accruals manipulation in the period preceding and the period of the violation. Their conclusions are however limited to a sample of 94 firms. Managers also have incentives to manipulate real activities during the period to meet certain covenant thresholds. Real activities manipulation affects cash flows and, in some cases, accruals. Earlier studies on earning management through real activities manipulation have focused mainly on investment activities, such as reductions in expenditures on research and development (Baber et al, 1991; Bushee, 1998; Bens et al, 2003).

Recent research shows increased appreciation for the importance of understanding how firms manage earnings through real activities manipulation in

addition to accrual-based activities (Zang, 2012). Roychowdhury (2006) finds evidence that managers are providing price discounts to increase sales temporarily, overproducing to report lower costs of goods sold and reducing discretionary expenses. Graham et al (2005) provide evidence suggesting that managers prefer real earnings management to accrual-based earnings management since real earnings management is less likely to be scrutinized by auditors and regulators. Subsequently, Cohen et al (2008) found evidence that managers have shifted away from accrual-based to real earnings management in the post Sarbanes-Oxley Act (SOX) period.

Despite the increasing interest in and importance of real earnings management activities, no study to date has examined whether and how firms engage in real earnings management around covenant violations, and how real and accrual-based earnings management activities vary around the violation period. This paper contributes to the literature on earnings management around covenant violation by presenting evidence on the management of not only accruals but also operational activities.

To capture accrual-based earnings management I follow prior studies[21] that use the cross-sectional model developed by Jones (1991) to estimate abnormal levels of total accruals and working capital accruals. I use working capital accruals in addition to total accruals as the former are more susceptible to management manipulation (DeFond and Jiambalvo, 1994). To capture real

[21] Sweeney, 1994; DeFond and Jiambalvo, 1994; Subramanyam, 1996.

earnings management, I follow Roychowdhury (2006) and Cohen and Zarowin (2010) to estimate abnormal levels of discretionary expenses, production costs and cash flow from operations.

The paper makes four contributions to the literature. First, this is the first paper that uses the debt covenant violation quarterly data created by Sufi to provide evidence of earnings management around violation quarters. Second, it provides evidence that managers manipulate accruals to avoid debt covenant violations. Previous studies have attempted to provide evidence of accrual manipulation to avoid covenant violation, but due to the cost of accessing actual debt covenant information, they have generally used a proxy for the existence and tightness of accounting-based covenants. The most frequently used proxy is the debt-equity ratio but, as noted by Watts and Zimmerman (1986), researchers in effect have tested a debt-equity hypothesis.

> Ceteris paribus, the larger a firm's debt/equity ratio, the more likely the firm is to make accounting choices that shift reported earnings from future periods to the current period (p. 216).

This hypothesis is different from the debt covenant hypothesis, which states that managers will choose to shift reported earnings from the future to the current period when a firm is close to violating a debt covenant. The present study is the first to provide evidence on the covenant hypothesis.

Third, it provides evidence on real earnings management around debt covenant violations. Although prior research has focused on accrual-based earnings management, I provide evidence that managers also engage in real earnings management to avoid covenant violations. Fourth, it also provides evidence that accrual-based earning management is concentrated in the quarter prior to, quarter of, and quarter following the violation, and that real earnings management activities are concentrated in the quarter of the violation and the quarter following the violation.

Our approach to examining abnormal accruals (total and working capital) and abnormal real earnings management has at least two advantages. First, I focus my analysis on the quarter prior to, quarter of and quarter following the violation. If covenant restrictions motivate manipulations, it seems likely that the incentives to manipulate are the highest in these periods. Thus, this design offers a powerful test of the covenant hypothesis. Second, the approach does not require a proxy for covenant violation – the firms are ex post known to be in violation.

While this approach has several benefits, it does have two drawbacks. First, successful manipulators, who were able to manage earnings to avoid debt covenant violations, cannot be observed. Second, managers may anticipate the violation and believe that no reasonable amount of manipulation will enable them to avoid the violation. This limitation would not have a serious effect on the quarter preceding the violation but, potentially, it makes the detection of manipulation in earnings, via accruals-based accounting and real earnings

management, in the quarter of the violation, more difficult. In spite of this limitation I was able to find evidence of earnings manipulation in the quarter of the violation.

The remainder of the paper is organized as follows. The next section describes the sample selection process and the variables used in the analysis. Section 3.3 provides the estimation models to calculate the normal levels of total accruals, working capital accruals, discretionary expenses, production costs and cash flow from operations. Section 3.4 develops the hypotheses and Section 3.5 presents the results. The final section of the study comprises the concluding remarks. Appendix 3.1 contains the definition of the variables.

3.2. Data Description and Variables

The study uses two data sets for the analysis that follows. First, it employs the Compustat database to collect the firm-specific financial information used to define the firm characteristics used in the estimation models. The broadest sample of Compustat observations used in this paper consists of 23,148 U.S. firms and 697,064 firm-quarter observations from the first calendar quarter of 1995 to the second fiscal quarter of 2009. Second, it uses the debt covenant violation reporting database constructed by Sufi. The data were constructed using the SEC Edgar website, which contains indices of every filing submitted to the Commission. The Commission made electronic filing mandatory for all SEC-

registered firms in the second calendar quarter of 1996. The earliest data point therefore is 1996 since electronic SEC filings were required to find the covenant violation. The entire data set covers the period 1996 – 2008 and includes fiscal quarters through the fourth quarter of 2008. The sample of violation data observations used in this paper consists of 21,627 U.S. firms and 569,272 firm-quarter observations from the second calendar quarter of 1996 to the fourth fiscal quarter of 2008. For the purpose of this paper I look at only those violations where the company has not reported any violation in at least eight successive quarters leading up to the quarter of violation.

3.2. A. Data

To construct the sample, I start with the universe of U.S. firms in the Compustat database from 1995 – 2009. This is the broadest sample used in this study since the violation data define the starting and ending year boundaries. First, the violation data are available only from the second calendar quarter of 1996 when electronic filing became mandatory for all SEC-registered firms. Since our earliest analysis starts from five quarters prior to the violation, our sample starts from the first calendar quarter of 1995. Second, the violation data are only available until the fourth quarter of 2008 and I extend my analysis up to the second quarter after the violation quarter. The sample therefore extends to the second quarter of 2009. Subsequently, I merge the two data sets after imposing the quarter-year restrictions to construct the sample to be used in this study.

3.2. B. Variables

The two different data sets provide details on the variables used in the study. The violations database provides information on the incidence of violations of debt covenants. The data set reports a violation as one if a firm is in violation of a debt covenant in a quarter and zero otherwise. The Compustat database provides information on firm-specific characteristics. *Total Accruals (TA)* is defined as net income minus operating cash flows following DeFond and Jiambalvo (1994). *Operating Cash Flows* is computed as working capital from operations, minus the sum of changes in accounts receivable, inventory and other current assets, plus the sum of changes in accounts payable, taxes payable and other current liabilities. *Working Capital Accruals (WCA)* is defined as the sum of changes in accounts receivable, inventory and other current assets, minus the sum of changes in accounts payable, taxes payable and other current liabilities. *Discretionary expenses (DISEXP)* is defined as the sum of research and development (R&D) and selling, general and administrative expenses (SG&A). *Production Costs (PROD)* is defined as the sum of costs of goods sold and changes in inventory. *Cash flows from Operations (CFO)* is the operating cash flow for the firm. *Total Assets (A)* is the quarterly assets of the firm. *Change in Revenues (*Δ*REV)* is the change in the revenue of the firm from time t-1 to time t. *Property, Plant and Equipment (PPE)* is the gross quarterly property, plant and equipment of the firm. *Sales (S)* is the total quarterly sales of the firm.

3.3. Estimation Models

3.3. A. Accrual-based earnings management

I use a cross-sectional model developed by Jones (1991) to calculate discretionary accruals after removing violating firm-quarters to obtain unbiased normal estimators and estimate the model for every industry for every quarter, where the industry is classified by its 4-digit SIC code. This approach controls for industry-wide changes in economic conditions that affect total accruals and allows for the estimated coefficients to vary across time and industry. All variables in the expectations models for accruals-based and real earnings management are scaled by lagged assets to reduce heteroscedasticity.

The primary model to estimate total accruals is based on the cross-sectional model estimated for each 4 digit SIC-quarter grouping. As proposed by DeFond and Jiambalvo (1994) and Cohen and Zarowin (2010), the model is as follows:

$$TA_{i,t}/A_{i,t-1} = \alpha_0 + \alpha_1 (1/A_{i,t-1}) + \beta_{1,i} (\Delta REV_{i,t}/A_{i,t-1}) + \beta_{2,i} (PPE_{i,t}/A_{i,t-1}) + \varepsilon_{i,t}, \quad (3.1)$$

where $TA_{i,t}$[22] = total accruals for firm i at time t, $\Delta REV_{i,t}$ = change in revenues for firm i at time t, $PPE_{i,t}$ = gross property, plant and equipment for firm i at time t, $A_{i,t-1}$ = total assets at time t-1 for firm i and $\varepsilon_{i,t}$ = error term for firm i at time t.

[22] Total Accruals ($TA_{i,t}$) are measured using Compustat data and defined as net income minus operating cash flows. Operating cash flows are defined as: Working capital from operations, minus the change in accounts receivable inventories and other current assets, plus the change in accounts payable, taxes payable and other current liabilities.

The coefficient estimates from Eq. (3.1) are used to estimate firm-specific normal accruals ($NTA_{i,t}$). Our measure of abnormal total accruals is the difference between the total accruals and the fitted total normal accruals, defined as:

$$\text{Abnormal Total Accruals} = (TA_{i,t}/A_{i,t-1}) - NTA_{i,t}, \quad (3.2)$$

Working capital accruals are subject to greater manipulation by managers; the estimation model is as follows:

$$WCA_{i,t}/A_{i,t-1} = \alpha_0 + \alpha_1 (1/A_{i,t-1}) + \beta_{1,i} (\Delta REV_{i,t}/A_{i,t-1}) + \varepsilon_{i,t}, \quad (3.3)$$

where $WCA_{i,t}$[23] = working capital accruals for firm i at time t, $\Delta REV_{i,t}$ = change in revenues for firm i at time t, $PPE_{i,t}$ = gross property, plant and equipment for firm i at time t, $A_{i,t-1}$ = total assets at time t-1 for firm i and $\varepsilon_{i,t}$ = error term for firm i at time t.

The coefficient estimates from Eq. (3.3) are used to estimate firm-specific normal working capital accruals ($NWCA_{i,t}$). Abnormal working capital accruals are the difference between working capital accruals and the estimated normal working capital accruals.

$$\text{Abnormal Working Capital Accruals} = (WCA_{i,t}/A_{i,t-1}) - NWCA_{i,t} \quad (3.4)$$

[23] Working Capital Accruals ($WCA_{i,t}$) are measured using Compustat data and defined as the sum of the changes in accounts receivable, inventories and other current assets, less the sum of the changes in accounts payable, taxes payable and other current liabilities.

3.3. B. Real earnings management

Following Roychowdhury (2006), I focus on manipulation of real earnings and their effects on the abnormal levels of three variables, namely, discretionary expenses, production costs and cash flow from operations. I focus primarily on the following:

a. *Decrease in discretionary expenses:* Reducing expenses will boost earnings in the current period. It could also lead to higher current period cash flows if the firms paid for such expenses in cash. These expenses include Research & Development expense and Selling, General & Administrative expense.

b. *Increasing production to report lower costs of goods sold:* Increasing the number of units produced will spread the fixed overhead costs over a larger number of units, thus lowering total cost per unit as long as the total reduction in fixed cost per unit is not offset by an increase in marginal cost per unit. This will reduce the reported costs of goods sold and increase earnings.

c. *Accelerating timing of sales:* Managers can accelerate the timing of sales to the current period by offering limited period price discounts and providing more lenient credit terms. The additional sales will boost current period earnings. Both of these strategies will result in lower cash flows in the current period. A potential problem with this argument is that purchasers may want to make use of early payment discounts (if available)

and this may lead to higher cash flows in the current period. I acknowledge this drawback, but contend that since the objective of the managers is to increase profits, the credit terms would be designed to accelerate sales (e.g. by extending the payment period) and would not focus on increasing cash flows (e.g. by offering early payment discounts).

The primary model to estimate normal levels of discretionary expenses, production costs and cash flow from operations is based on the cross-sectional model estimated for each 4-digit SIC-quarter grouping. The model for discretionary expenses, from Dechow et al (1998), is as follows:

$$DISEXP_{i,t}/A_{i,t-1} = \alpha_0 + \alpha_1 (1/A_{i,t-1}) + \beta_{1,i} (S_{i,t}/A_{i,t-1}) + \varepsilon_{i,t} \quad (3.5)$$

Roychowdhury (2006) presents the following problem with this model. If managers manipulate sales upwards to increase reported earnings in any period, they can exhibit unusually low residuals in Eq. (3.5), even when they do not reduce discretionary expenses. To avoid this problem, discretionary expenses are modelled as a function of lagged sales. Therefore, the following model is used to estimate normal discretionary expenses. The regressions are run for every industry and quarter:

$$DISEXP_{i,t}/A_{i,t-1} = \alpha_0 + \alpha_1 (1/A_{i,t-1}) + \beta_{1,i} (S_{i,t-1}/A_{i,t-1}) + \varepsilon_{i,t} \quad (3.6)$$

where $DISEXP_{i,t}$[24] = discretionary expenses for firm i at time t; $S_{i,t-1}$= revenues for firm i at time t-1; $A_{i,t-1}$ = total assets at time t-1 for firm i; $\varepsilon_{i,t}$ = error term for firm i at time t. The coefficient estimates from Eq. (3.6) are used to estimate firm-specific normal discretionary expenses ($NDISEXP_{i,t}$). Our measure of abnormal discretionary expenses is the difference between the total discretionary expenses and the fitted total normal discretionary expenses, defined as:

$$\text{Abnormal Discretionary Expenses} = (DISEXP_{i,t}/A_{i,t-1}) - NDISEXP_{i,t} \quad (3.7)$$

Production costs are the sum of costs of goods sold and changes in inventory. Dechow et al (1998) expressed expenses as a linear function of contemporaneous sales. The model for normal COGS is as follows:

$$COGS_{i,t}/A_{i,t-1} = \alpha_0 + \alpha_1 (1/A_{i,t-1}) + \beta_{1,i} (S_{i,t}/A_{i,t-1}) + \varepsilon_{i,t} \quad (3.8)$$

Similarly, Dechow et al (1998) model the normal inventory growth using the following:

$$\Delta INV_{i,t}/A_{i,t-1} = \alpha_0 + \alpha_1 (1/A_{i,t-1}) + \beta_{1,i} (\Delta S_{i,t}/A_{i,t-1}) + \beta_{2,i} (\Delta S_{i,t-1}/A_{i,t-1}) + \varepsilon_{i,t} \quad (3.9)$$

To arrive at the model for production costs, I add Eq. (3.8) and Eq. (3.9). The model is used to estimate normal production costs and the regressions are run for every industry in every quarter.

$$PROD_{i,t}/A_{i,t-1} = \alpha_0 + \alpha_1 (1/A_{i,t-1}) + \beta_{1,i} (S_{i,t}/A_{i,t-1}) + \beta_{2,i} (\Delta S_{i,t}/A_{i,t-1}) + \beta_{3,i} (\Delta S_{i,t-1}/A_{i,t-1}) + \varepsilon_{i,t}, \quad (3.10)$$

[24] Discretionary expenses are measured from Compustat data and defined as the sum of Research & Development expenses and Selling, General & Administrative expenses.

where $PROD_{i,t}$[25]= production costs for firm i at time t, $S_{i,t}$= revenues for firm i at time t, $\Delta S_{i,t}$ = change in revenues of firm i at time t, $\Delta S_{i,t-1}$ = change in revenues of firm i at time t-1, $A_{i,t-1}$ = total assets at time t-1 for firm i and $\varepsilon_{i,t}$ = error term for firm i at time t. The coefficient estimates from Eq. (3.10) are used to estimate firm-specific normal production costs ($NPROD_{i,t}$). Our measure of abnormal production costs is the difference between the total production costs and the fitted total normal production costs, defined as:

$$\text{Abnormal Production Costs} = (PROD_{i,t}/A_{i,t-1}) - NPROD_{i,t} \quad (3.11)$$

Following Dechow et al (1998), I estimate normal cash flow from operations using a linear model of sales and change in sales in the current period. I run cross-sectional regressions for every industry in every quarter, as follows:

$$CFO_{i,t}/A_{i,t-1} = \alpha_0 + \alpha_1 (1/A_{i,t-1}) + \beta_{1,i} (S_{i,t}/A_{i,t-1}) + \beta_{2,i} (\Delta S_{i,t}/A_{i,t-1}) + \varepsilon_{i,t} \quad (3.12)$$

where $CFO_{i,t}$[26]= operating cash flows for firm i at time t, $S_{i,t}$= revenues for firm i at time t, $\Delta S_{i,t}$ = change in revenues of firm i at time t, $A_{i,t-1}$ = total assets at time t-1 for firm i and $\varepsilon_{i,t}$ = error term for firm i at time t. The coefficient estimates from Eq. (3.12) are used to estimate firm-specific normal cash flow from operations ($NCFO_{i,t}$). Our measure of abnormal cash flows from operations is the difference between the total cash flows and the fitted total normal production costs, defined as:

[25] Production costs are measured using Compustat data and defined as the sum of costs of goods sold and changes in inventory.

[26] Cash flow from operations is measured using Compustat data and is the operating cash flow of the firm

$$\text{Abnormal Cash Flows} = (CFO_{i,t}/A_{i,t-1}) - NCFO_{i,t} \quad (3.13)$$

3.4. Hypotheses

Debt covenants are intended to restrict managers from engaging in investment and financing decisions that reduce the value of creditors' claims. These covenants are frequently based on accounting information and violation of these covenants is costly. Managers of firms that are close to violating a debt covenant are likely to make accounting choices that reduce the likelihood of default. Thus, they are inclined to make income increasing choices to avoid such violations. Quarterly financial statements, which report the violation, are issued ex post and managers know whether they violated a covenant in a quarter. I expect to find evidence of manipulation in the quarter preceding the violation as managers would implement accounting practices to avoid such events.

H3.1.A: ***Violating firms exhibit abnormal total accruals that are positive in the quarter preceding the quarter of the debt covenant violation.***

H3.1.B: ***Violating firms exhibit abnormal working capital accruals that are positive in the quarter preceding the quarter of the debt covenant violation.***

Even if manipulation of accounting information cannot prevent the violation of a covenant, managers are still likely to make income-increasing accounting choices in the hope of improving their bargaining position in case the violation leads to a renegotiation of a debt contract (DeFond and Jiambalvo,

1993)[27]. Managers also face other economic consequences of their accounting choices that induce them to make income increasing rather than income decreasing accounting choices. Healy (1985) indicates that management compensation plans do not motivate managers to make strictly income increasing accounting choices. Instead, the accounting choices depend on the relationship of the earnings figure (before any accounting choice is made) to any upper or lower limits in the executive compensation plan. Jones (1991) suggests that by increasing reported earnings, managers can reduce the restrictiveness of the debt covenants and increase their own compensation through higher bonuses. Managers would also continue with the accounting choice made in the quarter preceding the violation, as a reversal would also have a significant negative impact on earnings. I therefore expect to find a positive abnormal level of accruals in the quarter of the violation as well.

H3.2.A: ***Violating firms exhibit abnormal total accruals that are positive in the quarter of the debt covenant violation.***

H3.2.B: ***Violating firms exhibit abnormal working capital accruals that are positive in the quarter of the debt covenant violation.***

Managers would likely try to increase earnings in the quarter following the violation for two reasons. First, they will follow income increasing accounting choices similar to those made in the preceding quarters (Sweeney, 1994). Second,

[27] Nini et al (working paper) provide evidence that debt contracts are renegotiated after debt covenant violations.

managers will want the firm to get out of the state of covenant violation. I therefore expect managers to make accounting choices that increase the earnings of the firm in the quarter following the violation.

H3.3.A: ***Violating firms exhibit abnormal total accruals that are positive in the quarter following the quarter of the debt covenant violation.***

H3.3.B: ***Violating firms exhibit abnormal working capital accruals that are positive in the quarter following the quarter of the debt covenant violation.***

Unlike accruals management, where managers can make accounting choices ex post to manipulate earnings, real earnings management has some limitations. First, the extent of real activities manipulation will vary with the flexibility managers have to undertake such activities; for example, overhead cost distribution by means of excess production is easier to accomplish and escape detection when the firm maintains a high level of inventory. Similarly, management has more discretion over research and development expense and selling, general and administrative expenses in firms where such costs are high. Second, management may have more room to manipulate earnings using some real earnings management activities, but not all; for example, management may be able to reduce discretionary expenses for successive quarters, but may not be able to manipulate production costs as that would create high levels of inventory and arouse suspicion. Third, real activities cannot be manipulated ex post. If managers learn about the violation of a covenant at the end of the quarter, they cannot make any changes in earnings via real earnings management activities.

Managers have the most discretion over discretionary expenses relative to other methods of real activities manipulation. Earlier studies (e.g. by Nini et al) found that firm specific characteristics deteriorate in the quarters leading up to the violation, indicating to managers that a violation is likely to occur. To avoid such an event, managers would decrease discretionary expenses in the quarter leading up to the violation quarter. I would therefore expect to find abnormal discretionary expenses that are negative in the quarter leading up to the violation quarter. Managers have less control over production costs as increasing production costs in the quarter leading up to the violation quarter would mean a reversal in the quarter of the violation. I would therefore not expect to find an increase in production costs in the quarter leading up to the violation quarter. Likewise, managers can accelerate the timing of sales by offering limited period price discounts and providing more lenient credit terms. Both of these strategies would lead to lower cash flows. I do not expect to find evidence of such activities in the quarter leading up to the violation quarter as such activities can only be offered for a very short period of time.

H3.4.A: ***Violating firms exhibit abnormal discretionary expenses that are negative in the quarter preceding the quarter of the debt covenant violation.***

H3.4.B: ***Violating firms do not exhibit abnormal positive production costs in the quarter preceding the quarter of the debt covenant violation.***

H3.4.C: ***Violating firms do not exhibit abnormal operating cash flows that are negative in the quarter preceding the quarter of the debt covenant violation.***

Managers are able to determine whether a violation is likely to occur and will undertake all efforts to avoid such violations. I would therefore expect managers to engage in real earnings management activities in the quarter of the violation. The expectation is to have abnormal negative discretionary expenses in the quarter of the violation as managers would reduce such expenses to increase reported earnings. Production costs are also expected to be high in the quarter of the violation as managers would attempt to spread fixed overhead costs over a large number of units produced. Operating cash flows are also expected to be negative in the quarter of the violation as managers would be likely to offer discounts and lenient credit terms to boost sales.

H3.5.A: ***Violating firms exhibit abnormal discretionary expenses that are negative in the quarter of the debt covenant violation.***

H3.5.B: ***Violating firms exhibit abnormal production costs that are positive in the quarter of the debt covenant violation.***

H3.5.C: ***Violating firms exhibit abnormal operating cash flows that are negative in the quarter of the debt covenant violation.***

In the quarter following the violation quarter, managers still have the incentive to manipulate earnings as they would not want to be in violation of a covenant over a long period of time. They are therefore likely to keep discretionary expenses at a minimum and I expect that abnormal levels of such expenses would be negative in the quarter following the violation quarter. Since

management engages in increasing production in the quarter of the violation, so that the stock of inventory will be high, I would expect abnormal production costs to be negative in the quarter following the violation as managers will likely adjust the inventory in order to reduce inventory carrying costs. Managers will likely also have to withdraw limited time sales and tighten credit terms, so I expect to find abnormal positive levels of operating cash flows in the quarter following the violation.

H3.6.A: ***Violating firms exhibit abnormal discretionary expenses that are negative in the quarter following the quarter of the debt covenant violation.***

H3.6.B: ***Violating firms exhibit abnormal production costs that are negative in the quarter following the quarter of the debt covenant violation.***

H3.6.C: ***Violating firms exhibit abnormal operating cash flows that are positive in the quarter following the quarter of the debt covenant violation.***

3.5. Results

3.5. A. Descriptive Statistics

Table 3.1 presents descriptive statistics comparing the violating firms to the non-violators. The mean total assets ($867 million) of violating firms is smaller than that of non-violating firms ($6.1 billion). Interestingly, the profit margin (Net Income/Sales) is negative for both the violators and non-violators and the losses are greater for non-violating firms. The scaled total accruals ($Accruals/Assets_{t-1}$)

are negative for both samples and are significantly lower for the non-violating firms. Scaled working capital accruals (Working Capital Accruals/$Assets_{t-1}$) are positive for violating firms and negative for non-violating firms. The comparative difference in total and working capital accruals across violators and non-violators provides some evidence of earnings management to improve earnings in the period under study. Scaled discretionary expenses are positive for both samples; however, the magnitude of the mean values is close to zero for violating firms (0.03). Scaled production costs are positive for the violators and non-violators and higher for violating firms. Operating cash flows are negative for violators and non-violators; however, the magnitude of the means for the non-violators is more than three times that of the violators. In all cases, as expected, the differences are significant at the 1% level.

Table 3.2 profiles violating firms with respect to total accruals changes, total working capital accruals changes, earnings changes, cash flow changes and revenue changes in the five quarters prior to the violation, the quarter of the violation, and the subsequent two quarters. All changes are computed as the first difference ($X_t - X_{t-1}$) scaled by total assets at time t-1.

Panels A and B present the change in total accruals and working capital accruals scaled by total assets. This change is referred to as a measure of abnormal accruals (DeFond and Jiambalvo, 1994), with normal accruals in period t estimated as realized total accruals in period t-1. However total accruals are assumed to be independently, identically distributed and Dechow et al (1998)

document significant negative serial correlation in changes in accruals. Thus, the accrual (total and working capital) changes are presented as descriptive information and not as a measure of abnormal accruals.

As indicated in panel A, the changes in total accruals are generally small in the quarters leading up to the violation. However, in the quarter prior to the violation, the mean (median) change in total accruals is 0.0432 (-0.0128). The change is not significant using a two-tailed t-test, but is significant at the 1% level using a two-tailed Wilcoxon test. In the quarter of the violation the mean (median) change in total accruals is -0.066 (-0.0337). The negative change is significant at the 1% level using a two-tailed t-test and a two-tailed Wilcoxon test. The negative change is likely due to a variety of factors. The presence of negative serial correlation may result in negative accrual changes in the quarter of the violation (Quarter 0) since Quarter -1 is marked by positive total accruals. Manipulation of accruals by managers in the three quarters preceding the violation quarter needs to be adjusted for, and managers have an incentive to reverse the accruals manipulation in the quarter of the violation. Nini et al (forthcoming) provide evidence that creditors act as governance mechanisms in the event of a debt covenant violation. I suggest that the negative accruals may result because of management changes and increased monitoring by auditors. The mean (median) total accruals changes remain negative and significant in the quarters following the violation, though the significance disappears for the mean value of total accruals in Quarter 2.

Panel B reports the changes in working capital accruals. The general movement of these accruals is the same as observed in the total accruals, with positive accruals leading up to the quarter of the violation and a significant negative working capital accrual change in the quarter of the violation. The major differences in total and working capital accruals are the median values, which are positive and significant (using the two-tailed Wilcoxon test) in the quarters leading up to the violation, and negative and significant in the quarter of the violation. The behaviour of working capital accruals in the quarters following the violation exhibits the same trend as the total accruals in terms of direction and significance.

I also look at economic factors to understand changes in accruals in the quarters surrounding the violation. As indicated in panels C through E, there are significant changes in earnings, cash flows and revenues in the quarters where significant changes in accruals are observed. Changes in accruals may reflect changes in a firm's economic circumstances (Kaplan, 1985) and accruals changes in panels A and B must be interpreted with caution since they may reflect changes in a firm's economic circumstances rather than manipulation. The negative change may also be due to the bias of having only those firms in the sample that violated a debt covenant. That is, I include only those firms that violated a debt covenant and it may be difficult for such firms to engage in positive manipulation, leading to positive changes in total and working capital accruals. In the tests

reported later, I use time-series and cross-sectional models to control for such changes.

Table 3.3 profiles violating firms with respect to discretionary expense changes, production cost changes and operating cash flow changes in the five quarters prior to the violation, the quarter of the violation, and the subsequent two quarters. All changes are computed as the first difference ($X_t - X_{t-1}$) scaled by total assets at time t-1 to reduce heteroscedasticity.

As indicated in Panel A, changes in discretionary expenses are generally small in the quarters leading up to the violation. The mean (median) change in discretionary expenses in the quarter prior to the violation quarter is 0.0014 (0.0019). The mean change, though positive, is insignificant. In the quarter of the violation, the mean (median) change in the discretionary expenses is -0.006 (0.0035). The change is insignificant using the two-tailed t-test, but is significant at the 1% level using the two-tailed Wilcoxon test. The change in discretionary expenses in the quarter following the violation is negative with a mean (median) of -0.0203 (-0.0004) and is significant at the 1% level. Discretionary expenses stay negative for Quarter 2, but the level of significance drops to the 10% level.

Changes in production costs are small in the quarters leading up to the violation and the quarter of the violation, as shown in Panel B. The mean changes are generally negative in the quarter leading up to the violation, but are insignificant using a two-tailed t-test. The median changes are positive and significant for Quarter -5 through Quarter -2, positive and insignificant for the

quarter prior to the violation quarter, and negative and insignificant in the quarter of the violation. Production cost changes have a mean (median) of -0.017 (-0.001) in the quarter following the violation and the violations are significant at the 1% level, using both the two-tailed t-test and Wilcoxon test. Production costs remain negative in Quarter 2 but the mean change is insignificant and the median change is significant at the 10% level.

Panel C highlights changes in operating cash flows. The changes are generally small in the quarters leading up to the violation. The mean (median) operating cash flows changes are 0.0002 (0.0022) in the quarter prior to the violation quarter. The change is not significant using the two-tailed t-test, but is significant at the 10% level using the two-tailed Wilcoxon test. In the quarter of the violation the mean (median) change is 0.0087 (-0.002). The change is significant using the two-tailed Wilcoxon test. In the quarter following the violation, the mean (median) change is 0.0187 (0.0059) and is significant at the 1% level for both tests. The Quarter 2 changes are insignificant.

While accrual-based earnings management activities are concentrated in the quarter of and quarter following the violation, real earnings management activities are concentrated in the quarters following the violation. Managers have the liberty to manage accruals at the end of the violation quarter and influence earnings changes, but cannot do so with real earnings management as these activities cannot be altered once the quarter has ended. I find evidence of this in the reported results.

3.5. B. Multivariate Results

3.5. B. 1. Accrual-Based Earnings Management

Table 3.4 reports the regression coefficients for some of the key regressions used to estimate normal levels of total and working capital accruals. I estimate these models using the entire sample of firm-quarters after excluding firm-quarters in which firms report covenant violations. The table reports the mean coefficients and standard errors across industry-quarters.

The coefficients for total accruals are generally as predicted by Jones (1991), with one exception. The average coefficient for property, plant and equipment is positive, albeit insignificant. The expected sign for the coefficient should be negative because property, plant and equipment are related to an income decreasing accrual (i.e. depreciation expense). Jones et al (1988) estimated regression coefficients for four individual components of total accruals (i.e. accounts receivable, inventory, accounts payable and depreciation). The coefficient for depreciation was insignificant in their study as well and may help to explain the coefficient in our sample. The expected sign of the coefficient for revenues is not obvious as a given change in revenue can cause income-increasing changes in some accounts (e.g. increase in accounts receivable) and income-decreasing change in others (e.g. increase in accounts payable). Jones (1988) found that the coefficient was significantly positive for accounts receivables and significantly negative for accounts payable. The coefficient for change in

revenues is positive and significant for our sample. The average adjusted R^2 for the regression equation is 0.372 and in line with earlier studies.

The coefficients for working capital accruals are as expected. Working capital accruals are subject to more manipulation by managers and the significance of change in revenues at the 1% level suggests the same. It is noteworthy that the coefficient for change in revenues is positive and significant for both total and working capital accruals. This suggest that managers manipulate credit terms by accelerating receivables (thereby reporting increased earnings) and delaying payments to the creditors of the firm (thereby reducing costs). The average adjusted R^2 for the regression equation for working capital accruals is 0.412.

Table 3.5 presents the summary statistics for abnormal total accruals and abnormal working capital accruals in the quarter prior to, quarter of, and quarter following the violation. I use the estimates for Eq. (3.1) and Eq. (3.3) reported in Table 3.4. The model assumes the relationship between normal accruals and the explanatory variables is stationary. The estimates are used to calculate normal total and working capital accruals. Abnormal total accruals are defined as:

$$\varepsilon_{i,t} = TA_{i,t}/A_{i,t-1} - [\alpha_1 (1/A_{i,t-1}) + \beta_{1,i} (\Delta REV_{i,t}/A_{i,t-1}) + \beta_{2,i} (PPE_{i,t}/A_{i,t-1})], \quad (3.14)$$

where $\varepsilon_{i,t}$ represents the level of abnormal total accruals at time t.

The abnormal working capital accruals are defined as:

$$\varepsilon_{i,t} = WCA_{i,t}/A_{jt-1} - [\alpha_1 (1/A_{i,t-1}) + \beta_{1,i} (\Delta REV_{i,t}/A_{i,t-1})], \quad (3.15)$$

where $\varepsilon_{i,t}$ represents the level of abnormal working capital accruals at time t.

Abnormal accruals are calculated for the quarter prior to, quarter of, and quarter following the violation for both total and working capital accruals. Since depreciation expense does not enter into the calculation of working capital accruals, I do not include the level of property, plant and equipment in the estimation of the time-series models of normal working capital accruals. Other than this difference, the analyses of total and working capital accruals are identical.

The theory being tested suggests positive manipulation in accruals to increase reported earnings. I run t-tests by firm-quarters and report a summary of the results in Table 3.5. The first column of Table 3.5 reports the abnormal total and working capital accruals in the quarter preceding the violation and provides evidence for H3.1.A and H3.1.B. The mean (median) abnormal total accruals of 0.517 (0.460) is significant at the 1% level. A similar result is observed for working capital accruals with a positive mean (median) abnormal working capital accrual of 0.078 (0.092), significant at the 1% level. The significant changes in total accruals and working capital accruals in the quarter prior to the violation suggest that managers manipulated earnings to avoid violation. The second column reports the abnormal total and working capital accruals in the quarter of

the violation and provides evidence for H3.2.A and H3.2.B. The results are as expected with total accruals having a mean (median) of 0.491 (0.471), significant at the 1% level. The mean (median) for working capital accruals is 0.061 (0.084), with a significance level of 1%. The results are in accordance with conventional wisdom; that is, managers manipulate accruals to avoid violation of debt covenants. The third column reports the level and significance of abnormal total and working capital accruals in the quarter following the violation and provides evidence for H3.3.A and H3.3.B. If a firm was in violation in a given period and does not correct for it in the following period, it has to report the violation for both periods. I expected to find evidence of positive manipulation in the quarter following the violation in so far as managers do not want to report the violation in subsequent quarters. The mean (median) abnormal total accruals of 0.531 (0.444) suggest that this is the case and managers manipulate accruals in the quarters following the violation as well. The results are significant at the 1% level. The same is observed for working capital accruals, which has a mean (median) of 0.098 (0.097) and is significant at 1%. The overall results suggest that managers manipulate accruals in the quarter prior to, the quarter of, and the quarter following the violation.

3.5. B. 2. Real Earnings Management

Table 3.6 reports the coefficients for the regression used to estimate normal levels of discretionary expenses, production costs and operating cash flows. I estimate

these models using the entire sample of firm-quarters. The table reports the mean coefficients and standard errors across industry-quarters.

The coefficients are generally as predicted by Dechow et al (1998), with a few exceptions. First, under the simplifying assumption of Dechow et al, the coefficient of scaled discretionary expenses on scaled lagged sales should be positive, but our results indicate that the coefficient is negative and insignificant. Roychowdhury (2006) estimated the coefficient of scaled production costs on scaled sales and found it to be positive, while I estimate it to be negative and significant. The coefficient for scaled changes in sales is, however, positive and significant in line with Dechow et al and Roychowdhury. The coefficients for operating cash flows are as predicted by Dechow et al. The average adjusted R^2s across industry-quarters are 0.625 for discretionary expenses, 0.439 for production costs and 0.393 for operating cash flows.

Table 3.7 presents the summary statistics for the abnormal levels of discretionary expenses, production costs and operating cash flows in the quarter prior to, quarter of, and quarter following the violation. I used estimates for Eq. (3.6), Eq. (3.10) and Eq. (3.12) for discretionary expenses, production costs and operating cash flows respectively, as reported in Table 3.6. The estimates are used to calculate normal levels of discretionary expenses, production costs and operating cash flows. Abnormal discretionary expenses are defined as:

$$\varepsilon_{i,t} = DISEXP_{i,t}/A_{i,t-1} - [\alpha_1 (1/A_{i,t-1}) + \beta_{1,i} (S_{i,t-1}/A_{i,t-1})], \quad (3.16)$$

where $\varepsilon_{i,t}$ represents the level of abnormal discretionary expenses at time t.

Abnormal production costs are defined as:

$$\varepsilon_{i,t} = PROD_{i,t}/A_{i,t-1} - [\alpha_1 (1/A_{i,t-1}) + \beta_{1,i} (S_{i,t}/A_{i,t-1}) + \beta_{2,i} (\Delta S_{i,t}/A_{i,t-1}) + \beta_{3,i} (\Delta S_{i,t-1}/A_{i,t-1})], \quad (3.17)$$

where $\varepsilon_{i,t}$ represents the abnormal level of production costs at time t.

Abnormal operating cash flows are defined as:

$$\varepsilon_{i,t} = CFO_{i,t}/A_{i,t-1} - [\alpha_1 (1/A_{i,t-1}) + \beta_{1,i} (S_{i,t}/A_{i,t-1}) + \beta_{2,i} (\Delta S_{i,t}/A_{i,t-1})], \quad (3.18)$$

where $\varepsilon_{i,t}$ represents the abnormal level of operating cash flows at time t.

Abnormal levels of discretionary expenses, production costs and operating cash flows are calculated for the quarter prior to, quarter of, and quarter following the violation. The expectation is that abnormal discretionary expenses will be negative in the quarters surrounding the violation as managers try to increase earnings to avoid the violation. Abnormal production costs are expected to be positive as managers can produce more goods than are necessary to meet expected demand. With higher production levels, the fixed overhead costs can be spread over a larger number of units, lowering the reported fixed costs per unit. Abnormal operating cash flows are expected to be negative as managers boost

sales by offering limited time discounts. The lower margins due to the price discounts will cause production costs as a percentage of sales to be abnormally high. Another way to boost sales temporarily is to offer more lenient credit terms. In general, I expect sales management activities to lead to lower current period operating cash flows and higher production costs than what is normal given sales expectations.

The first column of Table 3.7 reports abnormal discretionary expenses, abnormal production costs and abnormal operating cash flows in the quarter preceding the violation. The table provides evidence for H3.4.A, H3.5.A and H3.6.A. The mean (median) abnormal discretionary expense of -0.02 (-0.019) is significant at the 1% level. The mean (median) of abnormal production cost is 0.013 (0.014) and is insignificant using the t-test. The mean (median) for operating cash flow is -0.037 (0.052) and is also statistically insignificant. The general result for the quarter prior to the violation is that managers manipulate discretionary expenses more easily as compared to production costs and operating cash flows. This may be one reason why earlier research (e.g. Baber et al, 1991; Bushee, 1998) focused primarily on discretionary expenses. The second column reports the abnormal discretionary expenses, abnormal production costs and abnormal operating cash flows in the quarter of the violation and provides evidence for H3.4.B, H3.5.B and H3.6.B. The results are as expected with discretionary expenses having a mean (median) of -0.021 (-0.013), significant at the 5% level. The mean (median) for production costs is 0.012 (0.014), significant

at 1%. The mean (median) for operating cash flows is -0.071 (0.041) and is not significant. I again observe results that suggest it is easier for managers to manipulate discretionary expenses. The evidence also suggests that managers manipulate production costs in the quarter of the violation. The third column reports the level and significance of abnormal discretionary expenses, abnormal production costs and abnormal operating cash flows in the quarter following the violation and provides evidence for H3.4.C, H3.5.C and H3.6.C. I expected to find evidence of manipulation in the quarter following the violation as managers attempt to avoid reporting a covenant violation in subsequent quarters. The mean (median) abnormal discretionary expense of -0.034 (-0.018) suggests that this is the case and managers manipulate discretionary expenses in the quarters following the violation as well. The results are significant at the 1% level. For production costs, a reversal is observed with production costs having a mean (median) of -0.006 (0.012). The opposing signs of the mean and median suggest that while median (by abnormal production costs) firms have positive abnormal production costs, some firms have extremely low abnormal production costs, which have produced a negative mean. This is also observed in the maximum (15.4) and minimum (-2.59) abnormal production costs. Operating cash flows have also reversed in the quarter following the violation, with a mean (median) of 0.021 (0.053) significant at 1%.

The overall results suggest that managers manipulate discretionary expenses in the quarter prior to, quarter of, and quarter following the violation.

However, it is not possible for managers to manipulate production costs over a long period as ending inventories from the violation period will result in lower production costs in the subsequent quarter. Manipulation of operating cash flows is also not sustainable over subsequent periods, as is evidenced by the reversal in the sign of the abnormal operating cash flows in the quarter following the violation.

3.6. Conclusion

Existing literature on the debt covenant hypothesis has attempted to provide evidence on the manipulation of accruals in the period surrounding the period of violation. However, these studies have generally relied either on a proxy of covenant violation (debt-equity ratio) or have provided evidence for a small sample. This paper complements the existing literature on earnings management around the period of violation in several ways. First, the study details the empirical methodology to detect not only accrual-based earnings management but also real earnings management. The prior literature on the covenant hypothesis has focused mainly on the accounting choices available to the managers to avoid covenant violation. The present study is the first to focus on real activities manipulation to test for the debt covenant hypothesis. Second, I find evidence that managers increase reported earnings through accruals management and real activities management. Our findings suggest that abnormal total and working capital accruals are positive in the quarter of and quarters surrounding the

covenant violation. Our results also suggest that managers decrease abnormal discretionary expenses in the quarter of and quarters surrounding the violation. The results for production costs suggest an increase in abnormal production costs in the quarter of the violation and a subsequent reversal (decrease) in abnormal production costs in the quarter following the violation. The results also display a decrease in abnormal operating cash flows in the quarter of the violation and an increase in abnormal operating cash flows in the quarter following the violation. Third, this study details the difference in accrual-based and real earnings management activities in the quarter of and the quarters surrounding that of the violation. While managers actively engage in accruals management in the quarters surrounding the violation, the opportunities for manipulating real activities may be limited. I find that managers decrease discretionary expenses in the quarter prior to, quarter of and quarter following the violation. However, it is not practicable to manipulate production costs as such activities will overload inventory stocks, and I observe a reversal in abnormal production costs in the quarter following the violation. I observe the same trend in abnormal operating cash flows as managers withdraw limited time discounts and tighten credit terms. Overall, our results suggest that managers actively engage in accrual-based and real activities manipulation in order to avoid violation of debt covenants.

References

Baber, W., P. Fairfield and J. Haggard (1991): The effect of concern about reported income on discretionary spending decisions: the case of research and development, *Accounting Review* 66, pp. 818-829

Bens, D., V. Nagar, D.J. Skinner and M.H.F. Wong (2003): Employee stock options, EPS dilution and stock repurchases, *Journal of Accounting and Economics* 36, pp. 51-90

Bushee, B. (1998): The influence of institutional investors on myopic R&D investment behaviour, *Accounting Review* 80, pp. 441-476

Cohen, D.A., and P. Zarowin (2010): Accrual based and real earnings management activities around seasoned equity offerings, *Journal of Accounting and Economics* 50, pp. 2-19

Cohen, D.A., A. Dey and T. Lys (2008): Real and accrual based earnings management in the Pre and Post Sarbanes Oxley period, *Accounting Review* 83, pp. 757-787

Dechow, P.M., S.P. Kothari and R. Watts (1998): The relation between earnings and cash flows, *Journal of Accounting and Economics* 17, pp. 145-176

DeFond, M.L., and J. Jiambalvo (1993): Factors related to auditor-client disagreement over income-increasing accounting methods, *Contemporary Accounting Research* 9, pp. 411-431

DeFond, M.L., and J. Jiambalvo (1994): Debt Covenant Violation and Manipulation of Accruals, *Journal of Accounting and Economics* 17, pp. 145-176

Graham, J.R., C.R. Harvey and S. Rajgopal (2005): The economic implications of corporate financial reporting, *Journal of Accounting and Economics* 40, pp. 3-73

Healy, P (1985): The Impact of Bonus Schemes on the Selection of Accounting Principles, *Journal of Accounting and Economics* 7, pp. 85-107

Jones J., Michael Bradley and Michael W. Maher (1988): The Effect of Foreign Trade Regulation on Accounting Choices, and Production and Investment Decisions, University of Michigan Press, Ann Arbor, Michigan

Jones J. (1991): Earnings management during import relief investigations, *Journal of Accounting Research* 29, pp. 193-228

Kaplan, R. (1985): Comments on Paul Healy: Evidence on the effect of bonus schemes on accounting procedure and accrual decision, *Journal of Accounting and Economics* 7, pp. 207-218

Nini, Greg, David C. Smith and Amir Sufi (forthcoming): Creditor Control Rights, Corporate Governance, and Firm Value, *Review of Financial Studies*

Roychowdhury, S. (2006): Earnings management through real activities manipulation, *Journal of Accounting and Economics* 42, pp. 335-370

Subramanyam, K.R. (1996): The pricing of discretionary accruals, *Journal of Accounting and Economics* 22, pp. 249-282

Sweeney, A.P. (1994): Debt-covenant violations and managers' accounting responses, *Journal of Accounting and Economics* 17, pp. 281-308

Watts, R.L. and J.L. Zimmerman (1986): Positive Accounting Theory, Englewood Cliffs, NJ: Prentice Hall

Zang, A. Y. (2012). Evidence on the trade-off between real activities manipulation and accrual based earnings management, *Accounting Review* 87, pp. 675-703

Table 3.1

Summary Statistics

	Violating Firms			Rest of the Sample			Difference in	
	Mean	Median	N	Mean	Median	N	Means[a]	Medians[b]
Total Assets ($ million)	866.920	93.695	185,150	6,053.385	180.062	289,594	-5186.46***	-86.37***
Sales ($ million)	194.304	24.890	185,142	498.211	20.854	289,583	-303.91***	4.04***
Net Income / Sales (%)	-1.986	0.008	136,938	-4.294	0.040	265,820	2.31***	-0.03***
Sales / Total Assets	0.432	0.281	185,142	0.297	0.147	289,583	0.14***	0.13***
Accruals ($ million)	-29.728	-0.786	153,290	-63.237	-0.661	251,295	33.51***	-0.13***
Accruals / Assets $_{t-1}$	-0.011	-0.019	142,820	-0.645	-0.019	234,141	0.63***	-0.0002***
Working Capital Accruals ($ million)	0.292	0.058	156,869	16.436	0.012	257,608	-16.14***	0.05***
Working Capital Accruals / Assets $_{t-1}$	0.053	0.002	142,532	-0.049	0.001	241,376	0.10***	0.00***
Discretionary Expenses ($ million)	38.742	7.386	72,412	148.395	9.545	113,318	-109.65***	-2.16***
Discretionary Expenses / Assets $_{t-1}$	-0.030	0.002	69,531	-0.638	0.002	107,890	0.61***	-0.0003***
Production Costs ($ million)	148.383	16.456	174,612	313.322	11.865	279,736	-164.94***	4.59***
Production Costs / Assets $_{t-1}$	-0.005	0.002	172,876	0.002	0.001	275,098	-0.01***	0.00***
Operating Cash Flows ($ million)	33.701	0.610	166,702	137.118	1.616	273,162	-103.42***	-1.01***
Operating Cash Flows / Assets $_{t-1}$	-0.050	0.012	157,533	-0.168	0.015	252,129	0.12***	-0.0027***

[a] The difference in means is tested using two- tailed t tests
[b] The difference in median is tested using two-tailed Wilcoxon testss
*** p<0.01, ** p<0.05, * p<0.1

Table 3.2

Scaled total accrual changes, working capital accrual changes, earnings changes, cash flow changes and revenue changes on a quarterly basis, where Quarter 0 is the violation quarter, for firms reporting debt covenant violations in the period 1996-2008[a]

	Quarter -5	Quarter -4	Quarter -3	Quarter -2	Quarter -1	Quarter 0	Quarter 1	Quarter 2
Panel A: Total Accrual Changes[b]								
Mean	-0.0038	-0.0144	0.0017	0.0181	0.0432	-0.0666	-0.0374	-0.9506
t-statistic	-0.33	-1.22	0.04	0.10	0.80	-7.49***	-2.30**	-1.08
Median	-0.0101	-0.0087	-0.0130	-0.0066	-0.0128	-0.0337	-0.0299	-0.0272
z-statistic for Wilcoxon signed-rank test	-2.64***	-2.09**	-3.23***	-2.99***	-4.38***	-10.92***	-12.10***	-10.53***
N	1,880	1,898	1,933	1,995	2,030	1,487	1,995	1,900
Panel B: Working Capital Accrual Changes[c]								
Mean	0.0012	0.0012	-0.0029	0.0876	0.0055	-0.0272	-0.0127	-0.3651
t-statistic	0.422	0.334	-0.127	0.908	0.942	-8.60***	-2.46**	-1.14
Median	0.0040	0.0040	0.0034	0.0050	0.0024	-0.0098	-0.0043	-0.0036
z-statistic for Wilcoxon signed-rank test	3.57***	4.84***	4.17***	4.54***	2.21**	-9.61***	-5.67***	-4.29***
N	1,904	1,923	1,965	2,013	2,052	1,499	2,008	1,919
Panel C: Earnings Changes[d]								
Mean	0.0002	-0.0033	0.0176	0.0158	-0.0093	-0.0387	0.0113	0.0179
t-statistic	0.0103	-0.3798	0.5105	0.967	-1.1012	-5.536***	2.16**	1.74*
Median	0.0002	0.0000	-0.0002	-0.0014	-0.0011	-0.0101	0.0018	0.0005
z-statistic for Wilcoxon signed-rank test	-1.047	-2.16**	-2.20**	-5.42***	-4.58***	-14.66***	4.45***	0.52
N	2,252	2,287	2,302	2,331	2,367	1,708	2,305	2,194

Table 3.2
Continued

Panel D: Cash Flow Changes[e]								
Mean.....	-0.0482	-0.0377	-0.1042	-0.1733	-0.1083	-0.0281	-0.0383	0.8783
t-statistic.....	-3.95***	-5.89***	-2.49**	-1.16	-2.02**	-4.24***	-2.25**	1.00
Median.....	0.0019	-0.0009	0.0021	-0.0042	-0.0033	-0.0002	0.0078	0.0077
z-statistic for Wilcoxon signed-rank test.....	-1.39	-2.95***	-2.15**	-3.88***	-3.83***	-1.88*	0.97	0.62
N.....	1,886	1,907	1,944	1,998	2,038	1,492	1,996	1,906
Panel E: Revenue Changes								
Mean.....	-0.0005	-0.0031	0.0233	-0.0782	-0.0196	0.0016	-0.0093	-0.0051
t-statistic.....	-0.08	-0.289	1.07	-0.742	-1.17	0.411	-3.37***	-2.01**
Median.....	0.0062	0.0071	0.0043	0.0035	0.0027	-0.0001	0.0013	0.0002
z-statistic for Wilcoxon signed-rank test.....	8.02***	9.49***	5.11***	3.97***	2.05**	-1.39	0.53	-0.44
N.....	2,244	2,280	2,298	2,327	2,363	1,707	2,304	2,188

[a]The scaled changes in the variables were computed as the first difference of the variables (X_t - X_{t-1}) divided by total assets at time t-1

[b] Total accruals are computed using Compustat data and defined as net income minus operating cash flows. Operating cash flows are defined as: Working capital from operations, minus the change in accounts receivable, inventories, and other current assets, plus the change in accounts payable, taxes payable, and other current liabilities.

[c] Working Capital Accruals are computed using Compustat data and defined as the sum of the changes in accounts receivable, inventories and other current assets, less the sum of the changes in accounts payable, taxes payable and other current liabilities.

[d] Earnings are defined as net income

[e] Cash Flow Changes are computed using Compustat data and defined as the sum of the changes in accounts receivable, inventories and other current assets, less the sum of the changes in accounts payable, taxes payable and other current liabilities

*** p<0.01, ** p<0.05, * p<0.1

Table 3.3

Scaled cash flow from operations, discretionary expenses and production costs on a quarterly basis, where Quarter 0 is the violation quarter, for firms reporting debt covenant violations in the period 1996-2008[a]

	Quarter -5	Quarter -4	Quarter -3	Quarter -2	Quarter -1	Quarter 0	Quarter 1	Quarter 2
Panel A: Discretionary Expenses Changes[a]								
Mean	0.0088	0.0061	0.0012	-0.0062	0.0014	-0.0060	-0.0203	-0.0061
t-statistic	1.12	2.69***	0.17	-0.56	0.31	-0.94	-2.77***	-1.80*
Median	0.0027	0.0029	0.0021	0.0026	0.0019	0.0035	-0.0004	-0.0005
z-statistic for Wilcoxon signed-rank test	4.97***	7.29***	4.57***	5.19***	4.08***	5.16***	-2.96***	-1.66*
N	868	884	889	903	925	665	897	849
Panel B: Production Costs Changes[c]								
Mean	0.0037	-0.0079	0.0016	-0.1056	-0.0116	-0.0033	-0.0177	-0.4454
t-statistic	0.78	-0.78	0.063	-0.85	-0.96	-0.89	-5.86***	-0.99
Median	0.0035	0.0040	0.0017	0.0021	0.0011	-0.0008	-0.0010	-0.0002
z-statistic for Wilcoxon signed-rank test	5.92***	6.71***	2.34**	2.47**	0.79	-0.35	-4.20***	-1.89*
N	2,067	2,112	2,130	2,178	2,237	1,616	2,220	2,117
Panel C: Operating Cash Flow Changes[d]								
Mean	-0.0131	-0.0001	-0.0199	0.0157	0.0002	0.0087	0.0187	0.3069
t-statistic	-0.903	-0.03	-1.19	0.39	0.027	0.79	1.99**	1.01
Median	0.0066	0.0028	0.0040	0.0016	0.0022	-0.0020	0.0059	0.0028
z-statistic for Wilcoxon signed-rank test	1.33	-1.37	0.56	-2.90	-1.94*	-3.55***	2.58***	0.43
N	2,173	2,219	2,256	2,289	2,337	1,691	2,298	2,184

[a] The scaled changes in the variables were computed as the first difference of the variables ($X_t - X_{t-1}$) divided by total assets at time t-1

[b] Discretionary expenses changes are calculated using Compustat data and defined as the sum of research and development expenses and selling, general and administrative expenses

[c] Production costs changes are calculated using Compustat data and defined as the sum of cost of goods sold and changes in inventory during the period

[d] Operating cash flow changes are calculated using Compustat data and defined as cash flow from operations as reported in the statement of cash flows

*** p<0.01, ** p<0.05, * p<0.1

Table 3.4
This table presents the mean values of the coefficients of the model parameters used to estimate the normal levels of total and working capital accruals.

	[a] $TA_{i,t}/Ai,_{t-1}$	[b] $WCA_{i,t}/Ai,_{t-1}$
$1/A_{t-1}$	0.033	0.087
	(0.083)	(0.091)
Δ Rev_t/A_{t-1}	0.79**	0.16***
	(0.421)	(0.037)
PPE_t/A_{t-1}	0.019	—
	(0.177)	—
Constant	-0.35**	-0.11*
N	334,656	357,398
R-Squared	0.372	0.412

Regressions are computed by industry and quarter using time-series estimates of the following model of total accruals

$$TA_{i,t}/A_{jt-1} = \alpha_0 + \alpha_1 (1/A_{i,t-1}) + \beta_{1,i} (\Delta REV_{i,t}/A_{i,t-1}) + \beta_{2,i} (PPE_{i,t}/A_{i,t-1}) + \varepsilon_{i,t},$$

where $TA_{i,t}$ = total accruals for firm i at time t; $\Delta REV_{i,t}$ = change in revenues for firm i at time t; $PPE_{i,t}$ = gross property, plant and equipment for firm i at time t; $A_{i,t-1}$ = total assets at time t-1 for firm i; $\varepsilon_{i,t}$ = error term for firm i at time t. The model for working capital accruals excludes the PPE term.

[a] Total Accruals ($TA_{i,t}$) are computed using Compustat data and defined as net income, minus operating cash flows. Operating cash flows are defined as: Working capital from operations, minus the change in accounts receivable, inventory, and other current asset, plus the change in accounts payable, taxes payable, and other current liabilities.

[b] Working Capital Accruals ($WCA_{i,t}$) are computed using Compustat data and are defined as the sum of the changes in accounts receivables, inventories and other current assets, less the sum of the changes in accounts payable, taxes payable and other current liabilities.

*** p<0.01, ** p<0.05, * p<0.1

Table 3.5

Abnormal total accruals and abnormal working capital accruals in the quarter preceding, the quarter of, and the quarter following the violation from time-series model estimates of total and working capital accruals for firms reporting a covenant violation in the period 1996-2008

	Quarter - 1[a]	Quarter 0[a]	Quarter 1[a]
	Abnormal Total Accruals[c]		
Mean	0.517	0.491	0.531
Median	0.460	0.471	0.444
Standard Deviation	2.38	0.322	0.221
Minimum	-16.52	-6.11	-3.89
Maximum	107.65	2.65	2.55
Parametric p-value[b]	0.000	0.000	0.000
	Abnormal Working Capital Accruals[d]		
Mean	0.078	0.061	0.098
Median	0.092	0.084	0.097
Standard Deviation	0.321	0.129	0.158
Minimum	-7.423	-2.21	-3.7
Maximum	9.328	1.164	4.19
Parametric p-value[b]	0.000	0.000	0.000

[a] Abnormal total accruals are computed using time-series estimates of the following model of total accruals:

$$TA_{i,t}/A_{jt-1} = \alpha_0 + \alpha_1 (1/A_{i,t-1}) + \beta_{1,i} (\Delta REV_{i,t}/A_{i,t-1}) + \beta_{2,i} (PPE_{i,t}/A_{i,t-1}) + \varepsilon_{i,t},$$

where $TA_{i,t}$ = total accruals for firm j at time t, $\Delta REV_{i,t}$ = change in revenues for firm i at time t, $PPE_{i,t}$ = gross property, plant and equipment for firm i at time t, $A_{i,t-1}$ = total assets at time t-1 for firm i and $\varepsilon_{i,t}$ = error term for firm i at time t. The model for working capital accruals excludes the PPE term.

Abnormal total and working capital accruals are the differences between predicted and actual accruals.

[b] The parametric p-values are two-tailed t tests

[c] Total Accruals are computed using Compustat data and are defined as net income minus operating cash flows. Operating cash flows are defined as: Working capital from operations, minus the change in accounts receivable, inventories, and other current assets, plus the change in accounts payable, taxes payable and other current liabilities.

[d] Working Capital Accruals are computed using Compustat data and are defined as the sum of the changes in accounts receivables, inventories and other current assets, less the sum of the changes in accounts payable, taxes payable and other current liabilities

*** p<0.01, ** p<0.05, * p<0.1

Table 3.6
This table presents the mean values of the coefficients of the model parameters used to estimate the normal levels of discretionary expenses, production costs and cash flows.

	[a] $DISEXP_{i,t}/A_{i,t-1}$	[b] $PROD_{i,t}/A_{i,t-1}$	[c] $CFO_{i,t}/A_{i,t-1}$
$1/A_{t-1}$	0.064**	0.003	-0.07***
	(0.033)	(0.004)	(0.012)
$Sales_{t-1}/A_{t-1}$	-0.058	–	–
	(0.239)	–	–
$Sales_t/A_{t-1}$	–	-0.13*	0.064**
	–	(0.073)	(0.037)
$\Delta Sales_t/A_{t-1}$	–	0.65***	-0.4**
	–	(0.177)	(0.123)
$\Delta Sales_{t-1}/A_{t-1}$	–	0.030	–
	–	(0.583)	–
Constant	0.014*	0.019	-0.06***
N	132,058	432,088	424,861
R-Squared	0.625	0.439	0.393

Table 3.6

Continued

Regressions are computed by industry and quarter using time-series estimates of the following model of

1) Discretionary Expenses

$$DISEXP_{i,t}/A_{i,t-1} = \alpha_0 + \alpha_1 (1/A_{i,t-1}) + \beta_{1,i} (S_{i,t-1}/A_{i,t-1}) + \varepsilon_{i,t},$$

where $DISEXP_{i,t}$ = discretionary expenses for firm i at time t, $S_{i,t-1}$= revenues for firm i at time t-1, $A_{i,t-1}$ = total assets at time t-1 for firm i and $\varepsilon_{i,t}$ = error term for firm i at time t.

2) Production Costs

$$PROD_{i,t}/A_{i,t-1} = \alpha_0 + \alpha_1 (1/A_{i,t-1}) + \beta_{1,i} (S_{i,t}/A_{i,t-1}) + \beta_{2,i} (\Delta S_{i,t}/A_{i,t-1}) + \beta_{3,i} (\Delta S_{i,t-1}/A_{i,t-1}) + \varepsilon_{i,t},$$

where $PROD_{i,t}$= production costs for firm i at time t, $S_{i,t}$= revenues for firm i at time t, $\Delta S_{i,t}$ = change in revenues of firm i at time t, $\Delta S_{i,t-1}$ = change in revenues of firm i at time t-1, $A_{i,t-1}$ = total assets at time t-1 for firm i and $\varepsilon_{i,t}$ = error term for firm i at time t.

3) Operating Cash Flows

$$CFO_{i,t}/A_{i,t-1} = \alpha_0 + \alpha_1 (1/A_{i,t-1}) + \beta_{1,i} (S_{i,t}/A_{i,t-1}) + \beta_{2,i} (\Delta S_{i,t}/A_{i,t-1}) + \varepsilon_{i,t},$$

where $CFO_{i,t}$= operating cash flows for firm i at time t, $S_{i,t}$= revenues for firm i at time t, $\Delta S_{i,t}$ = change in revenues of firm i at time t, $A_{i,t-1}$ = total assets at time t-1 for firm i and $\varepsilon_{i,t}$ = error term for firm i at time t.

[a] Discretionary expenses are computed using Compustat data and defined as the sum of research and development expenses and selling, general and administrative expenses

[b] Production cost changes are computed using Compustat data and defined as the sum of costs of goods sold and changes in inventory during the period

[c] Operating cash flow are computed using Compustat data and defined as cash flow from operations as reported in the statement of cash flows

*** p<0.01, ** p<0.05, * p<0.1

Table 3.7
Abnormal discretionary expenses, abnormal production costs and abnormal operating cash flows in the quarter preceding, the quarter of and the quarter following the violation from time-series model estimates of discretionary expenses, production costs and operating cash flows for firms reporting a covenant violation in the period 1996-2008

	Quarter - 1[a]	Quarter 0[a]	Quarter 1[a]
	Abnormal Discretionary Expenses[a,c]		
Mean	-0.02	-0.021	-0.034
Median	-0.019	-0.013	-0.018
Standard Deviation	0.10	0.209	0.191
Minimum	-1.31	-1.94	-3.77
Maximum	1.07	2.93	0.783
Parametric p-value[b]	0.000	0.017	0.000
	Abnormal Production Costs[a,d]		
Mean	0.013	0.012	-0.006
Median	0.014	0.014	0.012
Standard Deviation	0.844	0.151	0.154
Minimum	-25.49	-3.58	-2.59
Maximum	33.50	2.82	1.51
Parametric p-value[b]	0.504	0.007	0.102
	Abnormal Operating Cash Flows[a,e]		
Mean	-0.037	-0.071	0.021
Median	0.052	0.041	0.053
Standard Deviation	2.11	3.21	0.11
Minimum	-98.34	-124.62	-1.62
Maximum	1.92	5.85	1.01
Parametric p-value[b]	0.375	0.277	0.000

Table 3.7

Continued

[a] Abnormal levels are computed using time-series estimates of the following model of

1) Discretionary Expenses

$$DISEXP_{i,t}/A_{i,t-1} = \alpha_0 + \alpha_1 (1/A_{i,t-1}) + \beta_{1,i} (S_{i,t-1}/A_{i,t-1}) + \varepsilon_{i,t},$$

where $DISEXP_{i,t}$ = discretionary expenses for firm i at time t, $S_{i,t-1}$= revenues for firm i at time t-1, $A_{i,t-1}$ = total assets at time t-1 for firm i and $\varepsilon_{i,t}$ = error term for firm i at time t.

2) Production Costs

$$PROD_{i,t}/A_{i,t-1} = \alpha_0 + \alpha_1 (1/A_{i,t-1}) + \beta_{1,i} (S_{i,t}/A_{i,t-1}) + \beta_{2,i} (\Delta S_{i,t}/A_{i,t-1}) + \beta_{3,i} (\Delta S_{i,t-1}/A_{i,t-1}) + \varepsilon_{i,t},$$

where $PROD_{i,t}$= production costs for firm i at time t, $S_{i,t}$= revenues for firm i at time t, $\Delta S_{i,t}$ = change in revenues of firm i at time t, $\Delta S_{i,t-1}$ = change in revenues of firm i at time t-1, $A_{i,t-1}$ = total assets at time t-1 for firm i and $\varepsilon_{i,t}$ = error term for firm i at time t.

3) Operating Cash Flows

$$CFO_{i,t}/A_{i,t-1} = \alpha_0 + \alpha_1 (1/A_{i,t-1}) + \beta_{1,i} (S_{i,t}/A_{i,t-1}) + \beta_{2,i} (\Delta S_{i,t}/A_{i,t-1}) + \varepsilon_{i,t},$$

where $CFO_{i,t}$= operating cash flows for firm i at time t, $S_{i,t}$= revenues for firm i at time t, $\Delta S_{i,t}$ = change in revenues of firm i at time t, $A_{i,t-1}$ = total assets at time t-1 for firm i and $\varepsilon_{i,t}$ = error term for firm i at time t.

Abnormal discretionary expenses, production costs and operating cash flows are the differences between predicted and actual values.

[b] The parametric p-values are two-tailed t tests

[c] Discretionary expenses are computed using Compustat data and defined as the sum of research and development expenses and selling, general and administrative expenses

[d] Production cost are computed using Compustat data and defined as the sum of costs of goods sold and changes in inventory during the period

[e] Operating cash flow are computed using from Compustat data and defined as cash flow from operations as reported in the statement of cash flows

Appendix 3.1

Definition of variables

- Total Accruals (TA): Net income minus operating cash flows
- Operating Cash Flows: Working capital from operations, minus the sum of changes in accounts receivable, inventory and other current assets, plus the sum of changes in accounts payable, taxes payable and other current liabilities.
- Working Capital Accruals (WCA): Sum of changes in accounts receivable, inventory and other current assets, minus the sum of changes in accounts payable, taxes payable and other current liabilities.
- Discretionary expenses (DISEXP): Sum of research and development (R&D) and selling, general and administrative expenses (SG&A).
- Production Costs (PROD): Sum of costs of goods sold and changes in inventory.
- Cash flows from Operations (CFO): Operating cash flow for the firm.
- Total Assets (A):Quarterly assets of the firm.
- Change in Revenues (ΔREV): Change in the revenue of the firm from time t-1 to time t.
- Property, Plant and Equipment (PPE): Gross quarterly property, plant and equipment of the firm.
- Sales (S): Total quarterly sales of the firm.

Chapter 4

Debt Covenant Violation and Cost of Borrowing: Evidence from Quarterly Bond Issues

4.1. Introduction

Recent research on debt covenants has acknowledged the adverse consequences of debt covenant violations on violating firms. DeFond and Jiambalvo (1994) and Sweeney (1994) show that firms go to great lengths to avoid technical defaults and engage in activities such as manipulation of accruals to avoid such events. Beneish and Press (1993, 1995) find that the costs of such violations can be substantial for the firms involved and that common share prices respond negatively to reports of violations. These studies reveal that a debt covenant violation is an important event and is viewed with concern by managers and shareholders. Fargher et al (2001) report an increase in firm risk that is associated with the initial debt covenant violation. I add to this research by investigating the changes in the cost of borrowing as a result of covenant violation and a subsequent increase in firm risk. This is the first study that provides explicit estimates of the cost of covenant violations and documents the importance of the incidence, timing and frequency of the violations.

Firms report debt covenant violations when they fail to meet the contractual requirements contained in public and private debt agreements. The violations are reported to the SEC and creditors at the end of each fiscal quarter.

Dichev and Skinner (2002) and Nini et al (forthcoming) find that once a violation is reported, the creditors intervene and suggest remedial changes with the expectation that the violation will be corrected in the short-term. However, the concessions demanded by the creditors are often substantial and in extreme cases may lead to accelerated repayment of the violated debt. Violations are not only viewed with concern by existing creditors but also provide two pieces of information to potential future creditors. First, they signal that the firm was not able to maintain its debt agreement and is more risky than previously believed. Second, they signal that the firm has not been able to attain its objectives and that its short term goals are not achievable. Creditors in this case would view the firm as more risky and hence would only extend future credit at a higher cost to the borrower. Because debt covenant violations are potentially significant breaches in firms` loan agreements and increase the likelihood of debt service default, bankruptcy and risk of the firm (Wilkins, 1997; Fargher et al, 2001), I contend that the timing and frequency of such violations would increase the cost of borrowing to the firm.

To test this conjecture, I develop a set of five hypotheses and use new bond issue data to examine the importance of the incidence, frequency and timing of debt covenant violations. Specifically, I look at three different aspects of violations. First, I look at bond issuance by violating and non-violating firms to determine whether the cost of borrowing for violators differs from that of non-violators. I hypothesize that firms that violate at least one debt covenant will have

a higher cost of borrowing than firms that do not violate a debt covenant. Second, I look at the timing of the debt covenant violation with respect to the issuance of new bonds. I hypothesize that firms that report debt covenant violations in the quarter of bond issuance have a higher cost of borrowing than firms that do not violate a debt covenant. I also hypothesize that if the incidence of debt covenant violation occurred in the quarter preceding the bond issue, the cost of debt for the firm would be higher than for firms that did not report a debt covenant violation and for firms that reported a violation in the bond-issue quarter. Third, I look at the frequency of covenant violation to determine whether frequent violators are penalized more by creditors. I hypothesize that firms that report a violation once will have a higher cost of debt than firms that did not violate a debt covenant. I also hypothesize that firms that violate debt covenants more than once will have a higher cost of debt than firms that either did not violate a debt covenant or violated a debt covenant once[28].

The results indicate that debt covenant violations are associated with significant increases in the cost of borrowing to the firm. I used three different specifications to account for the cost of debt (Offer Yield, Net Interest Cost and Spread to Treasury) and find the results to be robust to these three specifications. The results show that violations are costly to the firm and attempts by the firm to avoid covenant violations, as, for example, through the manipulation of accruals, are reasonable. The timing of the violation also plays an important role in

[28] The severity of the violation and the number of violations in a particular quarter may also have a bearing on the cost of debt. However, data are not available on these two aspects of covenant violations.

increasing the cost of borrowing. Firms that report a debt covenant violation in the bond-issue quarter have a higher cost of borrowing than firms that did not report a debt covenant violation. The results are robust for firms that report a covenant violation in the quarter preceding the bond-issue quarter as the cost of borrowing for such firms is higher not only for firms that do not report a violation, but also for firms that report a covenant violation in the bond-issue quarter. I also find that the frequency of violation is an important determinant of the cost of debt as firms that violate exactly one debt covenant have a higher cost of debt than firms that do not violate any debt covenants. The results for repeat violators are even stronger, with repeat violators having a higher cost of borrowing than non-violators and one-time violators. Overall, the results indicate that the debt covenant violations are costly to the firm and the timing and frequency of violations play an important role in determining the cost of debt to the firm.

The remainder of the paper is structured as follows. The next section describes the sample selection process and the variables used in the analysis. Section 4.3 describes the debt covenants in public and private placements and presents summary statistics. Section 4.4 outlines the covenant violation indicators and the changes in firm specific characteristics before and after the violation. Section 4.5 develops the hypotheses and section 4.6 presents the results. The final section of the report comprises the concluding remarks.

4.2. Data Description and Variables

I use three data sets for the analysis that follows. First, I employ the Compustat database to collect firm-specific financial information used to define the firm-specific characteristics, which are an important part of this study. The broadest sample of Compustat observations used in this paper consists of 19,635 U.S. firms and 474,744 firm-quarter observations from the second calendar quarter of 1996 to the fourth quarter of 2005. Second, I use the debt covenant violation reporting data constructed by Sufi. The data were constructed using the SEC Edgar website that contains indices of every filing submitted to the Commission. The Commission made electronic filing mandatory for all SEC-registered firms in the second calendar quarter of 1996. The earliest data point therefore is 1996 since electronic SEC filings were required to find the covenant violation. The entire sample covers the period 1996 – 2008 and includes fiscal quarters through the fourth quarter of 2008. The sample of violation data used in this paper consists of 21,627 U.S. firms and 569,272 firm-quarter observations from the second calendar quarter of 1996 to the fourth fiscal quarter of 2008. Third, I use the public bond issue data collected by SDC Platinum. The data set consists of new bond issues by corporations and contains specific bond issue characteristics such as offer yield, loan maturity, loan amount, et cetera. The entire sample contains bond issue data from 1970 to 2005 and contains 1,587 U.S. firms and 3,895 public bond issues.

4.2. A. Data

To construct the sample, I start with the universe of U.S. firms in the Compustat database from 1996 to 2005. This is the broadest sample used in this study since the violation data set and the public bond issue data set impose the starting and ending year boundaries. First, the violation data are available only from the second calendar quarter of 1996, when electronic filing became mandatory for all SEC-registered firms. For a company to be reported as a violator, the SEC filing reports five terms: "waiv", "viol", "in default", "modif" and "not in compliance"[29]. Second, the bond issue dataset is available only until the third calendar quarter of 2005 (the last bond issue is made on September 09, 2005). The sample reports specific loan characteristic information in different formats, for example, for the *offer yield* the data set reports the data in six different ways: "numerical value", "floats", "market", "serial", "varies" and "Index"[30]. For the purpose of this paper only a numerical value can be used and I drop the remaining observations, which account for 12.31% of the reported *offer yield*. Next, I impose the quarter-year restrictions on the violation and bond issue dataset. Imposing the ending quarter-year restriction on the violation data set leaves a sample of 10,088

[29] "waiv" refers to the fact that covenant violations are handled by a contractual waiver, meaning the lender voluntarily relinquishes the rights granted following the default, perhaps in exchange for concessions from the borrower. This happens in a majority of cases; "viol" refers to a specific incidence of violation; "in default" refers to the fact that the borrower is in default; "modif" refers to a modification in the contractual agreement following a violation; and "not in compliance' refers to the borrower not being in compliance with the contractual agreement of the loan issue.

[30] "numerical value" refers to a numerical percentage value; "float" refers to a bond offering a yield that fluctuates with the market interest rate; "market" refers to the market yield at the time of the issue; "serial" refers to a bond in which a portion of the outstanding bonds matures at regular intervals until all of the bonds have matured; "varies" refers to a bond offering a fluctuating yield; and "index" refers to a yield pegged to an index, generally a bond index

U.S. firm and 226,637 firm-quarter observations. Imposing the starting quarter-year restriction on the bond issue data set yields a sample of 722 U.S. firms and 1,494 public bond issues. Subsequently, I merge the three data sets to construct the sample to be used in this study.

4.2. B. Variables

The three data sets provide details on the variables used in the study. The violations database provides information on the incidence of violations of debt covenants. The data set reports a violation as one if a firm is in violation of a debt covenant in a quarter and zero otherwise. For the purpose of the analysis I use five different measurements of violation. *VIOL* is a binary variable that equals one for violating firms and zero for non-violating firms. *Viol* is a binary variable that equals one if a debt covenant violation has occurred or has not been corrected in subsequent quarters, and zero if a violation has either not occurred or has been corrected. *Viol = 1* is a binary variable that equals one if a firm has reported exactly one debt covenant violation in the period from 1996 to 2005 and zero otherwise. *Viol > 1* is a binary variable that equals one if a firm has ever reported more than one covenant violation either in consecutive or intermittent quarters and zero otherwise. *Viol = n* is the total number of violations reported by the firm. The bond issue database provides information on bond specific characteristics. I use three different specifications for the Cost of Debt: Offer Yield, Net Interest Cost and Spread to Treasury. *Offer Yield* is the yield offered to investors at the

time of the bond issue. *Net Interest Cost* is the overall interest expense that is associated with the bond and is based on the average coupon rate weighted to years of maturity adjusted for any associated discounts or premiums. *Spread to Treasury* is the difference in the bond yield and risk free treasury security yield with similar maturity. *Loan Size* is the proceeds in dollars from bond issuance. *Log Maturity* is the log of maturity in months of issued bonds and *S&P ratings* is the S&P rating for bonds and has been converted to a number.

The S&P ratings have a total of twenty two categories and I assign "1" for the S&P bond rating of "D" (lowest rating) and "22" for the S&P bond rating of "AAA" (highest rating)[31]. The Compustat database provides information on firm specific characteristics. *Z-score* is the Altman z-score used to predict corporate defaults. The z-score for manufacturing firms is computed following Hillegeist et al (2004) and for non-manufacturing firms following Altman (2000). *Size* is the natural log of total quarterly assets of the firm in year 2000 dollars. *Leverage* is the ratio of book value of long term debt plus long term debt in current liabilities to the book value of total assets of the firm ($\frac{LTD}{TA}$). *Coverage* is the interest coverage ratio and is computed as the ratio of earnings before interest and taxes to the interest expense ($\frac{EBIT}{Interest}$). *Tangibility* is the ratio of property, plant and equipment to the total assets of the firm ($\frac{PPE}{TA}$). *Market-to-Book* is the ratio of market value of assets, computed as the market value of equity plus the book

[31] See Appendix for a detailed description of the numerical rating system

value of debt, to the book value of assets ($\frac{MVA}{TA}$). *Current ratio* is the ratio of current assets to current liabilities ($\frac{CA}{CL}$).

4.3. Covenants in Private and Public Agreements: Background

Debt covenants are conditions in loan agreements that either guide or limit the actions of the borrower. Creditors use protective covenants in bond indentures and bank loans to protect their interests by restricting certain activities of the issuer that could endanger the creditor's position and to ensure that the borrower uses the funds for the stated purposes. If a borrower fails to comply with these conditions in any of the fiscal quarters it is termed as being in default of the agreement. If a company is in default the creditor can require immediate repayment of the bond issue or loan, although Nini et al (forthcoming*)* report that creditors almost always waive the violation.

4.3. A. Covenants

In practice, debt covenants are somewhat different for public and private placement of debt. For public bond issues, the covenants can be divided into four categories: *New debt issuance restrictions* are the most frequent type of debt covenant and may require any subsequent bond issue to be subordinated to existing debt. They are designed to prevent risk shifting to existing bondholders

by imposing restrictions on the issuance of new bonds with superior or equal claims on the firm's assets. Other covenants may prohibit the issuance of additional debt altogether, unless the firm maintains prescribed financial ratios. *Dividend payment restrictions* place a restriction on the level of dividends that can be paid to the shareholders. These restrictions generally require that dividends are paid only from earnings generated subsequent to the borrowing or earnings above a given amount. They are designed to limit shareholders from transferring assets to themselves through the issuance of extraordinary dividends, specifically assets that serve as collateral. Most dividend restrictions limit not only dividend payments but also share repurchases and often limit the borrower from increasing dividends from existing levels. *Merger activity restrictions* limit merger activity by allowing such activities only when certain conditions are met. These restrictions are designed to limit risk shifting to existing bondholders in cases when the acquiring firm has more debt than the target firm, or if the debt of the acquiring firm matures sooner. *Asset disposition restrictions* limit the ability of the managers to dispose of assets that provide collateral under the provisions of the indenture agreement. They are designed to limit bondholders' losses in case of default. Other common restrictions include, but are not limited to, restrictions on common stock investment, loans, extension of credit, maintenance of minimum asset levels and maintenance of the levels of certain accounting-based measures.

For private loan issues, the covenants can be divided into four categories: *Affirmative restrictions* include actions that a firm needs to take during the term of

the loan contract, and include actions such as meeting GAAP accounting standards, meeting all regulatory reporting demands, remaining in compliance with the law, submitting financial information to the lender on a timely basis, et cetera. These restrictions are designed to be an early warning sign to the creditor regarding the firm's compliance with accounting principles and corporate law. *Negative covenants* are actions that a firm agrees not to take during the period of the loan contract. These include constraints on asset disposal, restrictions on merger and acquisition activity, limits on dividend payments, providing loan guarantees to other firms, and so forth. These restrictions are designed to limit the creditors' risk by diminishing the possibility of risk shifting. *Financial restrictions* include restrictions on firm leverage, interest coverage, total fixed charges, among other things. These covenants in private lending agreements often modify GAAP and, for example, may include off-balance-sheet debt in calculating leverage. They are designed to limit the default risk of the creditors. *Compensation restrictions* are especially common for closely held companies and place a limit on officers' compensation. They are designed to prevent the manager-owner from appropriating benefits at the expense of the creditors.[32]

Financial covenants are common in both private and public debt agreements, but differ in their specification in the following respect: Financial covenants in public bond agreements are usually incurrence-based, signifying that the borrower needs to be in compliance at the time of a specific event (Roberts

[32] Three sources were used to identify debt covenants in private and public debt agreements. They are Copeland and Weston (1988), Helfert (1996) and Kester, Furhan and Piper (1997)

and Sufi, 2009). Conversely, the financial covenants in private loan agreements are maintenance-based, meaning that the borrower must be in compliance with the covenants on a regular basis, typically every fiscal quarter (Sansone and Taylor, 2007).

4.3. B. Violations

A debt covenant violation is deemed an event of default, giving the creditor the right to demand immediate repayment of the entire loan balance or limit access to unused portions of a line of credit. Creditors rarely do either, however, opting instead to renegotiate the terms of the agreement. Loan covenants thus have an impact on loan characteristics, and violation of these contractually imposed restrictions results in unfavourable loan terms for violating firms.

Table 4.1 presents evidence that this is the case. Using the new bond issuance database, I find that firms that violated debt covenants (violating firms) are different from firms that did not violate debt covenants (non-violating firms), in terms of loan-specific characteristics and firm-specific characteristics. The assumption is that non-violating firms will have favourable loan characteristics compared to violating firms and will have better financial health. Violating firms have had at least one debt covenant violation.

Panel A of Table 4.1 shows that bonds issued by violating firms carry a higher offer yield, a higher net interest cost, a higher spread to treasury, are

smaller in denomination and have shorter maturities as compared to non-violating firms. The difference in loan characteristics between non-violating and violating firms is significant at the 1% level. This difference suggests that loan covenant violation is costly to the firm not only in terms of the cost of debt, but also in terms of the ability to raise debt capital and issue bonds with longer maturities. Consistent with this motivation, violating and non-violating firms also differ in terms of firm characteristics. Firm characteristics comprise accounting value measures (assets, tangibility, and market to book) and financial health measures (z-score, leverage, coverage ratio, current ratio, and S&P rating of new bond issues). Non-violating firms have healthier accounting ratios and are larger organizations, have larger tangible assets and higher market to book ratios compared to violating firms. Non-violating firms also have higher z-scores (that is, a lower chance of default), lower financial leverage, higher interest coverage ratios, higher current ratios and better S&P ratings compared to violating firms. The differences in the accounting value and financial health of non-violating and violating firms are significant at the 1% level.

The difference in firm characteristics signals the likelihood of a covenant violation by a firm and the difference in loan characteristics indicates that debt covenant violation is costly to the firm. Firms with debt covenant violations pay 100 to 107 basis points more than firms that do not violate any restriction. Nini et al (forthcoming) find similar loan characteristic results for private loans and conclude that firms with covenant violations are not only closely monitored by

creditors, but also pay 39 basis points more in the event of a covenant violation that prompts the renegotiation of a loan contract.

4.3. C. Summary Statistics

Figure 4.1 reports the fraction of firms that violate at least one debt covenant in any given year from 1996 to 2005. The chart shows that between 9 percent and 17 percent of firms are in violation of a covenant in any given year with the violation incidence peaking during the 2001-2002 recession and declining thereafter. It suggests that the recession accelerated the incidence of covenant violation and that violations are cyclical in nature.

Table 4.2 provides summary statistics on the incidence of violations. About 38 percent of firms in the sample violated a debt covenant at some point during the ten year sample period. Nearly 9 percent of firms are in violation of one covenant, 29 percent are in violation of more than one financial covenant and 6 percent of all firm-quarter observations report a financial covenant violation. Table 4.2 also suggests that firm characteristics (accounting values) influence debt covenant violation. Firms in the middle quartiles of size and tangibility are more likely to report a financial covenant violation and the incidence of violation decreases as size and tangibility increases. The incidence of debt covenant violation also decreases for firms with higher market to book ratios. Figure 4.2 provides a series of three panels that summarize the variation in the incidence of

debt covenant violation as the data are segregated according to size, tangibility and market to book ratios. The solid line shows that the incidence of financial violation decreases with an increase in size and tangibility and is lowest for firms in the 95th percentile, though a quarter of the firms in the 95th percentile for size and one third of the firms in the 95th percentile for tangibility report at least one debt covenant violation at some point. Firms in the middle quartiles of size and tangibility have the highest incidence of covenant violation. Violations are also negatively correlated with market to book value, but more than one fifth of the firms in the 95th percentile violated a debt covenant at least once.

A possible explanation for this observed trend in the covenant violations with respect to size is that large firms have the ability to operate within the guidelines of the contractual agreement and possess the capacity to manipulate their accounts to avoid technical violations. The incidence of relatively lower covenant violations for small firms can also be explained by the fact that creditors are cautious in extending credit to small firms and only extend credit to firms that are financially sound. It could also be that small firms are wary of the fact that it is difficult for them to obtain credit and therefore operate within the restrictions set forth in the loan agreement for the sake of future credit availability.

In all, I conclude that small and large firms violate debt covenants less frequently than medium sized firms, though covenant violations are also quite common in small and large firms. The incidence of debt covenant violation displays the same trend for tangibility, with firms having too few or too many

tangible assets violating covenants less frequently than firms with average levels of tangible assets. For market to book, the incidence of debt covenant violation decreases as the market to book value of the firm increases, with the incidence dropping from approximately 50 percent to about 22 percent. Overall firms violate debt covenants frequently regardless of size, tangibility and market to book value.

4.4. Financial Covenant Violation Indicators

Creditors play an important role and have higher stakes in the event of bankruptcy or following a payment default by the borrower. Financial covenant violations act as a first indicator that the firm is going through a period of financial uncertainty. The violations of restrictions imposed on debt contracts act as a first sign that a firm may not be able to meet its debt payment obligations in the future, and certain firm characteristics can help creditors determine whether a firm will violate a debt covenant. However, a covenant violation does not mean that a firm is near default. In this section, I examine the hypotheses that (i) certain firm characteristics can help identify firms that will violate debt covenants and that (ii) creditors' actions after the violation result in improving the overall financial condition of the firm.

4.4. A. Accounting Value Measures Before and After Violation

I first look at three accounting value firm characteristics: assets, tangibility and market to book. Figure 4.3 produces a series of three panels that summarize these measures for violators during the eight quarters leading up to, including and following a violation. Total assets and tangibility of the firm increase in the quarters leading up to the violation and decrease after the violation has occurred. Nini et al (forthcoming) attribute this trend to investment conservatism. They argue that creditors play an important role in the event of a covenant violation, even if bankruptcy or payment default is not imminent, and this results in a decrease in investment. The trend lines for assets and tangibility in Figure 4.3 show that in the quarters leading up to a violation, firms grow fairly aggressively, with total assets increasing an average of over 5 percent. Growth levels off in the quarter of the violation and decreases moderately in the quarters immediately after the violation. Growth in tangibility exhibits the same pattern. The nearly 4 percent increase in tangibility in the quarters leading up to a violation and nearly 5 percent decline in tangibility following the violation suggests that violators engage in divestitures and investment conservatism after a violation. The market to book value of the firm falls leading up to a violation and for three quarters thereafter, whereupon it starts improving. Although not reported, the stock price of the firm decreases in the quarters leading up to and after the quarter of the violation, with the decrease tapering off in the seventh quarter after the violation. The nearly 18 percent decline in market to book in the quarters leading up to a violation and a

near 3 percent recovery following the violation suggests that the decrease in assets in the quarter following the violation does not entirely compensate for the decrease in the stock price. Overall, the financial condition of the firm deteriorates in the quarters leading up to a violation and only improves moderately after the intervention of creditors.

4.4. B. Financial Value Measures Before and After Violation

A debt covenant violation does not mean that a firm is on the verge of insolvency and Nini et al (forthcoming) show that violating firms are usually in relatively good health. A violation would however warrant attention from creditors and, as such, should lead to an improvement in the financial health of the firm following a violation. I look at four financial value firm-specific indicators: z-score, leverage, coverage ratio and current ratio, and two bond issue specific indicators: S&P rating and number of new bond issues, to determine the change in the financial health of the firm pre- and post-violation.

Figure 4.4 produces a series of six panels that summarize the financial health of the violating firms. The z-scores of violating firms in the quarters surrounding the violation are relatively low, starting around the "grey zone" and falling into the "distress zone"[33] by the time of the violation. Although the decrease of 27 percent in the z-scores in the eight quarters preceding the violation

[33] z-score > 2.9 -"Safe" zone; 1.23 < z-score < 2. 9 -"Grey" zone and z-score < 1.23 -"Distress" zone as in Altman (2000).

is largely offset by an increase of nearly 18 percent after the violation, the z-scores nevertheless remain in the "distress zone". The financial leverage of violating firms increases aggressively in the quarters leading up to a violation with the financial leverage increasing from nearly 29 percent to nearly 36 percent. Leverage levels off in the quarters immediately following the violation and decreases moderately following the fifth quarter after violation. Following a violation, creditors intervene and prevent the firm from issuing any more debt. The panel indicating new bond issues confirms this. The total number of new bonds issued decreases considerably following a violation, with nearly 75 percent of all bond issues occurring in the eight quarters preceding the covenant violation. Only 2.5 percent of bonds are issued in the quarter of the violation and the rest are issued in the quarters following a violation.

The coverage ratio is a measure of a firm's ability to pay interest and serves as a good indicator of whether the firm will default. In the eight quarters leading up to the violation, the coverage ratio declines sharply from about 12 to 1 for violating firms. In the violation quarter the coverage ratio becomes negative, indicating the firm would not be able to meet its interest obligation from operating earnings. After the violation the coverage ratio rises sharply and becomes positive in the quarter immediately following the violation. The ratio continues on an upward trend for the quarters following the violation.

The current ratio displays the same movement as the coverage ratio in the quarters leading up to and following the violation. The current ratio declines by

nearly 16 percent in the quarters preceding the violation, levels off in the violation quarter and the quarter following, and begins to increase steadily afterwards. This ratio shows that violators are not experiencing sharp liquidity shortages and that the lowest level of 1.9 in the violation quarter is still adequate for short term liquidity needs, although it may reflect high inventory levels.

The S&P ratings of new bond issues does not show any specific trend pre- and post-violation, though the trend line does indicate that the rating decreases slightly over the sixteen quarters examined. This is in line with the earlier reported findings that violating firms are not on the verge of insolvency and are in relatively good health. The S&P ratings also show that for bonds issued in the violation quarter the rating dropped from "BBB+" in the preceding quarter to "BB+" in the violation quarter. The ratings however increased subsequently to "BBB+" in the quarter following the violation.

Overall the plots of trend lines indicate that financial covenant violations are preceded by a deterioration in the financial health indicators of the firm, and intervention by creditors following a violation helps improve the financial health of the violator.

Table 4.3 provides the summary statistics for the outcome and control variables used in the analysis. All of these variables are defined in Appendix 4.1. The first three variables represent the outcome variables and include the offer yield, net interest cost, and spread to treasury presented in percentages. They are used to test the importance of covenant violations in determining the cost of debt

to the firm. The control variables for the cost of debt include Altman's z-score, size, leverage, coverage ratio, tangibility, market to book, current ratio, S&P rating, log of the maturity of the bonds, and log of the proceeds generated from the bond issue. The bond-specific characteristics are limited to the bond issue data available and hence have a small number of observations[34].

4.5. Hypotheses

The financial condition of the firm is inversely related to the agency costs of debt, and debt covenants are more restrictive in the loan contracts of the least creditworthy borrowers. Riskier firms should have tighter covenants because such covenants provide lenders with the option to reassess the loan and take action for even a modest deterioration in performance (Demiroglu and James, 2010). The information content of a debt covenant violation is thus twofold. First, the covenant threshold conveys information to other market participants about expectations regarding the future prospects and riskiness of the borrower (Diamond, 1991 and Rajan, 1992). Second, contract design models (e.g. Gârleanu and Zwiebel, 2009) and collateral requirement models (e.g. Besanko and Thakor, 1987) imply that contract terms require borrowers to convey credibly private information regarding a firm's future prospects. In the framework of these models, information asymmetry between borrowers and lenders regarding the

[34] Because of the differences in the availability of data for the three measures of cost of debt and the corresponding control variables, the reported number of observations is smaller in the regression models (Tables 4.4, 4.5 and 4.6) compared to the corresponding figures in the summary statistics (Table 4.3)

borrower's credit quality and risk-shifting opportunities determines the tightness of the covenant design. The information content to the lender of a violation of such debt restrictions is straightforward: The borrower has not been able to meet targets or stay on course for future projections and hence is more risky.

I employ three measures of the cost to the borrower of a new bond issue. These are offer yield, net cost of debt and spread to treasury, and are collectively referred to as the Cost of Debt (CoD)[35]. Specifically I test the following hypothesis:

H4.1: ***Violators, on average, experience a higher Cost of Debt (CoD) compared to non-violators.***

The timing of the violation has definite implications regarding the effect of reporting of the violation on the cost of debt of the new bond issue. Mandatory reporting of quarterly firm characteristics by the SEC reduces information asymmetry between borrowers and lenders, and these characteristics act as indicators preceding the incidence of violation. If the violation-CoD effect[36] holds, then deterioration in firm-specific indicators signals that the firm may violate a debt covenant in the bond issue quarter. The borrower does not know if an actual violation has occurred during the quarter as the violation would be reported to the borrower(s)/SEC at the end of the quarter. I test to see whether the

[35] The cost of debt (CoD), in this study, refers specifically to the cost of borrowing when issuing new bonds.

[36] The Violation-CoD effect is defined as the effect of a covenant violation on the cost of debt.

incidence of violation in the same quarter as the bond issue increases the cost of debt for the issuer. Accordingly, I test the following hypothesis:

H4.2: ***Debt covenant violation at time t, where t is the quarter of bond issue, increases the cost of debt to the borrower.***

A natural implication of H4.2 is that if the incidence of violation was known with certainty in a quarter, the cost of debt to the borrower would be high for any bond issue in the subsequent quarter. For example, Gârleanu and Zwiebel (2009) present a model with information asymmetry, where borrowers are better informed than lenders concerning the present and future prospects of the firm. Debt covenants are designed to reduce this information asymmetry between borrowers and lenders, and the incidence and subsequent reporting of a covenant violation would make the violating firm riskier for the lender. A central result of this premise is that if the violation occurred in the quarter preceding the bond issue, the cost of debt would not only be higher for the violating firm, but also even higher than if the violation occurred in the bond issue quarter. I test the following hypothesis, which is conditional on the covenant violation reporting requirement.

H4.3: ***Debt covenant violation at time t-1, where t is the quarter of bond issue, increases the cost of debt to the borrower and the increase is greater than if the incidence of violation occurred at time t.***

Covenant violations provide creditors with the same rights as payment defaults and creditors can accelerate the repayment of any outstanding principal, although few creditors exercise this right (Nini et al, forthcoming). The consequences of renegotiating loans following a covenant violation include, among other things, an increase in the cost of debt for the borrower and an improvement in the performance of the firm due to creditors' intervention (Dichev and Skinner, 2002).

Beneish and Press (1995) report that a decline in stock prices in the days around the announcement of a covenant violation indicates that investors do not immediately impound future performance improvements into the stock price of a violator once a violation becomes public. They suggest that investors do not immediately incorporate such information into their assessment of the financial health of the firm. It follows that firms violating a restriction and correcting it in the following quarter should benefit from the creditors' discretionary right to waive the penalties of covenant violation as the violation is corrected for before the information can be incorporated into investors' analyses. However, the incidence of violation does indicate that the firm has not been able to maintain the minimum requirements outlined in the loan contract. The outcome of this proposition would be that firms violating a debt restriction once and correcting for it in the following quarter would have a moderately higher cost of debt than firms that have not violated any covenants. Accordingly, I test the following hypothesis:

H4.4: ***Firms that violate a debt covenant once and correct for it in the following quarter have a higher cost of debt than firms that do not violate a debt covenant.***

An instinctive outcome of H4.4 would be that firms that either violate more than one debt covenant or do not correct for the violation in the quarter following the incidence of violation, would have a higher cost of debt than that of firms which do not violate a debt covenant or violate a debt covenant but correct it in the following quarter. The violation in this case would be reported to the creditor at the end of each quarter and would indicate that the firm had not been able to achieve the expected results consistently. If the violation-CoD effect holds, then such firms would incur a higher cost of borrowing. A central premise of this argument is that the cost of debt for the bond issue made by firms that have had more than one reported incidence of violation would be particularly high. Accordingly, I test the following hypothesis:

H4.5: ***Firms that violate debt covenants more than once or do not correct for a violation in the following quarter would have a higher cost of debt than firms that do not violate a debt covenant or report a violation only once.***

Violations are costly to the firms and managers attempt to correct for a violation to avoid being penalized. DeFond and Jiambalvo (1994) show that managers manipulate accruals and adopt accounting practices that help avoid covenant violations. If the violation-CoD effect holds, then the number of

reported violations would affect the cost of borrowing. Accordingly, I test the following hypothesis:

H4.6: ***The number of reported covenant violations has a direct relationship with the cost of debt.***

4.6. Methodology and Results

4.6. A. Univariate test of H4.1

To examine whether violating firms on average carry a higher cost of debt than non-violating firms, I first examine key loan and firm-specific characteristics to see if these are significantly different between violators and non-violators. As reported earlier, Table 4.1 shows that violating and non-violating firms differ in both firm-specific and loan characteristics. The loan terms used to test for H4.1 include offer yield, net interest cost and spread to treasury, and are reported in the first three rows of Panel A of Table 4.1. The first column reports the findings for firms that did not violate a debt covenant. The second column provides the same information for violating firms and the last column reports the difference in the mean loan characteristics between violating and non-violating firms. The results of the univariate test of differences in mean provide strong evidence that non-violators enjoy a lower cost of debt. Comparing it for the two classifications of firms, *Offer Yield* is 100 bps lower for non-violating firms. The difference is significant at the 1% level. The results for *Net Interest Cost* are similar, with non-

violators, on average, paying 105 bps less than violating firms. The difference is significant at the 1% level. *Spread to Treasury* is the third measure of CoD and the results show that non-violating firms are better off by 107 bps. Again the difference is significant at the 1% level and economically large. Thus, the violation-CoD effect documented in the univariate tests suggests that violating a debt covenant is costly for the firm and on average violating firms incur a higher cost of debt. The violation-CoD effect also provides evidence for H4.1.

While the univariate test provide preliminary evidence that violating a debt covenant is costly, these results do not take into account potentially significant differences in borrower and loan characteristics. Consequently, I employ multivariate tests to better document the violation-CoD effect.

4.6. B. Multivariate Tests

The cost of borrowing is likely to be related to various borrower-specific features such as the probability of bankruptcy, the relative size of the firm, the financial leverage ratio and bond-specific features such as issue size and maturity. Accordingly I use a regression model of the following form:

$$CoD = \beta_0 + \beta_1 (VIOLATION) + \sum \beta_i (Borrower\_Characteristics_i)$$

$$+ \sum \beta_j (Bond\_Characteristics_j) + \sum \beta_k (Control_k)$$

A brief description of the variables is provided below:

- CoD: The dependent variable is "Cost of Debt", measured by Offer Yield, Net Interest Cost and Spread to Treasury.
- VIOLATION: This is measured by three different specifications: VIOL, [$Viol_t$, $Viol_{t-1}$], and [Viol =1, Viol >1, Viol = n].
- *Borrower_Characteristics*$_i$: Various characteristics of the borrower as described below:
  - Z-SCORE: The z-score for the issuer calculated separately for manufacturing and non-manufacturing firms.
  - SIZE: The natural log of the book value of the assets of the borrower adjusted for inflation in year 2000 dollars. This controls for the cross-sectional variation in issuer size in the sample.
  - LEVERAGE: Ratio of book value of long term debt plus long term debt in current liabilities to the book value of total assets
  - COVERAGE RATIO: Calculated as ($\frac{EBITDA}{Interest\ Expense}$).
  - TANGIBILITY: Ratio of property, plant and equipment to total assets.
  - MARKET-to-BOOK: Ratio of market value of the firm to the book value of the firm
  - CURRENT RATIO: Ratio of current assets to current liabilities.
- *Bond_Characteristics*$_j$: Various characteristics of the new bond issue are described below

- S&P RATING: The Standard & Poor's rating of the new bond issue converted to a numerical value.
- LOG MATURITY: The natural log of the maturity of the bond issue in months.
- LOG AMOUNT: The natural log of the loan issue value.

- *Controls*$_k$: Other control variables, including dummy variables for the year and quarter of the bond issue and the industry of the borrower.

The results of this regression equation for H4.1 – H4.5 are reported for *Offer Yield, Net Interest Cost* and *Spread to Treasury* in Tables 4.4, 4.5 and 4.6 respectively.

4.6. C. Multivariate Results

As suggested by the univariate results, borrowers and bond characteristics play an important role in determining the cost of debt. I discuss the results for these characteristics in this section and outline their relationship with the cost of borrowing. The results for the borrower and bond characteristics are reported in Tables 4.4, 4.5 and 4.6 across all specifications for debt covenant violation *(VIOL, Viol*$_t$*, Viol*$_{t-1}$*, Viol = 1, Viol >1).*

The coefficient for the z-score, although mostly negative for the three specifications of cost of debt, is not significant. This is in line with expectations in two ways. First, it is consistent with the contention that a higher z-score translates

into a lower probability of bankruptcy and hence should have a negative coefficient. Secondly, it is consistent with results reported earlier indicating that violating firms are not necessarily at risk of default and therefore the coefficient for the z-score is not statistically significant. Size has a negative coefficient, significant at the 1% level, for all specifications. This is consistent with expectations as previous research (e.g. Frank and Goyal, 2009) provides evidence that the cost of borrowing is low for large firms. In this sample, size reduces the cost of borrowing by approximately 14 – 20 bps. The coefficient for leverage is not significant for any of the three specifications of the cost of borrowing. This is consistent with expectations since the insignificance of the coefficient shows that firms are not highly leveraged, in line with Binsebergen et al (2010), and that an increase in the use of debt does not change the cost of borrowing significantly. Coverage has varying results for the three specifications. The coefficient for *Offer Yield* is positive and significant. This is unexpected as coverage indicates the ability of the firm to cover its interest obligations and a higher coverage ratio should translate into a lower offer yield.

Coverage has a negative coefficient for *Net Interest Cost*. The negative coefficient is consistent with expectations; however, it is statistically insignificant. *Spread to Treasury* has a positive but insignificant coefficient. Overall, the results seem to show that the coverage ratio is not an important determinant of the cost of debt. Tangibility has a negative but mostly insignificant coefficient for all specifications of the cost of borrowing. The availability of collateralizable assets

is expected to decrease the cost of debt. This decrease, though not statistically significant for most specifications, is relatively large, ranging up to 36 bps for spread to treasury (significant at the 10% level). Market-to-book has a negative coefficient for all specifications, but the coefficient is significant only for the *Offer Yield* and for two of four cases for *Spread to Treasury*. Current ratio, surprisingly, displays a positive coefficient. This measure of short term liquidity of the firm was expected to reduce the cost of debt, but the results show that this is not the case, and an increase in the current ratio increases the cost of borrowing by 6 – 16 bps. The S&P Rating of the bond issue has a significant impact on the cost of borrowing as the coefficients are negative and significant for all specifications. The magnitude of the coefficients indicate that a change in one level in the S&P rating (e.g. from BBB to BBB+) results in a decrease of 22 to 28 bps in the cost of debt. Log_Maturity displays a varying relationship for the three measures of the cost of debt. For *Offer Yield* the coefficient of Log_Maturity is in line with expectations and is positive and significant at the 1% level. For *Net Interest Cost* the coefficient of Log_Maturity is positive but mostly insignificant. The coefficients for the first two measures of cost of debt are nearly identical; however, the standard errors for *Net Interest Cost* are very large and the coefficient is not statistically significant. The coefficient of Log_Maturity for *Net Interest Cost* is positive but insignificant, and negative and insignificant for *Spread to Treasury.* Log_Loan_Amount has a positive and significant coefficient

across all specifications and is in line with expectations. The coefficients are economically significant, ranging from 7 – 13 bps.

4.6. D. Multivariate Test of H4.1

The results in Section 4.6.A provides evidence that violators, on average, incur a higher cost of borrowing compared to non-violators. This section examines this issue after controlling for various firm- and bond-specific characteristics.

To test H4.1, the regression equation outlined in Section 4.6.B is used and the results are reported in column (1) of Tables 4.4, 4.5 and 4.6. Three different measures of cost of debt *(Offer Yield, Net Interest Cost and Spread to Treasury)* are employed, and the results are reported in column (1) of the three tables outlined above to test for H4.1. Holding all else constant, the cost of debt for violators is higher than that of non-violators. The *Offer Yield, Net Interest Cost* and *Spread to Treasury* for a firm reporting a violation in the bond-issue quarter are higher by approximately 48 bps, 61 bps and 40 bps respectively. The coefficients are significant for all specifications at the 1% level. The multivariate tests provide evidence of the violation-CoD effect documented in the univariate tests and suggest that violating a debt covenant is costly for the firm and violating firms incur a higher cost of debt after controlling for firm- and bond-specific characteristics.

4.6. E. Multivariate Test of H4.2

The univariate tests in Section 4.6.A suggest that there are significant benefits in not violating a debt covenant in terms of cost of debt. The discussion in Section 4.5 suggests that the overall cost of debt would be higher when the incidence of violation is not known with certainty, but a deterioration in the firm-specific indicators would indicate a higher probability of covenant violation in the quarter of the bond issue.

To test this, the regression equation outlined in Section 4.6.B is used. Three different measures of cost of debt *(Offer Yield, Net Interest Cost and Spread to Treasury)* are employed, and the results for H4.2 are reported in column (2) of Tables 4.4, 4.5 and 4.6. Holding all else constant, the cost of debt, as a result of a violation in the quarter of bond issue, is higher. The *Offer Yield, Net Interest Cost* and *Spread to Treasury* for a firm reporting a violation in the bond-issue quarter are higher by approximately 34 bps, 30 bps and 44 bps respectively. The coefficients, though not significant for any of the specifications, are economically large. Based on the deterioration of borrower-specific characteristics in the quarters preceding the violation quarter, lenders are wary of the incidence of violation as evidenced by an increase in the cost of borrowing. However, since the actual reporting of the violation does not take place until after the end of the quarter and lenders cannot ascertain the incidence of violation with certainty in the bond-issue quarter, the coefficients for the three measures of cost of borrowing are not significant.

4.6. F. Multivariate Test of H4.3

The discussion in Section 4.5 suggests that lenders would charge borrowers more if the incidence of violation was known with certainty. This hypothesis (H4.3) encompasses two important outcomes. First, it tests whether the incidence of violation in the quarter preceding the bond issue increases the cost of debt. Second, it establishes that this increase in the cost of borrowing is higher than when the violation occurs in the bond issue quarter.

To test for H4.3, I use the regression equation outlined in Section 4.6.B and report the results in column (3) of Tables 4.4, 4.5 and 4.6. As above, I employ three different measures of the cost of debt *(Offer Yield, Net Interest Cost and Spread to Treasury).* The results provide evidence on two important characteristics of the timing of the violation. First, they show that holding all else constant, the cost of debt, as a result of a violation in the quarter preceding the bond issue, is higher. The *Offer Yield, Net Interest Cost* and *Spread to Treasury* for a firm reporting a violation in the bond-issue quarter is higher by approximately 105 bps, 118 bps and 88 bps respectively. Second, the results provide evidence that this increase in cost of borrowing is higher than the case in which the violation occurred in the bond issue quarter. The difference is approximately 71 bps for *Offer Yield*, 88 bps for *Net Interest Cost* and 44 bps for *Spread to Treasury*. The coefficients are significant for *Offer Yield* and *Net Interest Cost* but not for *Spread to Treasury*. The increase in the cost of debt appears to be economically important.

4.6. G. Multivariate Test of H4.4

As discussed in Section 4.5, Nini et al (forthcoming) suggest that firms that violate debt covenants incur a higher cost of borrowing following creditor intervention. They focused on debt contract renegotiation following a covenant violation in private lending arrangements. The practice of renegotiation (after violation) of a debt contract for loans provided by banks is also followed in public loans, and lenders would penalize violators by demanding a higher return for the credit extended. H4.4, however, postulates that firms which violate a covenant only once and correct for it in the following quarter should benefit from creditors' discretionary rights, and the increase in the cost of debt would not be excessive.

To test for H4.4, I use the regression equation outlined in Section 4.6.B and report the results in column (4) of Tables 4.4, 4.5 and 4.6. As above, I employ three different measures of cost of debt *(Offer Yield, Net Interest Cost and Spread to Treasury)*. Holding all else constant, the cost of debt for firms reporting a violation in one quarter is higher than firms that do not violate any debt covenant. The *Offer Yield*, *Net Interest Cost* and *Spread to Treasury* for violating firms are higher by approximately 39 bps, 47 bps and 13 bps respectively. The coefficients are significant for *Offer Yield* and *Net Interest Cost* at the 1 percent level, but not significant for *Spread to Treasury*. Overall, the results suggest that violating a debt covenant once is costly for the firm, although the increase is not significant across all specifications.

4.6. H. Multivariate Test of H4.5

An important implication of H4.4 is that firms that violate debt covenants more than once would incur a higher cost of borrowing. H4.5 encompasses two important implications for violating firms. First, it tests whether violators incur a higher cost of debt. Second, it establishes that the increase in the cost of borrowing is greater for firms that are repeat offenders than firms that violated a debt covenant once.

To test for H4.5, the regression equation outlined in Section 4.6.B is used and the results are reported in column (5) of Tables 4.4, 4.5 and 4.6. As above, three difference measures of cost of debt *(Offer Yield, Net Interest Cost and Spread to Treasury)* are used. The results provide evidence on two important characteristics of the incidence of violation. First they show that, holding all else constant, the cost of debt is higher for firms which repeatedly violate debt covenants. The *Offer Yield*, *Net Interest Cost* and *Spread to Treasury* for repeat offenders are higher by approximately 48 bps, 47 bps and 39 bps respectively. Second, the results provide evidence that the increase in the cost of debt for repeat offenders is greater than that for one time offenders. The cost to repeat offenders is higher approximately by 9 bps for *Offer Yield*, 0 bps for *Net Interest Cost* and 26 bps for *Spread to Treasury*, when compared with one time offenders. The coefficients are statistically significant at the 1 percent level for the three specifications and the magnitudes of the coefficients highlight the adverse economic impact of the repeated violations on the cost of borrowing for the firm.

4.6. I. Multivariate Test of H4.6

The number of reported violations by the firms has an adverse impact on the cost of debt as a firm with a higher number of reported violations would be considered more risky. H4.6 encompasses the implications of each covenant violation on the cost of debt.

To test for H4.6, the regression equation outlined in Section 4.6.B is used and the results are reported in column (6) of Tables 4.4, 4.5 and 4.6. As above, three difference measure of cost of debt *(Offer Yield, Net Interest Cost and Spread to Treasury)* are used. The results provide evidence on the increase in the cost of debt with each violation. The *Offer Yield, Net Interest Cost* and *Spread to Treasury* for repeat offenders are higher by approximately 6 bps, 7 bps and 5 bps respectively. The coefficients are statistically significant at the 1 percent level for the three specifications and the magnitudes of the coefficients highlight the adverse economic impact of each violation on the cost of borrowing for the firm[37].

4.7. Conclusion

The role of covenants in debt contract design has been an area of active research in recent years. Evidence of violation of these restrictions translates into information to the creditors regarding borrowers' ability to maintain contractual agreements. I find that incidences of covenant violation are cyclical in nature with

[37] In Tables 4.5 and 4.6 some of the explanatory variables are not significant. This may be explained by the fact that the S&P ratings, which are calculated based on firms and bond specific characteristics, are significant throughout the analysis and may be the reason for the insignificance of some of the variables.

38 percent of firms having reported a debt covenant violation in at least one quarter. Firm characteristics also play an important role in violations with firms in the middle quartiles of size, tangibility and market-to-book reporting a higher frequency of violation. I also find that the financial health of a firm deteriorates in the quarters leading up to the quarter of violation and improves thereafter. The primary goal of this study was to see if there is a cost of debt covenant violation in terms of an increased cost of debt to the borrower. I find that violating at least one debt covenant translates into a 40 – 61 bps increase in the cost of debt.

The results also provide evidence that after controlling for firm- and loan-specific characteristics, a debt covenant violation in the quarter of bond issue increases the cost of borrowing. This result continues to hold across different measures of the cost of debt with the increase ranging from 30 to 44 bps, although the incidence of violation is reported only at the end of the quarter. I also find that if the incidence of violation is known with certainty in the bond issue quarter, the cost of borrowing is economically more important than if the incidence of violation is not known. The results show that a debt covenant violation occurring in the quarter preceding the bond issue translates into an increase in the cost of debt of 88 – 105 bps. The results also shed light on the timing and information content of the violation and show that creditors penalize violators by expensing higher borrowing costs for known violations.

The paper also employs measures to see if there is any difference in the cost of borrowing for one-time and repeat offenders. The results show that firms

that reported a violation in exactly one quarter have a cost of borrowing which is 13 – 47 bps higher than firms that did not report any violation. Further tests reveal that repeating violations translates into a 39 – 48 bps increased cost of borrowing. The paper also tests for the relationship between each covenant violation and the increase in the cost of debt and finds that each violation translates into a 5 – 7 bps increased cost of borrowing. The results are robust to three different measures of the cost of debt. In sum, I find that there are significant costs to violating a debt covenant, and that violators are penalized by creditors for not upholding their contractual commitments.

References

Altman, Edward I. (2000): Predicting Financial Distress of Companies: Revisiting the z-score and ZETA models, Updated from E. Altman, "Financial Ratios, Discriminant Analysis and the Prediction of Corporate Bankruptcy," *Journal of Finance*, September 1968; and E. Altman, R. Haldeman and P. Narayanan, "Zeta Analysis: A New Model to Identify Bankruptcy Risk of Corporations," *Journal of Banking and Finance*, 1, 1977. The paper is available on Dr. Altam's website at New York University

Beneish, Messod D. and Eric Press (1993): Costs of Technical Violations of Accounting-Based Debt Covenants, *Accounting Review* 68, pp. 233-257

Beneish, Messod D. and Eric Press (1995): Interrelation among Events of Default, *Contemporary Accounting Research* 12, pp. 57-84

Besanko, D and A.V. Thakor (1987): Collateral and Rationing: Sorting Equilibria in Monopolistic and Competitive Credit Markets, *International Economic Review* 28, pp. 671-689

Binsebergen, Jules H. van, John R. Graham, and Jie Yang (2010): The Cost of Debt, *Journal of Finance* 65, pp. 2089-2136

Copeland, Thomas E., and J. Fred Weston (1988): Financial Theory and Corporate Policy, 3rd edition, Reading, MA: Addison-Wesley

DeFond, M. and J. Jiambalvo (1994): Debt Covenant Violation and Manipulation of Accruals, *Journal of Accounting and Economics* 17, pp. 145-176

Demiroglu, Cem and Christopher M. James (2010): The Information Content of Bank Loan Covenants, *Review of Financial Studies* 23, pp. 3700-3737

Diamond, D. (1991): Monitoring and Reputation: The Choice between Bank Loans and Directly Placed Debt, *Journal of Political Economy* 99, pp. 689-721

Dichev, Ilia D. and Douglas J. Skinner (2002): Large-Sample Evidence on the Debt Covenant Hypothesis, *Journal of Accounting Research* 40, pp. 1091-1122

Fargher, Neil L., Michael S. Wilkins and Lori M. Holder-Webb (2001): Initial Technical Violations of Debt Covenants and Changes in Firm Risk, *Journal of Business Finance and Accounting* 28, pp. 465-480

Frank, Murray Z., and Vidhan K. Goyal (2009): Capital Structure Decisions: Which Factors are Reliably Important?, *Financial Management* 38, pp. 1-37

Gârleanu, Nicolae and Jeffrey Zwiebel (2009): Design and Renegotiation of Debt Covenants, *Review of Financial Studies* 22, pp. 749-781

Helfert, Erich A. (1996): Techniques of Financial Analysis: A Modern Approach. 9th edition, New York: McGraw-Hill/Irwin

Hillegeist, Stephen A., Elizabeth K. Keating, P. Donald Cram, and Kyle G. Lunstedt (2004): Assessing the probability of bankruptcy, *Review of Accounting Studies* 9, pp. 5-34

Kester, W. Carl, William F. Furhan, and Thomas Piper (1997): Case Problems in Finance, 11th edition, New York: McGraw-Hill/Irwin

Nini, Greg, David C. Smith and Amir Sufi (forthcoming): Creditor Control Rights, Corporate Governance, and Firm Value, *Review of Financial Studies*

Rajan, R. (1992): Insiders and Outsiders: The Choice between Informed and Arm's-Length Debt, *Journal of Finance* 47, pp. 1367-1400

Roberts, Michael and Amir Sufi (2009): Control Rights and Capital Structure: An Empirical Investigation, *Journal of Finance* 64, pp. 1657-1695

Sansone, Allison and Alicia Taylor (2007): The Handbook of Loan Syndications and Trading, New York: McGraw-Hill/Irwin

Sweeney, A. (1994): Debt Covenant Violations and Managers' Accounting Responses. *Journal of Accounting and Economics* 17, pp. 281-308

Wilkins, M. S. (1997): Technical Default, Auditors` Decisions and Future Financial Distress, *Accounting Horizons* 11, pp. 40-48

Table 4.1
Comparing Loan & Firm Characteristics for Debt Covenant Non-Violating and Violating Firms

Panel A presents mean loan characteristics for new bond issues by firms that did not violate a debt covenant (Non-Violating Firms) and firms that violated at least one debt covenant (Violating Firms). *Offer Yield* is the yield offered to investors at the time of bond issue; *Net Interest Cost* is the overall interest expense that is associated with the bond and is based on the average coupon rate weighted to years of maturity adjusted for any associated discounts or premiums; *Spread to Treasury* is the difference in the bond yield and risk free treasury security yield with similar maturity; *Loan Size* is the proceeds from bond issuance; *Loan Maturity* is the maturity in years of issued bonds. Panel B presents mean firm characteristics for new bond issues by firms that did not violate any debt covenant (Non-Violating Firms) and firms that violated at least one debt covenant (Violating Firms). *Z-score* is the Altman z-score used to predict corporate defaults and is computed differently for manufacturing and non-manufacturing firms. *Assets* are total assets of the firm; *Leverage* is the ratio of book value of long term debt plus long term debt in current liabilities to the book value of total assets of the firm; *Coverage* is the ratio of earnings before interest and taxes to the interest expense; *Tangibility* is the ratio of property, plant and equipment to the total assets of the firm; *Market-to-Book* is the ratio of market value of assets to the book value of assets; *Current ratio* is the ratio of current assets to current liability; *S&P ratings* is the S&P rating for bonds and has been converted to a number (see Appendix 4.1). ***, ** and * denote 1%, 5% and 10% levels of significance, respectively.

	Non-Violating Firms	Violating Firms	Difference
Panel A: Loan Characteristics			
Offer Yield (%)	6.99	7.99	-1 ***
Net Interest Cost (%)	7.15	8.2	-1.05 ***
Spread to Treasury (%)	1.67	2.74	-1.07 ***
Loan Size ($ millions)	253.72	220.79	32.93 ***
Loan Maturity (months)	143.4	115.3	28.1 ***
Panel B: Firm Characteristics			
z-score	2.19	1.58	0.61 ***
Assets ($ millions)	10,442	6,103	4339 ***
Leverage (%)	0.36	0.42	-0.06 ***
Coverage Ratio	12.1	7.15	4.95 ***
Tangibility	0.423	0.399	0.024 ***
Market-to-Book	1.87	1.49	0.38 ***
Current Ratio	1.58	1.68	-0.1 ***
S&P Rating	14.7	12.43	2.27 ***

*** p<0.01, ** p<0.05, * p<0.1

Table 4.2

Frequency of Debt Covenant Violation

This table presents the percentage of firms that report a financial covenant violation at least once at any point between 1996 and 2005. The sample includes firm-quarter observations available from the Compustat universe that can be matched with the firm-quarter observation for the violation data. Assets are total quarterly assets of the firm; Tangibility is the ratio of property, plant and equipment to the total assets of the firm; Market-to-Book is the ratio of market value of assets to the book value of assets.

	Violator Percentage
Fraction of firms reporting a covenant violation	37.97%
Fraction of firms reporting 1 covenant violation	9.40%
Fraction of firms reporting more than 1 covenant violation	28.57%
Firm-quarter observations with covenant violation	6.29%
By Assets	
25th Percentile	35.38%
Between 25th and 50th Percentile	46.75%
Between 50th and 75th Percentile	45.11%
Between 75th and 100th Percentile	36.02%
Top 10%	30.53%
Top 5%	25.42%
By Tangibility	
25th Percentile	34.47%
Between 25th and 50th Percentile	39.86%
Between 50th and 75th Percentile	41.81%
Between 75th and 100th Percentile	40.68%
Top 10%	36.98%
Top 5%	33.05%
By Market-to-Book	
25th Percentile	48.75%
Between 25th and 50th Percentile	45.05%
Between 50th and 75th Percentile	40.26%
Between 75th and 100th Percentile	32.86%
Top 10%	26.88%
Top 5%	22.70%

Table 4.3

Summary Statistics

This table presents loan characteristics for new bond issues by all firms before applying the restrictions of each data set. *Offer Yield* is the yield offered to investors at the time of bond issue; *Net Interest Cost* is the overall interest expense that is associated with the bond and is based on the average coupon rate weighted to years of maturity adjusted for any associated discounts or premiums; *Spread to Treasury* is the difference in the bond yield and risk free treasury security yield with similar maturity; *Loan Size* is the proceeds from bond issuance; *Loan Maturity* is the maturity in years of issued bonds; *z-score* is the Altman z-score used to predict corporate defaults and is computed differently for manufacturing and non-manufacturing firms (see Appendix 4.1). *Assets* are total assets of the firm; *Leverage* is the ratio of book value of long term debt plus long term loan in current liabilities to the book value of total assets of the firm; *Coverage* is the ratio of earnings before interest and taxes to the interest expense; *Tangibility* is the ratio of property, plant and equipment to the total assets of the firm; *Market-to-Book* is the ratio of market value of assets to the book value of assets; *Current ratio* is the ratio of current assets to current liabilities; *S&P rating* is the S&P rating for bonds and has been converted to a number (see Appendix 4.1); *Log Maturity* is the log of the maturity of the bonds; *Log Amount* is the log of the total value of the issued bonds.

Variable	Mean	Median	Standard Deviation	25th Percentile	75th Percentile	N
Offer Yield (%)	6.818	6.829	1.529	6.000	7.622	1,269
Net Interest Cost (%)	6.960	6.902	1.608	6.016	7.745	1,152
Spread to Treasury (%)	1.658	1.280	1.239	0.800	2.100	1,270
z-score	-9.323	2.044	67.076	-0.840	5.047	362,212
Size	5.021	5.111	2.691	3.277	6.825	512,908
Leverage	0.306	0.184	0.518	0.022	0.382	480,904
Coverage Ratio	7.410	4.692	105.145	1.006	11.653	306,416
Tangibility	0.260	0.160	0.265	0.042	0.415	496,767
Market-to-Book	3.315	1.414	7.657	1.057	2.456	446,445
Current Ratio	3.213	1.744	5.157	1.019	3.148	423,255
S&P Rating	15.166	15.000	3.034	14.000	17.000	1,473
Log Maturity	4.569	4.802	1.017	4.113	4.826	1,483
Log Amount	4.943	5.298	1.283	4.605	5.704	1,486

Table 4.4
Regression Results: Offer Yield

This table presents the regression results to test for the hypotheses (H4.2 – H4.5). Offer Yield is the yield offered to investors at the time of bond issue. VIOL is a binary variable that equals 1 for violating firms and 0 otherwise. $Viol_t$ is a binary variable that equals one if the firm reported a debt covenant violation in the quarter of bond issue and zero otherwise. $Viol_{t-1}$ is a binary variable that equals one if the firm reported a debt covenant violation in the quarter preceding the bond issue and zero otherwise. Viol = 1 is a binary variable that equals one if a firm has reported one debt covenant violation in the period from 1996 to 2005 and zero otherwise. Viol > 1 is a binary variable that equals one if a firm has reported more than one covenant violation either in consecutive or intermittent quarters and zero otherwise. Viol = n is the total number of violations reported by the firm. Z-score is the Altman z-score used to predict corporate defaults and is computed differently for manufacturing and non-manufacturing firms (see Appendix 4.1). Size is the natural log of the total quarterly assets of the firm in year 2000 dollars; Leverage is the ratio of book value of long term debt plus long term debt in current liabilities to the book value of total assets of the firm; Coverage is the ratio of earnings before interest and taxes to the interest expense; Tangibility is the ratio of property, plant and equipment to the total assets of the firm; Market-to-Book is the ratio of market value of assets to the book value of assets; Current ratio is the ratio of current assets to current liabilities; S&P rating is the S&P rating for bonds and has been converted to a number (see Appendix 4.1); Log_Maturity is the natural log of the maturity of the loan in months. Log_Loan_Amount is the natural log of the proceeds from bond issuance. All regressions include year and quarter dummies. Figures in parentheses are robust clustered standard errors.

	(1)	(2)	(3)	(4)	(5)	(6)
VIOL	0.475***					
	(0.124)					
$Viol_t$		0.339				
		(0.407)				
$Viol_{t-1}$			1.052*			
			(0.590)			
Viol =1				0.388**		
				(0.183)		
Viol > 1					0.477***	
					(0.137)	
Viol = n						0.0577***
						(0.021)
z_score	0.00302	-0.0177	-0.0278	-0.0232	-0.00986	-0.014
	(0.045)	(0.040)	(0.043)	(0.040)	(0.042)	(0.041)
$Size_{t-1}$	-0.158***	-0.196***	-0.186***	-0.187***	-0.189***	-0.186***
	(0.045)	(0.041)	(0.044)	(0.043)	(0.042)	(0.042)
$Leverage_{t-1}$	0.196	0.0832	0.162	0.0832	0.108	0.295
	(0.353)	(0.357)	(0.345)	(0.353)	(0.338)	(0.339)

Table 4.4
Continued

Coverage $_{t-1}$	0.00191***	0.00180**	0.00184**	0.00178**	0.00182**	0.00230***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Tangibility $_{t-1}$	-0.0466	-0.0884	-0.0623	-0.152	-0.017	-0.15
	(0.232)	(0.205)	(0.209)	(0.206)	(0.190)	(0.196)
Market-to-Book $_{t-1}$	-0.0775	-0.118**	-0.125**	-0.105*	-0.106*	-0.138**
	(0.059)	(0.057)	(0.060)	(0.057)	(0.058)	(0.057)
Current Ratio $_{t-1}$	0.126*	0.117*	0.137**	0.132**	0.096	0.117*
	(0.068)	(0.065)	(0.065)	(0.063)	(0.064)	(0.062)
S&P Rating $_{t-1}$	-0.226***	-0.224***	-0.212***	-0.220***	-0.214***	-0.219***
	(0.028)	(0.022)	(0.022)	(0.022)	(0.021)	(0.022)
Log_Maturity	0.188***	0.163***	0.159**	0.161***	0.178***	0.159***
	(0.065)	(0.062)	(0.062)	(0.059)	(0.062)	(0.060)
Log_Loan_Amount	0.125***	0.104***	0.0987***	0.105***	0.111***	0.120***
	(0.041)	(0.034)	(0.033)	(0.035)	(0.035)	(0.032)
Constant	8.494***	9.344***	9.041***	9.152***	8.910***	8.918***
Observations	678	678	649	678	678	678
R-squared	0.66	0.664	0.656	0.669	0.676	0.68

*** p<0.01, ** p<0.05, * p<0.1

Table 4.5
Regression Results: Net Interest Cost

This table presents the regression results to test for the hypotheses (H4.2 – H4.5). Net Interest Cost is the overall interest expense that is associated with the bond and is based on the average coupon rate weighted to years of maturity adjusted for any associated discounts or premiums. VIOL is a binary variable that equals 1 for violating firms and 0 otherwise. $Viol_t$ is a binary variable that equals one if the firm reported a debt covenant violation in the quarter of bond issue and zero otherwise. $Viol_{t-1}$ is a binary variable that equals one if the firm reported a debt covenant violation in the quarter preceding the bond issue and zero otherwise. Viol = 1 is a binary variable that equals one if a firm has reported one debt covenant violation in the period from 1996 to 2005 and zero otherwise. Viol > 1 is a binary variable that equals one if a firm has reported more than one covenant violation either in consecutive or intermittent quarters and zero otherwise. Viol = n is the total number of violations reported by the firm. Z-score is the Altman z-score used to predict corporate defaults and is computed differently for manufacturing and non-manufacturing firms (see Appendix 4.1). Size is the natural log of the total quarterly assets of the firm in year 2000 dollars; Leverage is the ratio of book value of long term debt plus long term debt in current liabilities to the book value of total assets of the firm; Coverage is the ratio of earnings before interest and taxes to the interest expense; Tangibility is the ratio of property, plant and equipment to the total assets of the firm; Market-to-Book is the ratio of market value of assets to the book value of assets; Current ratio is the ratio of current assets to current liabilities; S&P rating is the S&P rating for bonds and has been converted to a number (see Appendix 4.1); Log_Maturity is the natural log of the maturity of the loan in months. Log_Loan_Amount is the natural log of the proceeds from bond issuance. All regressions include year and quarter dummies. Figures in parentheses are robust clustered standard errors.

	(1)	(2)	(3)	(4)	(5)	(6)
VIOL	0.611***					
	-0.144					
$Viol_t$		0.294				
		(0.386)				
$Viol_{t-1}$			1.182*			
			(0.690)			
Viol =1				0.469*		
				(0.242)		
Viol > 1					0.466***	
					(0.153)	
Viol =n						0.0700***
						(0.025)
z_score	0.0206	0.0129	0.00226	0.00625	0.0222	0.0204
	(0.0493)	(0.049)	(0.050)	(0.047)	(0.048)	(0.052)
$Size_{t-1}$	-0.123**	-0.161***	-0.142***	-0.151***	-0.155***	-0.145***
	(0.0513	(0.046)	(0.050)	(0.049)	(0.048)	(0.047)
$Leverage_{t-1}$	-0.0349	-0.117	-0.0371	-0.112	-0.0887	-0.0866
	(0.393)	(0.406)	(0.388)	(0.401)	(0.386)	(0.419)

Table 4.5
Continued

Coverage $_{t-1}$	-0.000202	-0.000246	-0.000204	-0.000216	-0.000287	-0.000151
	(0.000709	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Tangibility $_{t-1}$	-0.198	-0.182	-0.132	-0.271	-0.114	-0.162
	(0.268	(0.279)	(0.284)	(0.274)	(0.262)	(0.261)
Market-to-Book $_{t-1}$	-0.0275	-0.0416	-0.0449	-0.0254	-0.03	-0.064
	(0.0601	(0.062)	(0.064)	(0.061)	(0.062)	(0.064)
Current Ratio $_{t-1}$	0.121	0.136*	0.160**	0.151**	0.114	0.123
	(0.0762	(0.074)	(0.075)	(0.072)	(0.077)	(0.075)
S&P Rating $_{t-1}$	-0.274***	-0.287***	-0.278***	-0.283***	-0.276***	-0.284***
	(0.0335	(0.032)	(0.033)	(0.032)	(0.033)	(0.033)
Log_Maturity	0.320*	0.282	0.283	0.281	0.305	0.312
	(0.178)	(0.202)	(0.205)	(0.188)	(0.206)	(0.194)
Log_Loan_Amount	0.109**	0.0852*	0.0717	0.0909**	0.101**	0.0865*
	(0.0502	(0.045)	(0.044)	(0.045)	(0.047)	(0.046)
Constant	8.464***	9.498***	11.24***	9.238***	8.971***	9.153***
Observations	611	611	594	611	611	611
R-squared	0.674	0.651	0.644	0.657	0.66	0.66

*** p<0.01, ** p<0.05, * p<0.1

Table 4.6

Regression Results: Spread to Treasury

This table presents the regression results to test for the hypotheses (H4.2 – H4.5). Spread to Treasury is the difference in the bond yield and risk free treasury security yield with similar maturity. VIOL is a binary variable that equals 1 for violating firms and 0 otherwise. $Viol_t$ is a binary variable that equals one if the firm reported a debt covenant violation in the quarter of bond issue and zero otherwise. $Viol_{t-1}$ is a binary variable that equals one if the firm reported a debt covenant violation in the quarter preceding the bond issue and zero otherwise. Viol = 1 is a binary variable that equals one if a firm has reported one debt covenant violation in the period from 1996 to 2005 and zero otherwise. Viol > 1 is a binary variable that equals one if a firm has reported more than one covenant violation either in consecutive or intermittent quarters and zero otherwise. Viol = n is the total number of violations reported by the firm. Z-score is the Altman z-score used to predict corporate defaults and is computed differently for manufacturing and non-manufacturing firms (see Appendix 4.1). Size is the natural log of the total quarterly assets of the firm in year 2000 dollars; Leverage is the ratio of book value of long term debt plus long term debt in current liabilities to the book value of total assets of the firm; Coverage is the ratio of earnings before interest and taxes to the interest expense; Tangibility is the ratio of property, plant and equipment to the total assets of the firm; Market-to-Book is the ratio of market value of assets to the book value of assets; Current ratio is the ratio of current assets to current liabilities; S&P rating is the S&P rating for bonds and has been converted to a number (see Appendix 4.1); Log_Maturity is the natural log of the maturity of the loan in months. Log_Loan_Amount is the natural log of the proceeds from bond issuance. All regressions include year and quarter dummies. Figures in parentheses are robust clustered standard errors.

	(1)	(2)	(3)	(4)	(5)	(6)
VIOL	0.369***					
	(0.105)					
$Viol_t$		0.437				
		(0.393)				
$Viol_{t-1}$			0.882			
			(0.581)			
Viol =1				0.13		
				(0.146)		
Viol > 1					0.393***	
					(0.129)	
Viol = n						0.0485***
						(0.019)
z_score	0.00004	0.00203	-0.00561	-0.00571	0.00607	-0.00642
	(0.040)	(0.039)	(0.042)	(0.039)	(0.040)	(0.040)
$Size_{t-1}$	-0.136***	-0.153***	-0.138***	-0.154***	-0.151***	-0.156***
	(0.043)	(0.039)	(0.042)	(0.040)	(0.041)	(0.040)
$Leverage_{t-1}$	0.0999	0.0396	0.0514	0.0387	0.0602	0.0272
	(0.346)	(0.357)	(0.361)	(0.365)	(0.347)	(0.348)

Table 4.6
Continued

Coverage $_{t-1}$	0.000397	0.000273	0.000315	0.00029	0.000321	0.000411
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Tangibility $_{t-1}$	-0.362*	-0.284	-0.263	-0.319	-0.237	-0.337*
	(0.206)	(0.202)	(0.208)	(0.204)	(0.193)	(0.194)
Market-to-Book $_{t-1}$	-0.0764	-0.0822*	-0.0900*	-0.0755	-0.0735	-0.0909*
	(0.048)	(0.047)	(0.050)	(0.047)	(0.048)	(0.048)
Current Ratio $_{t-1}$	0.0712	0.0773	0.0847	0.0803	0.0601	0.0697
	(0.065)	(0.062)	(0.062)	(0.062)	(0.066)	(0.063)
S&P Rating $_{t-1}$	-0.224***	-0.238***	-0.232***	-0.237***	-0.230***	-0.232***
	(0.020)	(0.020)	(0.021)	(0.020)	(0.020)	(0.020)
Log_Maturity	-0.00291	-0.0172	-0.0226	-0.0178	-0.00102	-0.00253
	(0.026)	(0.031)	(0.031)	(0.031)	(0.029)	(0.027)
Log_Loan_Amount	0.0955**	0.0822***	0.0723**	0.0832***	0.0910**	0.0923**
	(0.040)	(0.030)	(0.029)	(0.030)	(0.035)	(0.039)
Constant	5.514***	6.077***	5.915***	6.088***	5.769***	5.889***
Observations	676	676	648	676	676	676
R-squared	0.596	0.586	0.589	0.586	0.597	0.592

*** p<0.01, ** p<0.05, * p<0.1

Figure 4.1

Covenant Violation from 1996 – 2005

This figure presents the annual fraction of firms reporting at least one covenant violation during the fiscal years 1996 to 2005.

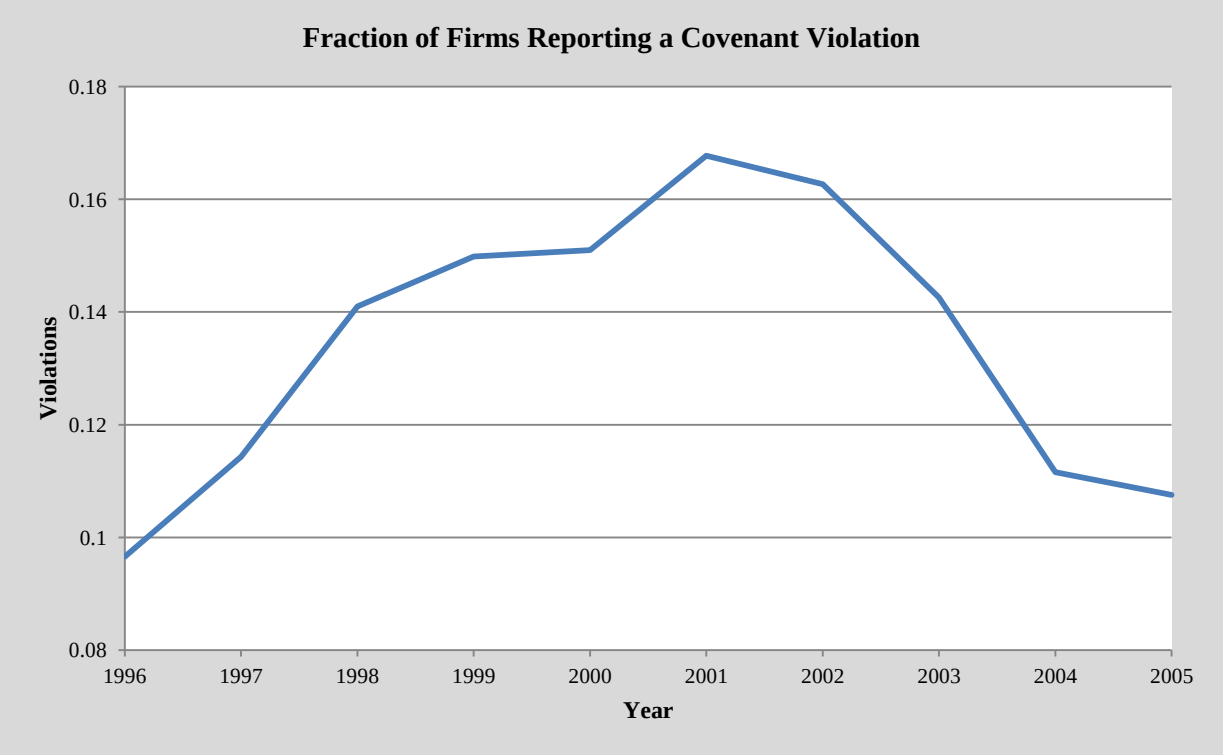


Figure 4.2

Covenant Violation by Firm Characteristics

This figure presents the annual percentage of firms reporting at least one covenant violation during the fiscal years 1996 to 2005 and segregates the data based on Size, Tangibility and Market to Book.

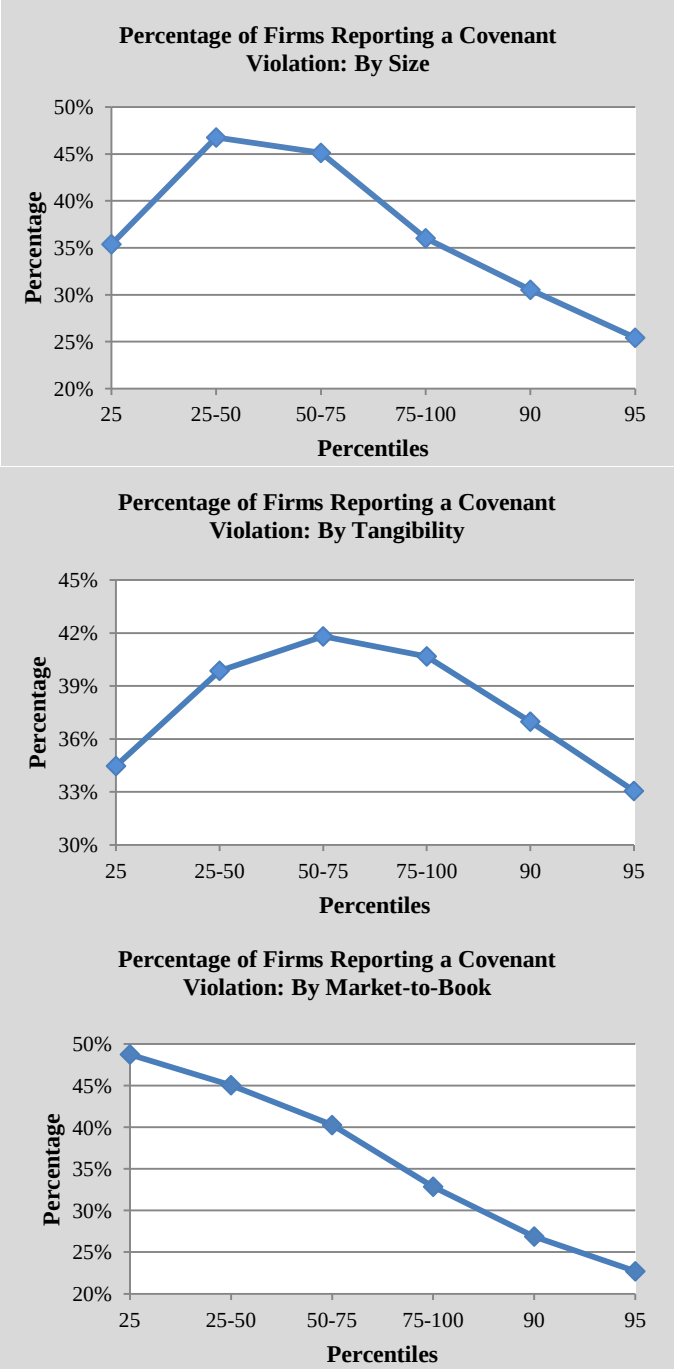


Figure 4.3

Firm Characteristics Preceding and Following a Violation

This figure presents the financial condition of firms reporting at least one covenant violation during the fiscal years 1996 to 2005 and looks at the progression of firm characteristics in the quarter preceding and following a financial covenant violation.

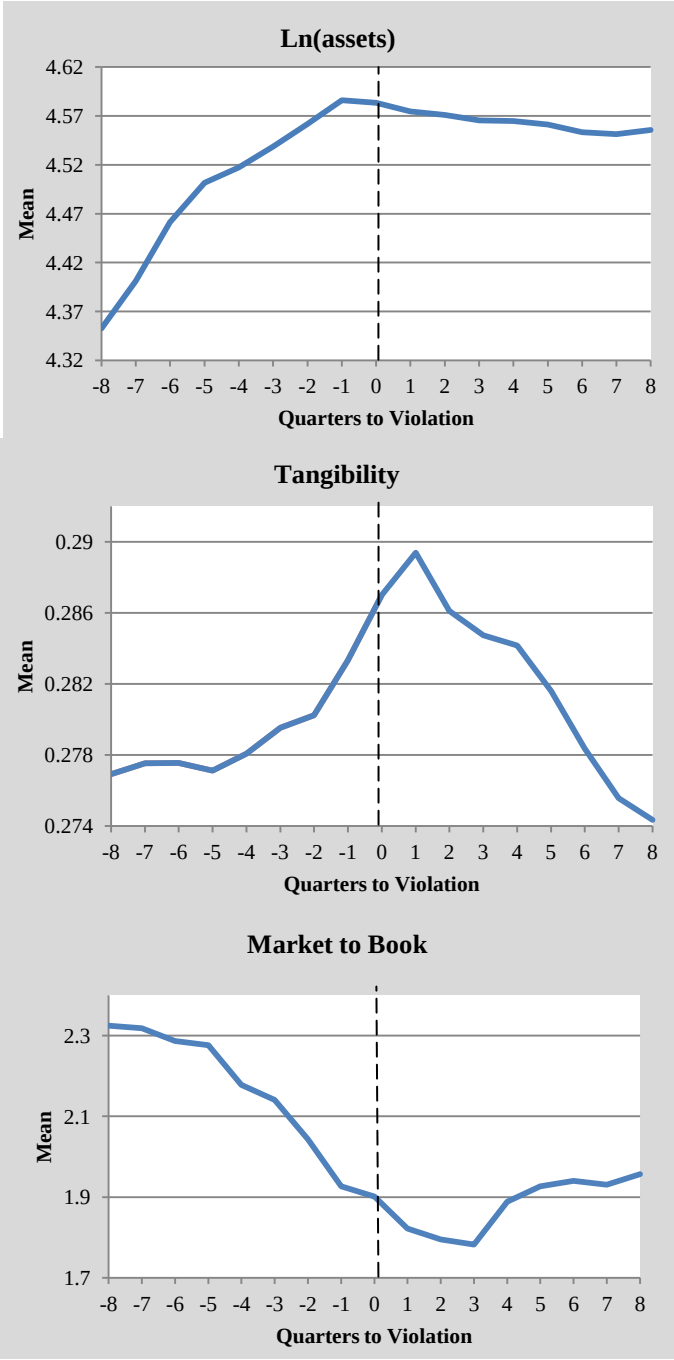


Figure 4.4

Financial Indicators Preceding and Following a Violation

This figure presents the financial condition of firms reporting at least one covenant violation during the fiscal years 1996 to 2005 and looks at the progression of the indicators of financial health of the firm in the quarter preceding and following a financial covenant violation. The smooth red line (Poly.) represents the direction of the movement of the financial condition of the firm over the quarters investigated.

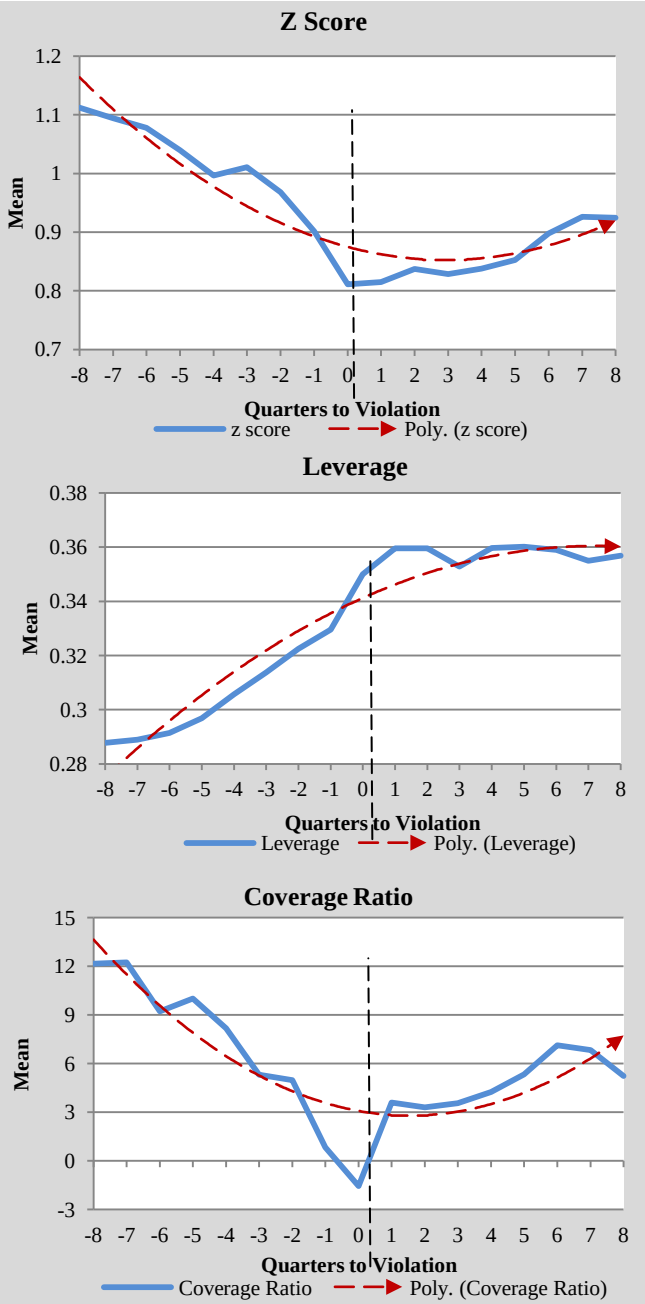
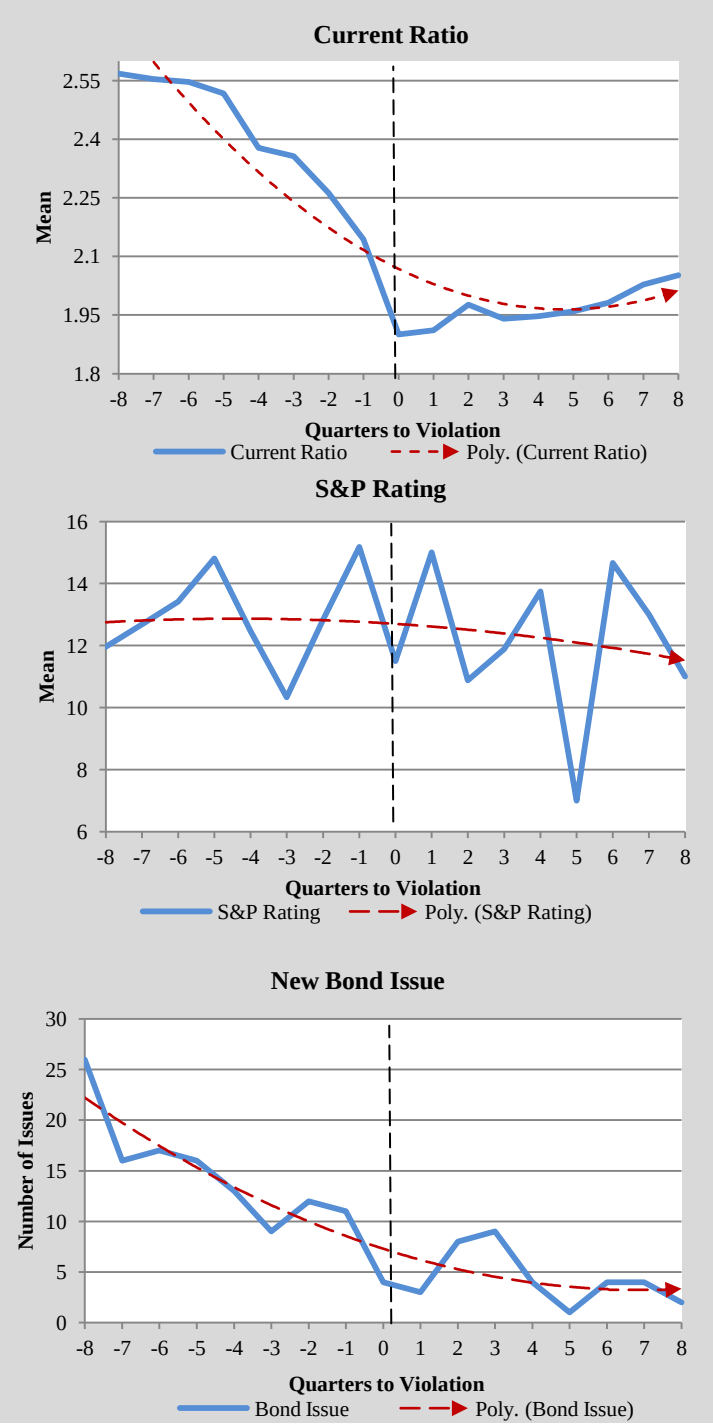


Figure 4.4

Continued



Appendix 4.1

Definition of variables

- CoD: The dependent variable is "Cost of Debt". Three different specifications are used: Offer Yield, Net Interest Cost and Spread to Treasury.
  - Offer Yield: The yield offered to investors at the time of bond issue.
  - Net Interest Cost: The overall interest expense that is associated with the bond and is based on the average coupon rate weighted to years of maturity adjusted for any associated discounts or premiums.
  - Spread to Treasury: The difference between the bond yield and a risk-free treasury security yield with similar maturity.
- VIOLATION: This is a binary variable measured by: VIOL, [$Viol_t$, $Viol_{t-1}$], and [Viol =1, Viol >1].
  - $Viol_{(t)}$: Incidence of violation occurred in the bond-issue quarter
  - $Viol_{(t-1)}$: Incidence of violation occurred in the quarter preceding the bond-issue quarter
  - Viol =1: Firm reported exactly one violation
  - Viol >1: Firm reported more than one violation
  - Viol = n: total number of violations reported by the firm

- Z-SCORE: The z-score for the issuer calculated separately for manufacturing and non-manufacturing firms.
- SIZE: The natural log of the book value of the assets of the borrower adjusted for inflation in year 2000 dollars. This controls for the cross-sectional variation in issuer size in the sample.
- LEVERAGE: Ratio of book value of long term debt plus the long term debt in current liabilities to the book value of total assets.
- COVERAGE RATIO: Calculated as $(\frac{EBITDA}{Interest\ Expenses})$.
- TANGIBILITY: Ratio of property, plant and equipment to total assets.
- MARKET-to-BOOK: Ratio of market value of the firm to the book value of the firm.
- CURRENT RATIO: Ratio of current assets to current liabilities.

- S&P RATING: The Standard & Poor's ratings of the new bond issue converted to a numerical value using the following scheme.

S&P Rating	Numerical Value
AAA	22
AA+	21
AA	20
AA-	19
A+	18
A	17
A-	16
BBB+	15
BBB	14
BBB-	13
BB+	12
BB	11
BB-	10
B+	9
B	8
B-	7
CCC+	6
CCC	5
CCC-	4
CC	3
C	2
D	1

- LOG MATURITY: The natural log of the maturity of the bond issue in months.
- LOG AMOUNT: The natural log of the loan issue value.

Controls$_k$: These are other control variables and include dummy variables for the year and quarter of the bond issue and the industry of the borrower.

Chapter 5

5. Conclusion

This thesis empirically investigates a number of important questions related to corporate governance, management behaviour, covenant violations and the costs of such violations. Factors influencing management decisions and the cost of violating contractual obligations are important issues in the corporate finance literature. Two chapters explored factors affecting management behaviour, which leads to important financing and operational decisions for the firm. Chapter 2 focused on the role of corporate governance structure in determining the financing choices made by firms and provided evidence on the trade-off theory of capital structure. The third chapter examined management behaviour close to debt covenant violations and investigated the use of accrual based and operational earnings management activities to provide evidence for the debt covenant hypothesis. The fourth chapter provided the first explicit estimates of the cost of covenant violations and focused on the incidence, timing and frequency of violations as a source of evidence on the cost of raising new debt financing.

Each of these chapters is self contained. The first chapter sheds light on a much deliberated subject and outlines the importance of corporate governance in determining a firm's choice of financing. This chapter makes two contributions to the literature. First, it provides evidence that earlier literature on capital structure overlooked the governance environment in which firms operate and that this could

be an important factor influencing management behaviour. Second, it makes a methodological contribution by identifying endogeneity concerns and providing a framework to deal with them. The introduction of a governance mechanism into the mix of profits and financial leverage yields interesting interpretations as the managers of firms with strong governance structures are likely to exhibit behaviour consistent with the trade-off theory of capital structure. Further support is gathered by investigating the use of the relative size and tangible assets of the firm (for debt issuance) for the two governance structures. The data on debt issuance and retirement also exhibit results that vary with the governance structure. The overall results of the study conclude that the trade-off theory of capital structure is valid once governance mechanisms are considered.

The second paper investigates debt covenant hypotheses and focuses on management behaviour around the time of debt covenant violations. It makes three contributions to the literature. First, this is the first paper to provide evidence on the debt covenant hypothesis by using data where the firms are ex post known to be in violation. Second, the study finds that management not only engages in accruals manipulation but also employs real earnings management techniques in an attempt to avoid violations. Third, the paper outlines the disparity in the use of these two techniques in the quarters surrounding the violation period. The results provide support for the debt covenant hypothesis and show that managers increase reported earnings through accruals manipulation and real earnings management. Abnormal total and working capital accruals are positive in the quarter prior to,

quarter of and quarter following the violation. Abnormal real earnings management techniques also show evidence of manipulation; however, the discretion of managers to engage in such activities plays an important role. The results show a decrease in abnormal discretionary expenses in the quarters surrounding the violation, consistent with the premise that managers have the most discretion on expenses such as research and development. Managers enjoy somewhat less flexibility in production costs, as overproducing in subsequent quarters will result in abnormally high levels of inventory. As expected, a reversal in production costs occurs in the quarter following the violation. Managers enjoy the least discretion over cash flows as activities such as limited time discounts and lenient credit terms can only be successful if customers take advantage of them. The overall results of the study suggest the managers engage in accrual based and real activities to increase reported earnings and thereby avoid covenant violations.

The third paper investigates the impact of debt covenant violations on the cost of new debt financing. The paper makes three contributions to the existing literature on the cost of debt. First, it provides the first explicit estimates of the impact of debt covenant violation on the cost of new public debt financing. Second, it highlights the importance of the timing of the covenant violation with respect to the bond issue. Third, it investigates the importance of the frequency of violations and the subsequent increase in the cost of debt. The results indicate that firms that violated a debt covenant have a higher cost of debt than firms that did not violate a covenant. The timing of the violations also has a significant bearing

on the cost of debt. Firms that violated a debt covenant in the quarter of bond issue have a higher cost of debt than firms that did not violate a covenant. In addition, firms that violated a debt covenant in the quarter preceding the quarter of the violation have a cost of debt that is higher than that of firms that did not violate a debt covenant and is also higher than that of firms that violated a covenant in the quarter of the bond issue. The results also indicate that firms that violated a covenant once have a higher cost of debt than non-violating firms, though the increase is not significant across all specifications. In addition, the results indicate that repeat offenders (firms with multiple violations) have a higher cost of debt than firms that did not violate a debt covenant and also a higher cost than firms that violated a debt covenant once. Overall, the study indicates that there are significant costs to not upholding contractual restrictions on debt and that the timing and frequency of such violations have a bearing on the cost of debt.

The thesis provides a good framework for future research. The role of corporate governance has been highlighted as having an important bearing on the use of debt financing and can play an important role in understanding other theories of capital structure (for example, the pecking theory of capital structure). Further research might focus on the suboptimal value of the firm as a result of poor governance structures. This work can also highlight the difference in the value of firms operating in different governance environments and focus on the disparity in valuations as a result of tax savings.

The thesis also highlights management's accounting and real earnings management activities around covenant violations. It provides insight into further research in the area specifically with respect to the change in the use of the two activities in the pre- and post-Sarbanes-Oxley (SOX) period. Additionally, research might also focus on the difference in management activities while dealing with public versus private lenders. The thesis also provides a framework for further investigating the importance of the number of violations reported in a particular quarter.

The last part of the thesis estimates the increase in the cost of debt of public borrowing as a result of covenant violation. This can be extended to investigate the changes in the cost of debt of private borrowing. Further research might focus on the difference in the changes in the cost of debt through private versus public borrowing. Additionally, the impact of the number of violations reported in a quarter on the cost of private and public borrowing may also be investigated.

Overall, the thesis sheds light on some important issues in corporate finance and, as suggested above, may provide some direction for future research.