

ESSAYS ON EARNINGS QUALITY AND CORPORATE INVESTMENT

by

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ABSTRACT

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This dissertation consists of two essays on earnings quality and corporate investments. In the first essay, I test the hypothesis that earnings quality affects corporate investment decisions. Using earnings quality as a measure of financial constraints, I find firms that have low earnings quality are less dependent on internal cash flows for investments than high earnings quality firms. I also find that low earnings quality firms are less dependent on the transitory component of internal cash flows for investments. My findings are robust across different measures of earnings quality, and additional tests suggest that the results are not driven by managerial empire-building.

In the second essay, I examine the corporate investment behavior of firms that have slightly positive or zero earnings. The findings suggest that such firms invest more and suffer from investment inefficiencies. Additional analysis shows that the presence of Big 4 auditors and debt holders may help reduce the investments made by such firms, signaling that external monitoring has an impact on corporate investment decisions.

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ESSAY 1

EARNINGS QUALITY AND CORPORATE INVESTMENT

1. INTRODUCTION

An important question in corporate finance asks whether financing frictions affect corporate investment decisions. On one hand, Modigliani and Miller (1958) state that capital allocations are efficient across firms in a frictionless financial market. On the other hand, Stiglitz and Weiss (1981) and Myers and Majluf (1984) argue that adverse selection problems give rise to costly external financing that could impact corporate investment decisions. Contrary to Modigliani and Miller (1958), several empirical studies find evidence of an association between measures of financial constraints and corporate investments.¹ Specifically, studies show an association between financial slack and investments in the presence of financing frictions. In a groundbreaking paper, Fazzari, Hubbard and Peterson (1988) find low dividend payout, or financially constrained, firms are more dependent on internal cash flows for capital expenditures.²

The critics of Fazzari, Hubbard and Peterson (1988) view dividend payout as a crude proxy for financial constraints. Kaplan and Zingales (1997) argue that a more comprehensive list of firm characteristics and managerial outlook statements would better identify the financial constraints. They construct a financial constraint index, the KZ index, and find that, contrary to Fazzari, Hubbard and Peterson (1988), investments of financially constrained firms are *less* sensitive to the availability of internal cash flows.

¹ Lamont et al. (2001) defines financial constraints as ‘frictions that prevent the firm from funding all desired investments.’

² The literature presents numerous debates about the validity of investment-cash flow sensitivity regressions. Novy-Marx (2008) shows that investment-cash flow sensitivities are valid in his theoretical model on productivity and cross section of expected returns.

Moreover, Cleary (1999) uses discriminant analysis to construct a financial constraint index from a large sample of firms and find similar results to those in Kaplan and Zingales (1997).³

My work contributes to the literature on the effect of financial constraints on corporate investment decisions. Using earnings quality as a measure of financial constraint, I study the relationship between earnings quality and corporate investment decisions. The existing research on earnings quality offers very different views on the earnings quality and financing frictions. On one hand, studies show that the stock portfolio of low earnings quality underperforms in stock returns, which implies that low earnings quality firms have a lower cost of financing at the time of portfolio formation and are less dependent on internal cash flows for corporate investment. (See Xie (2001)) On the other hand, studies also show that firms with low earnings quality face a higher cost of capital, which implies that such firms are more dependent on internal cash flows for corporate investment. (See Francis et al. (2004))

Specifically, I find that a 1% increase in internal cash flow leads to an approximate increase of 0.04% in capital expenditure for low earnings quality firms, compared to a 0.12% increase in capital expenditure for high earnings quality firms. This implies that the capital expenditures of high earnings quality firms are three times more sensitive to internal cash flows than the capital expenditures of low earnings quality firms. These findings are consistent with those of Kaplan and Zingales (1997) and Cleary (1999).

³ A separate strand in the literature uses investment Euler equations to identify financial constraints variables. For example, Whited and Wu (2006) use the structural investment Euler equations to construct a financial constraint index that links financial constraints to stock returns.

Few explanations exist for the differences in investment-cash flow sensitivities among firms facing different degrees of financial constraints. Kaplan and Zingales (1997) point to managerial risk aversion as a possible cause; Cleary (1999) refers to Jensen's free cash flow hypothesis as an alternative explanation.⁴ In this paper, I investigate the difference in investment-cash flow sensitivities by focusing on a firm's cash flow components in order to test whether cash flow variability is an explanation. According to the theoretical model of Froot, Scharfstein and Stein (1993), variability in internal cash flow can lead to variability in external financing or variability in corporate investments. Empirically, Minton and Schrand (1999) find evidence that an increase in cash flow volatility can lead to a decrease in capital expenditure. In addition, Rountree, Weston and Allayannis (2008) find a negative association between firm market value and cash flow variability.

Following Dechow, Kothari and Watts (1998) and Roychowdhury (2006), I divide internal cash flows into two components: the permanent cash flows and the transitory cash flows. The permanent cash flows are the normal level of cash flows determined by an industry- year model with firm, specific sales and changes in sales as inputs. The transitory cash flows are the difference between the actual cash flows and the permanent cash flows. The transitory cash flows are nonrecurring and hence more variable in nature. Results show that a firm's investments are more dependent on permanent cash flows than transitory cash flows. Specifically, a 1% increase in permanent cash flows leads to approximately a 0.20% increase in capital expenditure for high earnings quality firms compared to a 0.03% increase with transitory cash flow. And, in the case of low earnings

⁴ Moyn (2004) attributes differences in investment-cash flow sensitivities to proxies of financial constraints.

quality firms, a 1% increase in transitory cash flows actually reduces corporate investments by approximately 0.03%.

An alternative interpretation for the high investment-cash flow sensitivities of high earnings quality firms is based on Jensen's argument that managers are inclined to use most of the available cash flows because they seek more control of the corporation through empire building.⁵ To distinguish my findings from Jensen's free cash flow hypothesis, I examine the relationship between capital expenditure and corporate governance for both high and low earnings quality firms. According to Gompers, Ishii and Metrick (2003), firms with weaker shareholder rights have higher capital expenditures. They measure shareholder protection using a corporate governance index that is based on the 24 RISK METRICS provisions (G-Index). However, I do not find a variation in the relationship between capital expenditure and corporate governance between high and low earnings quality firms. My results suggest that the free cash flow hypothesis may not explain the investment-cash flow sensitivities in this study.

This paper also contributes to the small but growing literature that examines the association between earnings quality and corporate investment. Biddle and Hilary (2006) investigate the association between earnings quality and investment in a cross-country study. They use the earnings quality proxy in Dechow and Dichev (2002) and find that low earnings quality firms exhibit higher investment-cash flow sensitivities. Li and Tang (2008) study the role of large positive accruals on subsequent capital expenditures. They find that firms with lower earnings quality (large positive accruals) tend to have lower subsequent investment-cash flow sensitivities. This research extends the existing

⁵ See Jensen (1986).

literature by examining the roles of unsigned, discretionary accruals, including both positive and negative discretionary accruals, on corporate investment decisions. In addition, I provide an explanation for the observed difference in investment-cash flow sensitivities by examining firm cash flow components.

Section 2 outlines the underlying hypothesis. Section 3 describes the data sample and the key variables in the estimation analysis. Section 4 discusses the main results. Section 5 shows the alternative hypothesis and the robustness of the test results. Section 6 concludes the finds of this investigation.

2. HYPOTHESIS DEVELOPMENT

Prior research on the relationship between financial constraints and corporate investment decisions focuses on the association between internal cash flow and capital expenditure.⁶ According to the theory of costly external capital, a firm would meet its investment needs first through internal cash flow financing. Moreover, a firm with a higher degree of adverse selection problem would be more dependent on internal financing for its investments because the hurdle of obtaining external financing could be very high (see Myers and Majluf (1984)). The degree of financing friction is inversely proportional to a firm's available collateral such as internal cash flows. An increase in collateral leads to a lower cost of external financing and allows firms to become less dependent on internal financing for long-term investments.

My use of earnings quality as a proxy for financial constraint is motivated by research that has shown an association between the cost of capital and earnings quality.

⁶ See Hubbard (1998) and Stein (2003).

From an accounting research perspective, the degree of information asymmetry is measured by the quality of financial reporting, in particular the quality of reported earnings. High earnings quality reduces the information cost of firms wishing to access external financing.⁷ Francis et al. (2004) find that the higher cost of capital is associated with lower earnings quality and attributes the higher cost to an information cost that is related to the earnings quality of individual firm's financial reporting. From a corporate finance perspective, earnings quality is an appropriate proxy for financial constraint. Hubbard (1998) states that financial constraint sorting criteria 'should focus on a firm's characteristics that are associated with information cost'.

Without changing the underlying economic activities of a firm, opportunistic managers could increase reported earnings by manipulating accounting items. Higher the degree of manipulation, lower the earnings quality. The rationale behind earnings manipulation is based on the capital market's perception of earnings as the primary measure of firm's performance and the managers' incentives to avoid an earnings shortfall. (Graham, Harvey and Rajgopal (2005))

A widely used measure of earnings quality is accruals quality. Under the US GAAP, corporate earnings consist of two components: accruals and cash flows from operations. The closer the earnings map to cash flows, the higher the earnings quality. As stated in Statement of Financial Accounting Concepts, the role of accruals is to "relate revenues, expenses, gains, and losses to periods to reflect an entity's performance during a period instead of merely listing its cash receipts and outlays" [FASB 1985, SFAC No. 6, para. 145].

⁷ See Dechow and Schrand (2004).

The earnings quality measure in this paper follows the earnings management studies on discretionary accruals. Specifically, I use the Modified Jones Model to measure discretionary accruals.⁸ I then sort firm-year observations into two groups based on the absolute value of their discretionary accruals (unsigned discretionary accruals). Large, unsigned discretionary accrual group represents low earnings quality; small unsigned discretionary accrual group represents high earnings quality.⁹ This leads to my first hypothesis as defined below:

H1. Capital expenditures of high and low earnings quality firms exhibit different sensitivities to the internal cash flows.

A number of studies explore the relationship between cash flow variability and capital expenditure. Froot, Scharfstein and Stein (1993) theorize that variations in internal cash flows could lead to variations in capital expenditure. Following Roychowdhury (2006), I divide firms' cash flows into permanent and transitory components. I predict that cash flow variation, as measured by the transitory cash flow component, could help explain the investment-cash flow sensitivities in high and low earnings quality firms. This leads to my second hypothesis as defined below:

⁸ See Dechow, Sloan and Sweeney (1995) Please see the Appendix for definition of the earnings quality variable.

⁹ As pointed out in Hennesy and Whited (2007), one way to categorize whether a firm is financially constrained is by looking at a firm's cost of capital.

H2. Capital expenditures of high and low earnings quality firms exhibit different sensitivities to permanent and transitory cash flow components.

An alternative explanation for the difference in investment-cash flow sensitivities between high earnings quality and low earnings quality firms is Jensen's free cash flow hypothesis. To test the hypothesis, I rely on Gompers, Ishii and Metrick (2003) findings that firms with poor governance, measured by the Governance Index (G-Index), have high capital expenditures.¹⁰ I predict that high and low earnings quality firms exhibit different corporate governance characteristics that could help explain variations in their investment-cash flow sensitivities. This leads to my third hypothesis as defined below:

H3. Firms with high and low earnings quality exhibit different corporate governance characteristics and their capital expenditures exhibit different sensitivities to the Governance Index.

3. DATA SAMPLE and VARIABLE DEFINITIONS

3.1 Data

The data sample is from COMPUSTAT Annual Industrial. The sample period is from 1988 through 2006, which allows the use of cash flow data from the Statement of

¹⁰ The Governance Index is constructed using 24 RISK METRICS provisions. Wu, Zhang and Zhang (2008) argue that firms with poor corporate governance are susceptible to managerial overinvestment. Even though availability of free cash flow may lead to overinvestment, I do not test for overinvestment here.

Cash Flows.¹¹ All the firms in the data sample are manufacturing firms and have Standard Industrial Classification Code (SIC) that fall between 2000 and 3999.

Following the standard financial constraint literature, I eliminate firm-year observations with lagged Property, Plant and Equipment (Compustat Item 8) of less than \$5 million, asset growth greater than 100% and a negative Tobin's Q. This is to avoid any extreme observations that may skew the final results. Sales growth must be greater than zero to avoid any financially distressed firms. Any firm-year observations with missing data are also eliminated. (see Almeida and Campello (2004)) The top and bottom 1% of the data sample are winsorized. (see Whited and Hennessy (2007)) Every industry-year group must have at least 15 observations. The lagged asset (Compustat Item 6) must be greater than zero.¹²

3.2 Estimation Models

Following Fazzari, Hubbard and Petersen (1988) and Almeida and Campello (2007), my main empirical model is:

$$\text{Inv}_t / K_{t-1} = \alpha_1 Q_{t-1} + \alpha_2 \text{CFO}_t / K_{t-1} + \varepsilon_{i,t} \quad (1)$$

where Inv_t is the capital expenditure in period t (Compustat Item 128), K_{t-1} is the beginning of period capital stock in period $t-1$ (Compustat Item 8), CFO_t is the cash flow from operations in period t (Compustat Item 308 - 124), Q_{t-1} is Tobin's Q in period $t-1$

¹¹ Effective 1988, SFAS 95 requires companies to include cash flow statements in their financial reports.

¹² Industry is defined by the two digit SIC code.

that controls for investment opportunities $((\text{Compustat Item 6} + 24 \times 25 - 60 - 74)/6)$. The estimates are OLS coefficients and the standard errors are clustered by firm and year.¹³

Equation (1) states that capital expenditure, controlling for investment opportunities, is a function of the firm's internal cash flow (CFO). In a frictionless financial market, the coefficient estimate of CFO is zero because the allocation of external capital is efficient. However, in the real world where financing frictions exist, an increase in cash flows increases a firm's ability to obtain external capital and leads to a positive coefficient estimate for the cash flow. A large CFO coefficient estimate implies that a firm's capital expenditure is more dependent on internal cash flow.¹⁴

Next, I divide the CFO in Equation (1) into two components: the permanent CFO (PCFO) and the transitory CFO (TCFO). Following Roychowdhury (2006), I define the permanent cash flows as a linear function of the firms' sales (Compustat Item 12) and sales growth. The empirical model in this analysis is:

$$\text{Inv}_{t/K_{t-1}} = \alpha_1 Q_{t-1} + \alpha_2 \text{PCFO}_{t/K_{t-1}} + \alpha_3 \text{TCFO}_{t/K_{t-1}} + \varepsilon_{i,t} \quad (2)$$

where

$$\text{PCFO}_{t/K_{t-1}} = \alpha_1 + \alpha_2 (1/K_{t-1}) + \alpha_3 (S_{t/K_{t-1}}) + \alpha_4 (\Delta S_{t/K_{t-1}}) + \varepsilon_{i,t} \quad (3)$$

and

$$\text{TCFO}_{t/K_{t-1}} = \text{CFO}_{t/K_{t-1}} - \text{PCFO}_{t/K_{t-1}} \quad (4)$$

¹³ See Petersen (2009).

¹⁴ Numerous studies have defined internal cash flow as Compustat Item 14 + 18. However, as Bushman, Smith and Zhang (2008) point out, Compustat Item 14 + 18 consists of a working capital accrual component that is highly correlated with capital expenditure and biases the results.

In Equation (2), the PCFO is the normal level of cash flows determined by the industry-year model with firm specific sales and changes in sales as inputs. The transitory cash flows are the difference between the actual cash flows and the permanent cash flows.¹⁵

3.3 Financial Constraint Identification

To identify financially constrained and unconstrained firms, I use three financial constraint indexes from the literature: the Kaplan and Zingales Index (hereafter KZ index), the Cleary Index and Whited and Wu Index (hereafter called the WW Index).¹⁶ The financial constraint indexes incorporate various firm characteristics as determinants of financial constraint status. Firms with higher index values are more constrained.¹⁷ Each year, I rank the firms into the top half and the bottom half based on index values. I classify the top half as financially constrained and the bottom half as financially unconstrained. Please see the Appendix for the detailed definition of the indexes.

The literature also uses univariate financial constraint measures such as dividend payout and firm size. Though not reported here, I find similar results using these measures.

In addition, I use earnings quality as a sorting criterion. Following Yu (2008), I use the absolute value of discretionary accruals (unsigned discretionary accruals) as a measure of earnings quality. The discretionary accruals are calculated using the modified

¹⁵ The methodology in Roychowdhury (2006) follows Dechow et al. (1998).

¹⁶ See Lamont et al. (2001) for KZ Index, Cleary (1999) for Cleary Index and Whited and Wu (2006) for WW Index.

¹⁷ The value of Cleary index is lower for financially constrained firms. In this paper, I multiply the Cleary index by negative one.

Jones Model by Dechow, Sloan and Sweeney (1995).¹⁸ Firms with higher (lower) unsigned, discretionary accruals have low (high) earnings quality.

One advantage of using the unsigned discretionary accruals is that it is not highly correlated with cash flows.¹⁹ A high correlation between the financial constraint proxy and the cash flows could bias the results of investment cash flow sensitivity regressions. Another advantage is that unsigned discretionary accruals capture both the manipulation of positive and negative accruals. A manager could manipulate earnings upward with positive accruals to make earnings appear stronger. Conversely, a manager could manipulate earnings downward with negative accruals in order to boost future earnings.

3.4 Descriptive Statistics

3.4.1 Firm Characteristics

Table 1 provides a summary of the key variables in the analysis. The final sample has 14,424 firm-year observations. Panel A describes all firms in the sample. On average, firms invest at the rate of 26.1% of their capital stock in period t-1. The mean asset size is \$2,447 million with a range of between \$6.6 million and \$250 billion.

In panels B and C, the firm-year observations are sorted annually into high and low earnings quality groups based on firm-year, unsigned discretionary accruals. Panel B consists of 7,215 firm-year observations with low earnings quality (high unsigned discretionary accruals) and Panel C consists of 7,209 observations of firm years with high

¹⁸ I check the robustness of my results by using the abnormal current accruals calculated using the current accrual model by Teoh, Welch and Wong (1998). Please refer to the Appendix for the detailed descriptions of the discretionary accruals constructions.

¹⁹ The Pearson correlation between unsigned discretionary accrual and CFO is -0.076. In addition, the signed discretionary accruals have a high correlation with the cash flow variable CFO.

earnings quality (low unsigned discretionary accruals). Comparing Panel B to Panel C, high earnings quality firms have lower mean, unsigned discretionary accruals, capital expenditure, lagged-Tobin's Q and sales growth but a higher cash flow from operations.²⁰ Moreover, the high earnings quality group has lower standard deviations across its core variables, in particular the standard deviation of cash flow from operations and its components are significantly lower.

3.4.2 Univariate Correlations

The correlations among key variables are shown in Table 2. Capital expenditure is positively correlated with the unsigned discretionary accruals ($\rho = 0.17$) and negatively correlated with the KZ and Cleary index. ($\rho = -0.15$ and -0.22). The lagged Tobin's Q is positively correlated with the unsigned discretionary accruals ($\rho = 0.06$) and negatively correlated with all the financial constraint indexes (ρ ranges between -0.08 and -0.34). The cash flow from operations (CFO) is negatively correlated with the unsigned discretionary accruals and all the financial constraint indexes (ρ ranges between -0.08 and -0.40). The unsigned discretionary accruals are positively correlated with the KZ and WW Indexes ($\rho = 0.05$ and 0.17) and negatively correlated with the Cleary Index ($\rho = -0.07$). The financial constraint indexes are positively correlated with a ρ of between 0.03 and 0.31 .

²⁰ The differences in the means among the variables are all significant at the 1% level.

Capital expenditure is positively correlated with both lagged Tobin's Q ($\rho = 0.28$) and CFO ($\rho = 0.14$), consistent with the findings in the literature that firms with more financial slack invest more.²¹

4. MAIN RESULTS

4.1 Testing for Investment – Cash Flow Sensitivity

To test for an association between capital expenditure and cash flows, I run a regression of capital expenditures on lagged Tobin's Q and cash flow from operations for *all* firms in the sample. The coefficient estimates of the investment-cash flow sensitivity regressions are calculated using OLS regressions, and the standard error is clustered by firm and year.

The regression results are in Table 3, Panel A. The lagged Tobin's Q and cash flow coefficient estimates are both positive and statistically significant. A CFO coefficient estimate of 0.058 shows that, on average, a one percent increase in cash flows increases the firm's capital expenditures by 0.058 percent adjusted for capital stock. This is consistent with prior studies in the literature that show a positive association between capital expenditure and cash flows.

4.1.1 Earnings Quality and Investment-Cash Flow Sensitivities

I now examine whether earnings quality, as a financial constraint, could have an impact on corporate investment decisions. Specifically, I test for differences in

²¹ See Fazzari, Hubbard and Petersen (1988), Whited (1992), Bond and Meghir (1994), Gilchrist and Himmelberg (1995) and Hubbard (1998).

investment-cash flow sensitivities between firms of high earnings quality and firms with low earnings quality. If earnings quality does not proxy for financial constraint, one would expect no difference in investment- cash flow sensitivities between the high and low earnings quality firms. However, if earnings quality does proxy for financial constraint, one would expect to see a difference in investment-cash flow sensitivities between the two groups of firms.

The results in Table 3 Panel B show that both high and low earnings quality firm capital expenditures are positively associated with lagged Tobin's Q and cash flows; the regression coefficient estimates are all statistically significant. The coefficient estimates for lagged Tobin's Q is lower for the high earnings quality firms (0.098) than for low earnings quality firms (0.133). More importantly, the coefficient estimate for cash flows is higher for the high earnings quality firms (0.118) than for low earnings quality firms (0.036). This implies that, on average, the high earnings quality firm's investments are three times more dependent on internal cash flows than the low earnings quality firm's investments.

Comparing Table 3 Panel B to Panel A, the high earnings quality firms have a cash flow coefficient estimate of 0.118, twice the cash flow coefficient of 0.058 for *all* firms in the sample. This suggests that high earnings quality firms use more internal cash flows for capital expenditures than average firms.

The large difference in investment – cash flow sensitivities between high earnings quality firms and low earnings quality firms – suggests that earnings quality has an influence on corporate investments. Findings in Table 3, Panel B are consistent with

those of Kaplan and Zingales (1997) and Cleary (1999) in showing that financially unconstrained firms are more dependent on internal cash flow for corporate investments.

4.1.2 Alternative Measures of Financial Constraint

To verify findings in Table 3 Panel B, I use three existing measures of financial constraints from the literature as sorting criteria: the Whited and Wu Index, the Cleary Index and the KZ Index.

In Table 3 Panel C, I sort firms annually into financial constraint and unconstrained groups based on the Whited and Wu Index – an index determined by the firm characteristics such as leverage ratio, sales growth and cash flows. Large Whited and Wu index values correspond to high financial constraints. Then, I run investment-cash flow sensitivity regressions on both groups of firms and find that the investments of firms that are financially unconstrained are more dependent on internal cash flow than financially constrained firms. The cash flow coefficient estimate for unconstrained firms is 0.109 compared to 0.042 for constrained firms. The difference in cash flow sensitivities implies that financial constraints lead to a positive and significant association between investments and internal cash flows.

Similarly, in Table 3, Panel D, I sort firms annually into financially constrained and unconstrained groups using the Cleary Index – an index determined by discriminant analysis on dividend payout patterns. The investment-cash flow sensitivity regressions show that financially unconstrained firms have a cash flow coefficient estimate of 0.071 compared to a 0.031 cash flow coefficient estimate of financially constrained firms.

Finally, in Table 3, Panel E, I sort firms annually into a financially constrained and unconstrained index using the KZ Index. Again, the investment- cash flow sensitivities regressions show that financially unconstrained firms' investments have a higher sensitivity to internal cash flows. Financially unconstrained firms have a cash flow coefficient estimate of 0.076 compared to the 0.051 of financially constrained firms.

Overall, results show that existing financial constraint measures yield similar patterns of investment-cash flow sensitivities to those of the earnings quality sort.

4.2 Explaining the Investment – Cash Flow Sensitivity (Permanent Cash Flows vs. Transitory Cash Flows)

In Table 3, I show high earnings quality firms have higher investment-cash flow sensitivities than low earnings quality firms. Results in Table 3 are consistent with previous findings in the literature. However, few explanations exist in the literature for the high investment-cash flow sensitivities of financially unconstrained firms. Kaplan and Zingales (1997) attribute this finding to managerial risk aversion. Cleary (1999) points to the free cash flow theory of Jensen (1986) as a possible explanation for the phenomenon.

I explore the observed investment-cash flow sensitivities by focusing on the cash flow variable CFO. According to corporate finance theory, variability in internal cash flows can lead to variability in external capital and capital expenditures. Some studies show that an increase in cash flow volatilities could result in foregoing investments and lower market values.²²

²² See theory by Froot, Scharfstein and Stein (1993) and empirical studies by Minton and Schrand (1999) and Allayannis, Rountree and Weston (2008)

A major drawback with measuring cash flow volatilities is serial correlation in the volatility measures, which are standard deviations of up to five years of quarterly cash flow data. Allayannis, Rountree and Weston (2008) address the serial correlation problem by performing regression analysis on observations that are five years apart. However, their methodology significantly reduces the sample size.

To measure cash flow variability, I follow the methodology of Roychowdhury (2006) by dividing the cash flow variable CFO into permanent and transitory components.²³ The permanent component of CFO (PCFO) is defined as a linear function of a firm's sales and sales growth and the transitory component of CFO (TCFO) is the difference between the actual CFO and the PCFO. By construction, PCFO is the recurring cash flow component that could be explained by the normal operating activities of a firm, whereas TCFO is the nonrecurring cash flow component that is more variable.

I hypothesize that a firm's investments should be more dependent on PCFO than on TCFO, and test this by regressing capital expenditures against lagged Tobin's Q, PCFO and TCFO. Table 4, Panel A shows the investment-cash flow sensitivities regression results for all firms in the sample. The PCFO coefficient estimate of 0.180 is statistically significant, implying that a permanent component of cash flows does have a positive effect on corporate investments. In contrast, the TCFO coefficient estimate of negative 0.015 suggests that an increase in transitory cash flows actually reduces a firm's investments.

Results in Table 4, Panel B show that both high and low earnings quality firms' investments are positively associated with lagged Tobin's Q and permanent cash flows

²³ See Dechow, Kothari and Watts (1998).

PCFO. The coefficient estimates for the permanent cash flows PCFO is higher for the high earnings quality firms (0.203) than that of low earnings quality firms (0.171). The coefficient estimates for the transitory cash flows TCFO is positive for the high earnings quality firms (0.031) and negative for the low earnings quality firms (-0.028). The results show that high earnings quality firms are less dependent on transitory cash flows and low earnings quality firms actually reduce their capital expenditure with an increase in transitory cash flows.

In Table 4, Panel C, I sort firms annually into financial constrained and unconstrained groups based on the Whited and Wu Index. The permanent cash flow coefficient estimate for unconstrained firms is 0.221 compared to 0.167 for constrained firms, the difference being statistically significant. The transitory cash flow coefficient estimate for unconstrained firms is 0.024 compared to -0.019 for constrained firms. The results suggest that financially unconstrained firms are less dependent on TCFO and financially constrained firms reduce their capital expenditure with an increase in TCFO.

Similarly, in Table 4, Panel D, I sort firms annually into financially constrained and unconstrained groups using the Cleary Index. The permanent cash flow coefficient estimate for unconstrained firms is 0.191 compared to 0.163 for constrained firms, the difference being statistically significant. The transitory cash flow coefficient estimate for unconstrained firms is 0.000 compared to -0.051 for constrained firms.

Finally, in Table 4, Panel E, I sort firms annually into financially constrained and unconstrained group using the KZ Index. The permanent cash flow coefficient estimate for unconstrained firms is 0.194 compared to 0.163 for constrained firms, the difference being statistically significant. The transitory cash flow coefficient estimate, though

statistically insignificant, is -0.001 for unconstrained firms compared to -0.015 for constrained firms.

Overall, results suggest cash flow variability as measured by TCFO may help explain the difference in cash flow sensitivities between financially constrained and unconstrained firms. I find evidence that financially unconstrained firms show little or no dependence on TCFO in their capital expenditure decisions. Moreover, financially constrained firms actually reduce their capital expenditures with an increase in TCFO, which is consistent with previous finding that show a negative association between capital expenditure and internal cash flow variability.

5. ALTERNATIVE EXPLANATION AND DISCUSSION

5.1 The Free Cash Flow Hypothesis

As pointed out in Cleary (1999), an alternative explanation for high investment-cash flow sensitivities of financially unconstrained firms is Jensen's free cash flow hypothesis. Jensen (1986) argues that managers are prone to invest most of the available cash flow on new projects as they seek to expand their controls through empire building, which implies that capital expenditures increase with the rise of internal cash flows.

5.1.1 Empirical Design

Empirical test for the free cash flow hypothesis is motivated by recent research that examines the relationship between capital expenditure and corporate governance. Wu, Zhang and Zhang (2008) argue that firms with poor governance are more susceptible to

overinvestment. Their argument is based on Gompers, Ishii and Metrick (2003) findings that firms with poor governance have higher capital expenditures.

Specifically, I examine the Governance Index (G) value for both the high and low earnings quality firms. In addition, I examine the relationship between capital expenditure and the Corporate Governance Index (G) for both high and low earnings quality firms. If the free cash flow hypothesis holds, I expect to find a variation in the G value and (or) a variation in the relationship between capital expenditure and G.

The Governance Index data are from Risk Metrics, and the sample period is from 1990 to 2006. Due to the data limitation in Risk Metrics, the governance data sample consists of 3,845 firm-year observations only, compared to the total sample size of 14,424 firm-year observations.

5.1.2 Empirical Results

The descriptive statistics in Table 5 show that both high and low earnings quality firms have a median G-index value of 9. According to Gompers, Ishii and Metrick (2003), firms with a G index value of less than 6 are considered democratic.

Table 6 shows that the coefficient estimates of the Governance Index (G-index) are almost identical for high and low earnings quality firms, 0.010 versus 0.011, the difference in the estimates being not statistically significant.

Under the free cash flow hypothesis, managers invest most of the internal cash flows to fulfill their empire building ambitions. Furthermore, recent research shows that poor governance is associated with high capital expenditure. However, the evidence here

does not support the view that high earnings quality firms are more susceptible to managerial empire building than low earnings quality firms.

5.2 Alternative Measures of Earnings Quality

To ensure that this paper's findings are not driven by the specific proxy of earnings quality, I run the investment-cash flow sensitivity regressions using an alternative measure of earnings quality – the unsigned, discretionary current accruals. More specifically, I use the discretionary current accrual model from Teoh, Welch and Wong (1998). In Table 7, I present the results of investment-cash flow sensitivity regressions that are similar to those in Table 3. The coefficient estimate for cash flows is higher for the high earnings quality firms (0.106) than for low earnings quality firms (0.037), the difference being statistically significant.

5.3 Additional Deciles

I perform additional robustness tests by splitting the sample firms into three groups based on their unsigned, discretionary accruals. The firms are classified as high earnings quality, medium earnings quality or low earnings quality. The investment-cash flow sensitivity regression results in Table 8 show that high earnings quality firms are the most dependent on internal cash flows with a cash flow coefficient estimate of 0.130. Medium earnings quality firms follow next, with a cash flow coefficient estimate of 0.102, and finally low earnings quality firms have a cash flow coefficient estimate of 0.024.

5.4 Testing the Difference

Lastly, I check for significance differences between the high and low earnings quality firms. I rerun the investment-cash flow sensitivity regressions for all firms with an interaction term between unsigned discretionary accruals and cash flows $CFO_t * AbsDACC$.

Results in Table 9 show that the interaction term $CFO_t * AbsDACC$ is significant and has a coefficient estimate of -0.083. The negative coefficient estimate indicates that a decrease in earnings quality (an increase in unsigned, discretionary accruals) results in lower investment-cash flow sensitivities.

6. CONCLUSION

This research contributes to the literature on the effect of financial constraints on corporate investment decisions. It examines the relationship between earnings quality and corporate investment decisions and finds firms that have high earnings quality display greater investment-cash flow sensitivities than firms with low earnings quality. In addition, it finds corporate investments are more dependent on the permanent component of internal cash flows. It also tests the hypothesis that high earnings quality firms are more susceptible to managerial empire building. The evidence in this paper, however, does not find support for such managerial behavior bias.

The findings have the important implications. First, the results suggest that policy makers may want to look at how accounting standards can have an impact on a firm's investment decisions. Second, as pointed out by the Graham, Harvey and Rajgopal (2005)

survey, earnings quality seems to affect a firm's investment decisions. Further research is required to uncover the dynamics between earnings management and a firm's investment decisions.

APPENDIX

A.1 Abnormal Accruals Construction

The total accrual is measured as in Hribar and Collins (2002):

$$TACC_{it} = EBXI_{it} - CFO_{it} \quad (A.1)$$

where

$TACC_{it}$ = Total accrual

$EBXI_{it}$ = Earnings before extraordinary items & discontinued operations (Item 123)

CFO_{it} = Operating Cash Flow (Item 308- Item 124)

The discretionary accruals are the differences between the total accruals and the normal accruals estimated by using the industry-year regression of total accruals on firm-year sales and PP&E. I also adjust the regression results for return on assets:

$$ACC_t/TA_{t-1} = \alpha_1 1/TA_{t-1} + \alpha_2(\Delta REV_t - \Delta REC_t)/TA_{t-1} + \alpha_3 PP\&E_t/TA_{t-1} + e_t \quad (A.2)$$

where

ΔREV_t = change in sales (Item12)

ΔREC_t = change in accounts receivables (Item2)

$PP\&E_t$ = gross value of property, plant and equipments (Item7)

The total current accrual is measured as in Bharath, Sunder and Sunder (2004):

$$TCA_{it} = -(\Delta AR_{it} + \Delta INV_{it} + \Delta AP_{it} + \Delta TAX_{it} + \Delta OCA_{it}) \quad (A.3)$$

where

ΔAR_{it} = decrease (increase) in accounts receivable (Item 302)

ΔINV_{it} = decrease (increase) in inventory (Item 303)

ΔAP_{it} = decrease (increase) in accounts payable (Item 304)

ΔTAX_{it} = increase (decrease) in tax payable (Item 305)

ΔOCA_{it} = net change in other current asset (Item 307)

The abnormal current accruals are the differences between the total current accruals and the normal current accruals estimated by using the industry-year regression of current accruals on changes in firm sales and account receivables:

$$CACC_t/TA_{t-1} = \alpha_1 1/TA_{t-1} + \alpha_2 (\Delta REV_t - \Delta REC_t)/TA_{t-1} + e_t \quad (A.4)$$

where

ΔREV_t = change in sales (Item12)

ΔREC_t = change in accounts receivables (Item2)

A.2 Financial Constraint Index Construction

The KZ index is defined as:

$$-1.001909CF + 3.139193TLTD - 39.36780TDIV - 1.314759CASH + 0.2826389Q \quad (A.4)$$

where

CF = cash flow/ book assets,

TLTD = total long-term debt/ book assets,

TDIV = total dividends to book assets,

CASH = stock of cash to book assets, and

Q = book assets minus book equity (item 60) minus balance sheet deferred taxes (item 7) plus the market value of equity (item 199 times item 25)/ assets.

The Cleary index is defined as:

$$-0.11905CURAT - 1.903670TLTD + 0.00138COVER + 1.45618IMARG + 2.03604SG - 0.04772SLACK \quad (A.5)$$

where

CURAT = current assets/ current liabilities

COVER = earnings before interest and taxes/(interest expense + preferred dividend payments)/ (1 - τ_c)

IMARG = net income/ net sales

SG = firm real sales growth

SLACK = cash plus short-term investments + (0.5 \times inventory) + 0.7 (accounts receivable) - short term loans/ net fixed assets

The Whited and Wu index is defined as

$$-0.091CF - 0.062DIVPOS + 0.021TLTD - 0.044LNNTA + 0.102ISG - 0.035SG \quad (A.6)$$

where

DIVPOS = indicator variable for dividend payout

SG = firm real sales growth

ISG = three-digit industry sales growth

LNNTA = natural log of book assets

Current assets = Item 4; current liabilities = Item 5; earnings before interest and taxes = Item 13 minus Item 14; interest expense = Item 15; preferred dividend payments = Item 9; net income = Item 18; net sales = Item 13, cash plus short term investments = Item 1; inventory = Item 3; accounts receivable = Item 2; short terms loans = Item 196 and net fixed assets = Item 8.

Table 1: Descriptive Statistics

Panel A: All firms						
Variable	N	Mean	Std Dev	Minimum	Median	Maximum
Inv _t /K _{t-1}	14424	0.26	0.20	0.02	0.21	1.54
Q _{t-1}	14424	1.71	0.91	0.66	1.43	6.77
Total Asset	14426	2,446.98	7,832.73	6.61	331.64	250,772.03
Dividend Payout	14426	0.77	16.36	0.00	0.15	1,748.04
CFO _t /K _{t-1}	14424	0.38	0.49	-2.32	0.33	3.44
Sales Growth	14424	0.17	0.15	0.00	0.13	0.85
Absdacc _t	14424	0.05	0.05	0.00	0.03	0.93
PCFO _t /K _{t-1}	14424	0.38	0.28	-1.72	0.35	3.59
TCFO _t /K _{t-1}	14424	0.00	0.40	-2.74	0.00	2.61
Panel B: Low earnings quality firms						
Variable	N	Mean	Std Dev	Minimum	Median	Maximum
Inv _t /K _{t-1}	7215	0.28	0.22	0.02	0.22	1.54
Q _{t-1}	7215	1.73	0.96	0.66	1.42	6.77
Total Asset	7215	1,669.34	5,922.88	6.61	226.52	150,830.00
Dividend Payout	7215	0.62	7.06	0.00	0.06	515.42
CFO _t /K _{t-1}	7215	0.38	0.58	-2.30	0.32	3.44
Sales Growth	7215	0.19	0.16	0.00	0.15	0.85
Absdacc _t	7215	0.08	0.05	0.03	0.06	0.93
PCFO _t /K _{t-1}	7215	0.39	0.30	-1.72	0.35	3.59
TCFO _t /K _{t-1}	7215	-0.01	0.49	-2.53	-0.01	2.61
Panel C: High earnings quality firms						
Variable	N	Mean	Std Dev	Minimum	Median	Maximum
Inv _t /K _{t-1}	7209	0.24	0.17	0.02	0.20	1.53
Q _{t-1}	7209	1.69	0.86	0.66	1.44	6.76
Total Asset	7209	3,225.93	9,298.20	7.08	508.92	250,772.03
Dividend Payout	7209	0.92	22.04	0.00	0.24	1,748.04
CFO _t /K _{t-1}	7209	0.39	0.37	-2.32	0.33	3.15
Sales Growth	7209	0.15	0.14	0.00	0.11	0.85
Absdacc _t	7209	0.02	0.01	0.00	0.02	0.04
PCFO _t /K _{t-1}	7209	0.38	0.25	-1.52	0.34	2.59
TCFO _t /K _{t-1}	7209	0.01	0.29	-2.74	0.00	2.49

Inv_t(Item128) is the capital expenditure in period t, K_{t-1}(Item8) is beginning of period capital stock in period t-1, Q_{t-1}((Item6+Item24*Item25-Item60-Item74)/Item6) is Tobin's Q in period t-1, Total Asset (Item6) is the book value of assets, Dividend Payout is (Item21+Item115)/Item20, Sales Growth is (Item12-lagged Item12)/lagged Item12, CFO_t (Item308-Item124) is the cash flow from operations in period t, Absdacc_t is the earnings quality variable measured by the unsigned discretionary accruals, PCFO_t is the permanent cash flow from operations in period t and TCFO_t is the transitory cash flow from operations in period t.

Table 2: Pearson Correlations of Key Variables and Indexes

	Inv_t/K_{t-1}	Q_{t-1}	Total Asset	CFO_t/K_{t-1}	Sales Growth	Absdacc _t	$PCFO_t/K_{t-1}$	$TCFO_t/K_{t-1}$	KZ	WW	Cleary
Inv_t/K_{t-1}	1.00										
Q_{t-1}	0.28	1.00									
Total Asset	-0.07	0.04	1.00								
CFO_t/K_{t-1}	0.14	0.23	0.02	1.00							
Sales Growth	0.25	0.11	-0.03	-0.03	1.00						
Absdacc _t	0.17	0.06	-0.11	-0.08	0.18	1.00					
$PCFO_t/K_{t-1}$	0.15	0.10	-0.01	0.57	-0.04	0.00	1.00				
$TCFO_t/K_{t-1}$	0.07	0.21	0.03	0.82	-0.01	-0.09	0.00	1.00			
KZ	-0.15	-0.34	-0.08	-0.40	0.05	0.05	-0.29	-0.29	1.00		
WW	0.02	-0.08	-0.33	-0.33	0.09	0.17	-0.27	-0.21	0.30	1.00	
Cleary	-0.22	-0.28	0.03	-0.17	-0.29	-0.07	-0.09	-0.15	0.31	0.03	1.00

Inv_t (Item128) is the capital expenditure in period t, K_{t-1} (Item8) is beginning of period capital stock in period t-1, Q_{t-1} ((Item6+Item24*Item25-Item60-Item74)/Item6) is Tobin's Q in period t-1, Total Asset (Item6) is the book value of assets, Sales Growth is (Item12-lagged Item12)/lagged Item12, CFO_t (Item308-Item124) is the cash flow from operations in period t, Absdacc_t is the earnings quality variable measured by the unsigned discretionary accruals, $PCFO_t$ is the permanent cash flow from operations in period t and $TCFO_t$ is the transitory cash flow from operations.

Table 3 Investment - Cash Flow Regression

$$\text{Inv}_t/\text{K}_{t-1} = \alpha_1 \text{Q}_{t-1} + \alpha_2 \text{CFO}_t/\text{K}_{t-1} + \sum \text{Firm}_i + \sum \text{Year}_i + \varepsilon_{i,t}$$

	Q_{t-1}	CFO	Adj. R2
Panel A: All Firms			
All Firms	0.120 (20.95)	0.058 (7.57)	0.620
Panel B: Sorted by Earnings Quality			
High Earnings Quality	0.098 (18.57)	0.118 (9.31)	0.642
Low Earnings Quality	0.133 (20.95)	0.036 (4.74)	0.614
Panel C: Sorted by WW Index			
Unconstrained	0.097 (14.95)	0.109 (9.82)	0.669
Constrained	0.135 (21.84)	0.042 (5.01)	0.591
Panel D: Sorted by Cleary Index			
Unconstrained	0.117 (20.01)	0.071 (7.29)	0.620
Constrained	0.127 (17.87)	0.031 (2.89)	0.622
Panel E: Sorted by KZ Index			
Unconstrained	0.108 (20.84)	0.076 (6.56)	0.627
Constrained	0.135 (18.62)	0.051 (5.18)	0.621

Firms are sorted annually into financial constrained and unconstrained portfolios based on the absolute value of their discretionary accruals and the values of their WW index, Cleary Index and KZ index. Inv_t (Item128) is the capital expenditure in period t, K_{t-1} (Item8) is beginning of period capital stock in period t-1, Q_{t-1} ((Item6+Item24*Item25-Item60-Item74)/Item6) is Tobin's Q in period t-1, CFO_t (Item308-Item124) is the cash flow from operations in period t.

Table 4 Investment - Cash Flow Components Regression

$$Inv_t/K_{t-1} = \alpha_1 Q_{t-1} + \alpha_2 PCFO_t/K_{t-1} + \alpha_3 TCFO_t/K_{t-1} + \sum Firm_i + \sum Year_i + \varepsilon_{it}$$

	Q_{t-1}	PCFO	TCFO	Adj. R2
Panel A: All Firms				
All Firms	0.100 (19.45)	0.180 (8.97)	-0.015 (-3.05)	0.644
Panel B: Sorted by Earnings Quality				
High Earnings Quality	0.085 (15.47)	0.203 (8.87)	0.031 (4.06)	0.659
Low Earnings Quality	0.110 (20.82)	0.171 (8.08)	-0.028 (-4.95)	0.641
Panel C: Sorted by WW Index				
Unconstrained	0.079 (14.44)	0.221 (9.50)	0.024 (2.74)	0.694
Constrained	0.115 (19.46)	0.167 (7.85)	-0.019 (-2.53)	0.613
Panel D: Sorted by Cleary Index				
Unconstrained	0.100 (17.06)	0.191 (7.79)	0.000 (-0.01)	0.639
Constrained	0.097 (16.43)	0.163 (8.86)	-0.051 (-5.42)	0.658
Panel E: Sorted by KZ Index				
Unconstrained	0.091 (16.54)	0.194 (7.90)	-0.001 (-0.11)	0.650
Constrained	0.113 (18.60)	0.163 (9.59)	-0.015 (-1.33)	0.642

Firms are sorted annually into financial constrained and unconstrained portfolios based on the absolute value of their discretionary accruals and the values of their WW index, Cleary Index and KZ index. Inv_t (Item128) is the capital expenditure in period t, K_{t-1} (Item8) is beginning of period capital stock in period t-1, Q_{t-1} ((Item6+Item24*Item25-Item60-Item74)/Item6) is Tobin's Q in period t-1, CFO_t (Item308-Item124) is the cash flow from operations in period t. $PCFO_t$ is the permanent cash flow in period t and $TCFO_t$ is the transitory cash flow in period t.

Table 5: Descriptive Statistics

Panel A: High earnings quality firms						
Variable	N	Mean	Std Dev	Minimum	Median	Maximum
Inv	1921	0.23	0.14	0.03	0.20	1.35
Lq	1921	1.84	0.88	0.67	1.57	6.76
Cfo	1921	0.45	0.36	-1.35	0.35	3.33
Salesgrowth	1921	0.14	0.13	0.00	0.10	0.94
Absdacc	1921	0.01	0.01	0.00	0.01	0.03
NDCFO	1921	0.41	0.27	-0.26	0.35	2.70
DCFO	1921	0.03	0.28	-2.52	0.01	2.33
KZ	1921	-1.88	3.56	-19.54	-0.95	3.79
WW	1921	-0.47	0.11	-0.67	-0.49	0.40
Cleary	1921	0.45	0.71	-4.37	0.52	3.05
G-index	1921	9.36	2.83	2.00	9.00	19.00

Panel B: Low earnings quality firms						
Variable	N	Mean	Std Dev	Minimum	Median	Maximum
Inv	1924	0.27	0.18	0.02	0.22	1.53
Lq	1924	1.92	1.01	0.69	1.61	6.77
Cfo	1924	0.54	0.61	-1.82	0.38	3.44
Salesgrowth	1924	0.17	0.16	0.00	0.13	0.98
Absdacc	1924	0.07	0.04	0.03	0.05	0.41
NDCFO	1924	0.47	0.32	-1.09	0.38	3.19
DCFO	1924	0.07	0.49	-2.28	0.02	2.94
KZ	1924	-1.92	3.68	-19.21	-0.88	3.95
WW	1924	-0.45	0.11	-0.67	-0.47	0.39
Cleary	1924	0.35	0.81	-4.41	0.46	3.04
G-index	1924	9.08	2.68	2.00	9.00	18.00

Inv_t (Item128) is the capital expenditure in period t, K_{t-1} (Item8) is beginning of period capital stock in period t-1, $Q_{t-1}((Item6+Item24*Item25-Item60-Item74)/Item6)$ is Tobin's Q in period t-1, Total Asset (Item6) is the book value of assets, Dividend Payout is $(Item21+Item115)/Item20$, Sales Growth is $(Item12-lagged\ Item12)/lagged\ Item12$, CFO_t (Item308-Item124) is the cash flow from operations in period t, $Absdacc_t$ is the earnings quality variable measured by the unsigned discretionary accruals, $PCFO_t$ is the permanent cash flow from operations in period t and $TCFO_t$ is the transitory cash flow from operations in period t. G-index is the corporate governance measure from Gompers, Ishii and Metrick (2003).

Table 6 G-Index Regression

$$\text{Inv}_t/\text{K}_{t-1} = \alpha_1 Q_{t-1} + \alpha_2 G_t + \sum \text{Firm}_i + \sum \text{Year}_i + \varepsilon_{i,t}$$

	Q_{t-1}	G	Adj. R2
Panel A: Sorted by Abnormal Accruals			
High Earnings Quality	0.067 (17.36)	0.010 (15.18)	0.700
Low Earnings Quality	0.082 (17.57)	0.011 (13.07)	0.681

Firms are sorted annually into financial constrained and unconstrained portfolios based on the absolute value of their discretionary accruals. Inv_t (Item128) is the capital expenditure in period t , K_{t-1} (Item8) is beginning of period capital stock in period $t-1$, $Q_{t-1}((\text{Item6}+\text{Item24}*\text{Item25}-\text{Item60}-\text{Item74})/\text{Item6})$ is Tobin's Q in period $t-1$, G_t is the corporate governance measure from Gompers, Ishii and Metrick (2003).

Table 7 Investment – Cash Flow Regression

$$Inv_t/K_{t-1} = \alpha_1 Q_{t-1} + \alpha_2 CFO_t/K_{t-1} + \sum Firm_i + \sum Year_i + \varepsilon_{i,t}$$

	Q_{t-1}	CFO	Adj. R2
Panel A: Sorted by Abnormal Current Accruals			
High Earnings Quality	0.100 (21.92)	0.106 (6.99)	0.646
Low Earnings Quality	0.134 (19.82)	0.037 (5.61)	0.612

Firms are sorted annually into financial constrained and unconstrained portfolios based on the absolute value of their discretionary current accruals, as in Teoh, Welch and Wong (1998). Inv_t (Item128) is the capital expenditure in period t, K_{t-1} (Item8) is beginning of period capital stock in period t-1, Q_{t-1} ((Item6+Item24*Item25-Item60-Item74)/Item6) is Tobin's Q in period t-1, CFO_t (Item308-Item124) is the cash flow from operations in period t

Table 8 Robustness Test Using Terciles

$$Inv_t/K_{t-1} = \alpha_1 Q_{t-1} + \alpha_2 CFO_t/K_{t-1} + \sum Firm_i + \sum Year_i + \varepsilon_{i,t}$$

	Q_{t-1}	CFO	Adj. R2
Panel A: Sorted by Abnormal Accruals			
High Earnings Quality	0.095 (21.18)	0.130 (8.64)	0.660
Medium Earnings Quality	0.105 (16.4)	0.102 (6.37)	0.632
Low Earnings Quality	0.141 (20.45)	0.024 (3.2)	0.610

Firms are sorted annually into high earnings quality, medium earnings quality and low earnings quality portfolios based on the absolute value of their discretionary accruals. Inv_t (Item128) is the capital expenditure in period t, K_{t-1} (Item8) is beginning of period capital stock in period t-1, Q_{t-1} $((Item6+Item24*Item25-Item60-Item74)/Item6)$ is Tobin's Q in period t-1, CFO_t (Item308-Item124) is the cash flow from operations in period t.

Table 9 Robustness Test for Difference in Coefficients between Two Groups

$$\text{Inv}_i/\text{K}_{t-1} = \alpha_1 Q_{t-1} + \alpha_2 \text{CFO}_i/\text{K}_{t-1} + \alpha_3 Q_{t-1} * \text{AbsDACC}/\text{K}_{t-1} + \alpha_4 \text{CFO}_i * \text{AbsDACC}/\text{K}_{t-1} + \sum \text{Firm}_i + \sum \text{Year}_i + \varepsilon_{i,t}$$

	Q_{t-1}	CFO	$Q_{t-1} * \text{AbsDACC}$	$\text{CFO} * \text{AbsDACC}$	Adj. R2		
Panel A: All Firms							
All Firms	0.098 (18.56)	0.118 (9.31)	0.035 (8.70)	-0.083 (-7.11)	0.626		
Panel B: All Firms - Cash Flow Components							
	Q_{t-1}	NDCFO	DCFO	$Q_{t-1} * \text{AbsDACC}$	NDCFO * AbsDACC	DCFO * AbsDACC	Adj. R2
All Firms	0.085 (15.47)	0.203 (8.87)	0.031 (4.06)	0.026 (6.45)	-0.032 (-1.91)	-0.059 (-6.19)	0.648

Inv_i (Item128) is the capital expenditure in period t, K_{t-1} (Item8) is beginning of period capital stock in period t-1, Q_{t-1} ((Item6+Item24*Item25-Item60-Item74)/Item6) is Tobin's Q in period t-1, AbsDacc_i is the earnings quality variable measured by the unsigned discretionary accruals, CFO_i (Item308-Item124) is the cash flow from operations in period t. PCFO_i is the permanent cash flow from operations in period t and TCFO_i is the transitory cash flow from operations in period t.

Essay 2

Zero Earnings Target and Corporate Investment

1. Introduction

Investors view earnings as the premier measure of a firm's performance and respond positively to firms that meet or beat earnings targets. Managers have strong incentives in meeting investors' expectations because their financial compensation is closely tied to reported earnings. One earnings target of particular interest to managers is the zero earnings target.

Studies show that the number of years that firms register zero or slightly positive earnings is higher than those with slightly negative earnings, which is consistent with the idea that managers manipulate earnings to avoid showing losses (see Burgstahler and Dichev (1997)). A survey conducted by Graham, Harvey and Rajgopal (2005) finds that managers express a willingness to forego or delay corporate investments to meet earnings targets. In addition, Roychowdhury (2006) finds evidence that managers manage real activities to avoid reporting negative earnings.

In this paper, I examine the firms' investments just above the zero earnings threshold.²⁴ If managers manipulate earnings to avoid losses, one can expect their investment decisions to be less than optimal. This is because earnings management aggravates the information asymmetry problem within a firm and makes it harder for the stakeholders, such as the board of directors, to monitor the performance of a firm's assets.

This paper documents that firms that have earnings slightly above zero invest more than other firms in the sample, and their investments have lower efficiency. In

²⁴ Zero earnings or slightly positive earnings are "red flags" for earnings management. See Dechow and Schrand (2004)

addition, analysis shows that the presence of debt-holders and Big 4 auditing firms helps to reduce the investment due to their continuous monitoring of managerial activities.

Findings in this paper are consistent with recent research that investigates the relationship between earnings management and corporate investments. Biddle and Hillary (2006) study the association between investment cash flow sensitivities and discretionary accruals and find a negative relationship. Li and Tang (2008) show that firms with large and positive accruals experience a decline in performance. Using financial report restatements as a measure of earnings management, McNichols and Stubben (2008) find that firms that manipulate their earnings tend to allocate resources inefficiently. This paper adds to the literature by focusing on the earnings management of firms that are at the zero earnings threshold.

Section 2 describes the testable hypotheses. Section 3 describes the data sample and outlines the empirical methodology. Section 4 discusses the empirical results, and Section 5 presents the robustness of the tests results. Section 6 concludes this study.

2. Testable Hypotheses

A large number of corporate investment studies have focused on the association between a firm's financial slack and corporate investments. One major finding concludes that firms facing financing frictions tend to be more dependent on internal cash flows for corporate investment.²⁵ For example, Fazzari, Hubbard and Peterson (1988) find that firms that have low dividend payouts, or are financially constrained, are more dependent on internal cash flows for capital expenditures.

²⁵ See Stein (2003)

Recent literature has focused on the association between earnings management and corporate investment. Earnings management takes place, as stated by Healy and Wahlen (1999), ‘when managers use judgment in financial reporting and in structuring transactions to alter financial reports to either mislead some stakeholders about the underlying economic performance of the company or to influence contractual outcomes that depend on reported accounting numbers.’

Research on the relationship between earnings quality and corporate investment decisions centers on the role of accrual manipulation. Earnings consist of a cash flow component and an accruals component. Accrual manipulation of earnings occurs when managers increase or decrease accruals to mask the firm’s true economic performance. Biddle and Hillary (2006) investigate the association between discretionary accruals and investment – cash flow sensitivities across the U.S., U.K. and Japan. They find that firms with smaller discretionary accruals or higher earnings quality tend to have a lower dependence on internal cash flows. Li and Tang (2008) show that firms with large and positive accruals tend to have lower investment efficiencies. Chiu (2009) shows that firms with low earnings quality are less dependent on internal cash flows since they are more likely to be dependent on equity.

McNichols and Stubben (2008) take a different approach by investigating the relationship between earnings manipulations and corporate investment efficiency. They define earnings manipulation as earnings subjected to SEC enforcement rules, GAO earnings restatements and other litigation. Their results show that firms that manipulate earnings tend to allocate resources inefficiently via overinvestment.

Until now, very little attention has been paid to corporate investment behavior under earnings management that seeks to meet the zero earnings target. Firms are reluctant to report negative earnings because the capital market equates negative earnings with bad news for future firm performance. Burgstahler and Dichev (1997) show that there are more firms with zero or slightly positive earnings than there are firms with slightly negative earnings.²⁶

This study adds to the literature on zero earnings target by examining the corporate investment behavior of firms that register earning just above zero earnings. Following the methodology of Roychowdhury (2006), I divide a firm's years into different intervals of earnings, scaled by total assets. Since firms that manage earnings may suffer from less than optimal corporate investment decisions, such firms may either invest more or invest less in long-term assets. This leads to the first hypothesis:

H1. The capital expenditures of zero earnings target firms are different from other firms in the sample.

Recent research demonstrates that earnings management leads to investment inefficiencies. Following the methodology of Li and Tang (2008), I use a firm's return on assets as a measure of the firm's investment efficiency. This leads to the second hypothesis:

²⁶ However, the earnings management study on the zero earnings target is far from conclusive. Durtstehi and Easton (2005) attribute zero earnings discontinuity to data scaling issues.

H2. The capital expenditures of zero earnings target firms are less efficient than other firms in the sample.

Further, debt has been argued to discipline the managers. According to Jensen (1986), a higher debt level would result in less overinvestment. The third hypothesis is:

H3. The capital expenditure of zero earnings target firms would decrease with an increase in debt level.

Lastly, this paper examines whether Big 4 auditors would affect the corporate investment behavior of firms that have slightly positive earnings. The fourth hypothesis is:

H4. The capital expenditure of zero earnings target firms would decrease with the presence of Big 4 auditors.

3. DATA SAMPLE and VARIABLE DEFINITIONS

3.1 Data

The data sample is collected from COMPUSTAT Annual Industrial. The sample period is from 1988 through 2006, which allows the use of cash flow data from the Statement of Cash Flows. The sample contains 27,635 firm-year observations.

Following the standard corporate investment literature, I eliminate firm-year observations with lagged Property, Plant & Equipment (Compustat Item 8) of less than \$5 million, an asset growth rate greater than 100% and a negative Tobin's Q. This is to

avoid any extreme observations that may skew the final results. Sales growth must be greater than zero to avoid any financial distress firm-years. Any firm-year observations with missing data are deleted. (See Almeida, Campello and Weisbach (2004)) The top and bottom 1% of the data sample are dropped. (See Hennessy and Whited (2007)) Every industry-year group must have at least 15 observations. The lagged, total asset (Compustat Item 6) must be greater than zero.

3.2 Zero earnings target Firms

Following the methodology of Roychowdhury (2006), I divide the firm years using the variable, income before extraordinary items divided by lagged total assets. Each earnings interval has a width of 0.005.²⁷ The zero earnings target firm years fall in the interval of 0.000 and 0.005, which means that the zero earnings targets firm years report income before extraordinary items of between 0% and 0.5% of the lagged total assets.

Figure 1 depicts the firm years ranging from -0.075 to 0.075. Clearly, a discontinuity exists at the zero earnings threshold at interval 16, which is similar to the patterns documented by Burgstahler and Dichev (1997).

This paper focuses on zero earnings threshold firms. There are 567 firm years in the threshold, which consists of 508 unique firms.

²⁷ The earnings intervals of 0.005 widths are used in both Burgstahler & Dichev (1997) and Roychowdhury (2006).

3.3 Descriptive Statistics

3.3.1 Firm Characteristics

Table 1 provides summary statistics of the key variables in the analysis. The total sample has 27,635 firm-year observations. Panel A presents the descriptive statistics of the zero earnings target firm years in the sample (N = 567). On average, firms invest at the rate of 7.6% of their total assets in period t-1. The mean return on assets (ROA) is 9.9% with a range of minus 17.8% and 45.8%.

In Panel B, the firm-year observations for the rest of the samples are shown. There are 27,086 firm-year observations. In comparing Panel A to Panel B, zero earnings- target firms have a lower mean lagged Tobin's Q than the overall sample, 1.298 versus 1.817, the difference being statistically significant. This implies that zero earnings target firms have lower growth opportunities. They also have larger mean discretionary accruals of 0.002 versus -0.003, and higher mean leverage of 0.365 versus 0.286, the difference being statistically significant. This implies that they have a lower earnings quality and a lower capacity to take on more debt. Moreover, zero target firms have lower standard deviations across their core variables, in particular the standard deviation of cash flows. This implies that zero earnings target firms have less volatile internal cash flows.

3.3.2 Univariate Correlations

Table 2 presents the correlation coefficients among the key variables. Similar to previous findings, the correlation between IBEI and Cash Flow is highly positive (0.96),

and the correlation between discretionary accruals and Cash Flow is also positive (0.30). This implies that the cash flows and accruals components of earnings are closely related.

Capital expenditure is positively correlated with both lagged Tobin's Q ($\rho = 0.12$) and Cash Flow ($\rho = 0.22$), consistent with the findings in the literature that firms' investments are correlated with internal liquidity. Capital expenditure is negatively correlated with the discretionary accruals ($\rho = -0.01$), implying that firms with large, positive discretionary accruals (or lower earnings quality) have lower capital expenditures.

The lagged Tobin's Q is negatively correlated with the discretionary accruals ($\rho = -0.05$) and positively correlated with Cash Flows and IBEI ($\rho = 0.11$), implying that growth opportunities are negatively related to earnings quality and positively related to financial slack.

4. EMPIRICAL RESULTS

4.1.1 Investment – Cash flow Sensitivity

Following the methodology of Fazzari, Hubbard and Petersen (1988), this paper first examines the relationship between corporate investment and cash flows for all the firms in the sample by regressing capital expenditures on the lagged Tobin's Q and cash flows. The coefficient of the investment-cash flow sensitivities regressions is estimated using OLS regressions, and the standard errors are clustered by firm and year.

$$\text{Inv}_t/A_{t-1} = \alpha_1 Q_{t-1} + \alpha_2 \text{Cash Flow}_t/A_{t-1} + \varepsilon_{i,t} \quad (1)$$

where Inv_t is capital expenditure in period t (Compustat Item 128), A_{t-1} is the beginning of period total asset in period $t-1$ (Compustat Item 6), $Cash\ Flow_t$ is earnings plus depreciation in period t (Compustat Item 18 + 14) and Q_{t-1} is Tobin's Q in period $t-1$ that controls investment opportunities $((Compustat\ Item\ 6 + 24 * 25 - 60 - 74) / 6)$.

Equation (1) hypothesizes that capital expenditure, controlled for investment opportunities, is a function of a firm's internal cash flow (Cash Flow).

The regression results are presented in Table 3. The lagged Tobin's Q and cash flow coefficient estimates are both positive and statistically significant. The Cash Flow coefficient estimate of 0.268 shows that, on average, a 1% increase in cash flows would increase the firm's capital expenditures by 0.268 percent- adjusted for total assets. This is consistent with prior studies in the literature that document a positive association between capital expenditure and cash flows. The results are robust when CFO, cash flows from operations, is used in place of Cash Flows in the regression.²⁸

4.1.2 Zero Earnings Target and Investment-Cash flow sensitivities

To test Hypothesis 1, this paper examines whether earnings management via a zero earnings target has an impact on corporate investment decisions. More specifically, it investigates whether zero earnings target firms exhibit a different investment behavior from the rest of the sample. It uses a dummy indicator variable, called ZET, which takes on a value of one for zero earnings target firms, which are firms with net income (IBEI scaled by lagged total assets) of between 0.000 and 0.005, and zero otherwise. If the zero

²⁸ Bushman et al. (2008) suggest that CFO is a better proxy for financial slack.

earnings target does not affect corporate investment decisions, one would expect the coefficient of ZET to be insignificant. The testable empirical model is as follows:

$$\text{Inv}_t/A_{t-1} = \alpha_1 Q_{t-1} + \alpha_2 \text{Cash Flow}_t/A_{t-1} + \alpha_3 \text{ZET}_t + \alpha_4 \text{SIZE}_t + \varepsilon_{i,t} \quad (2)$$

where ZET_t is the indicator variable that is set equal to 1 if earnings (Compustat Item 18) scaled by lagged total assets (Compustat Item 6) is between 0.000 and 0.005. The estimates are OLS coefficients and the standard errors are clustered by firm and year. Again, the focus of the regression is the coefficient on the dummy variable ZET_t .

The results in Table 4 show that a firm's capital expenditures are positively associated with lagged Tobin's Q, Cash Flow and ZET indicator variables. The coefficient estimates are 0.024 and 0.268 for lagged Tobin's Q and Cash Flow respectively and are statistically significant. More importantly, the coefficient estimate for ZET is 0.03 and is significant. This implies that, on average, the zero earnings target-firms tend to invest more than other firms in the sample, lending support to Hypothesis 1.

In the second column, I include a control variable defined by Size_t (equaling log of Sales – Compustat Item 12) as a proxy for a firm's performance. The coefficient estimate for ZET remains positive and significant at 0.016, when size is included. This implies that the zero earnings target firms are prone to invest more in long-term assets.

4.2 Investment Efficiency

To test Hypothesis 2, this paper investigates corporate investment efficiency by examining the return on assets, ROA. The ROA at time t is regressed on Tobin's Q , capital expenditures, ZET, and the interaction term between ZET and capital expenditure at time $t-1$. Specifically, it tests:

$$\begin{aligned} \text{ROA}_t = & \alpha_1 Q_{t-1} + \alpha_2 \text{ZET}_{t-1} + \alpha_3 \text{INV}_{t-1}/\text{A}_{t-2} + \alpha_4 \text{INV}_{t-1}/\text{A}_{t-2} * \text{ZET}_{t-1} \\ & + \alpha_5 \text{SIZE}_{t-1} + \alpha_6 \text{Leverage}_{t-1} + \varepsilon_{i,t} \quad (3) \end{aligned}$$

In Equation (3), the ROA is the Compustat Item 13 adjusted for total assets for period t . It is important that ROA and ZET are one period apart because they are both earnings items and could be highly correlated if they were from the same time period t . SIZE and Leverage are control variables for a firm's performance and debt level.

Table 5 reports the coefficient estimates for equation (3). In column one, the coefficient estimate for ZET is -0.022 (t-stat = -4.81), which suggests that zero earnings-target firms, on average, generate a lower return on their assets. In column three, the coefficient estimate for the interaction between ZET and INV is -0.113 (t-stat = -2.02), which shows that the zero earnings target firms' investments tend to under-perform. This suggests that when firms manage earnings to avoid losses, the corporate investment would have a lower efficiency as well.

5. Robustness Check

Results in Table 4 and Table 5 suggest that zero earnings target firms tend to invest more and suffer from lower investment efficiencies. To test for the robustness of the findings, I investigate whether two forms of corporate governance mechanisms could have an impact on corporate investments of zero earnings target firms: debt holders and auditors. Prior research suggests that agency problems may lead to over-investment. Jensen (1986) argues that debt may curb over-investment problems since debt holders monitor the free cash flows within a firm. In addition, accounting research shows that Big 4 auditors (Deloitte Touche, Ernst & Young, KPMG, and PricewaterhouseCoopers) provide higher quality audits on the earnings. (See Teoh and Wong (1993)) To test Hypotheses 3 and 4, this paper uses the following regression:

$$\begin{aligned}
 \text{Inv}_t/A_{t-1} = & \alpha_1 Q_{t-1} + \alpha_2 \text{Cash Flow}_t/A_{t-1} + \alpha_3 \text{ZET}_t + \alpha_4 \text{Size}_t \\
 & + \alpha_5 \text{Leverage}_t + \alpha_6 \text{Big4}_t + \alpha_7 \text{MFG}_t + \alpha_8 \text{Leverage}_t * \text{ZET}_t \\
 & + \alpha_9 \text{Big4}_t * \text{ZET}_t + \alpha_{10} \text{MFG}_t * \text{ZET}_t + \varepsilon_{i,t}
 \end{aligned}
 \tag{4}$$

where Inv_t is the capital expenditure in period t , A_{t-1} is the beginning of the total assets in period $t-1$, Q_{t-1} is Tobin's Q in period $t-1$, Cash Flow_t is the earnings plus depreciation, ZET is an indicator variable that is set to 1 if net income scaled by lagged total assets is between 0.000 and 0.005, Size_t is the firm's performance proxy, Leverage_t is a proxy for the debt level, Big4 is an indicator variable that is set to 1 if the auditor is a Big4 auditor, MFG is an indicator variable that is set to 1 if the firm has a two-digit SIC code of

between 20 and 39. The variable MFG represents the manufacturing firms that generally have higher capital expenditures. The remaining three variables $\text{Leverage}_t * \text{ZET}_t$, $\text{Big4}_t * \text{ZET}_t$ and $\text{MFG}_t * \text{ZET}_t$ are interaction terms between the indicator variable ZET and other variables.

The correlation among the additional variables in Table 6 shows that Leverage has a negative correlation of -0.03 with the Big4 indicator variable. This implies that firms with Big 4 auditors have lower debt.

Table 7 presents regression coefficient estimates with the additional control variables and the interaction terms for regression equation (4). The coefficient estimate for Big4 is 0.046 (t-stat = 20.17), which suggest that firms that hire Big 4 auditors, on average, have higher capital expenditures. The coefficient estimate for leverage is 0.107 and significant. This is consistent with the evidence showing that firms tend to finance capital expenditures with additional debt. The coefficient estimate for MFG is both negative and significant.

The interaction coefficient estimate between Leverage and ZET is -0.063 (t-stat = -2.79). On average, an increase in the debt level seems to reduce the investment among the zero earnings target firms. Moreover, the interaction coefficient estimate between Big4 and ZET is also negative and significant at -0.053 (t-stat = -5.07). These findings lend support to Hypothesis 3 and Hypothesis 4 that debt and Big 4 auditors seem to help reduce investments made by the zero earnings target firms.

6. Conclusion

This paper examines the corporate investment behavior of firms with slightly positive or zero earnings. The findings suggest that such firms tend to invest more and suffer from investment inefficiencies. An additional analysis shows that the presence of auditors and debt holders may reduce the investments made by such firms.

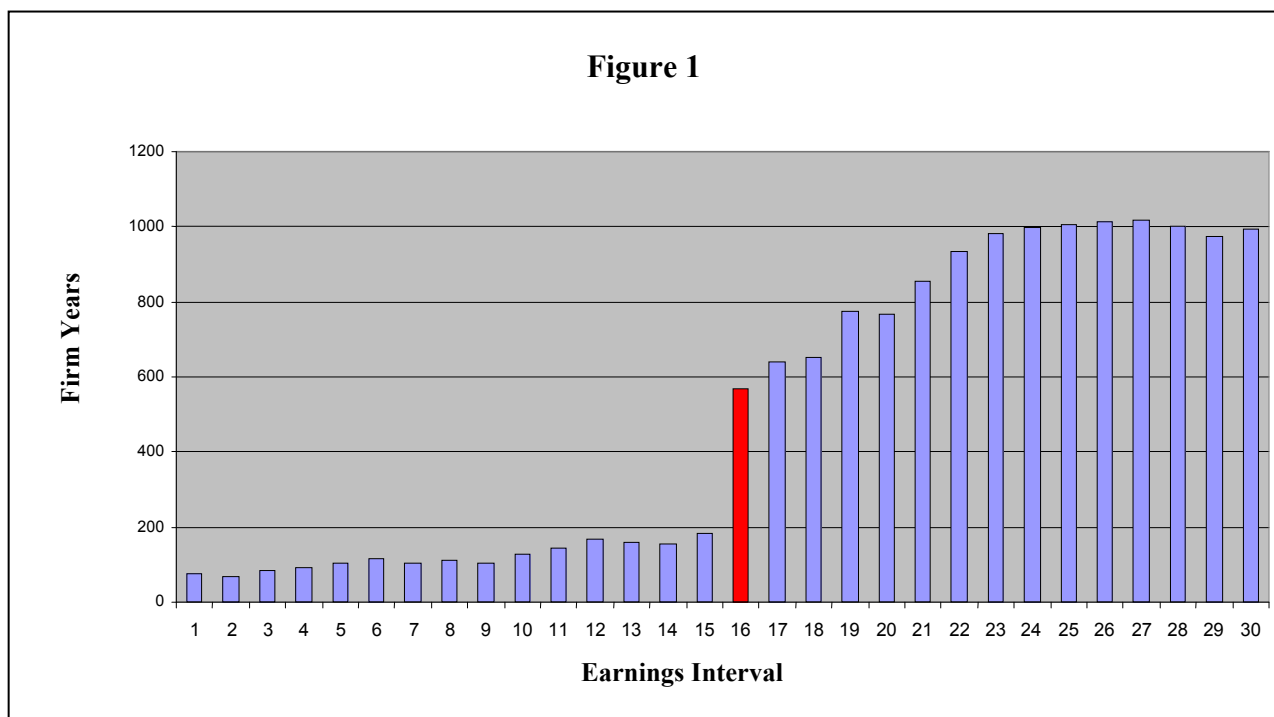


Figure 1: Plot of earnings intervals against number of firm years. Earnings intervals are computed as net income (IBEI) scaled by lagged total asset (A) with a 0.005 width. For example, interval 16 includes firm years with scaled earnings of between 0.000 and 0.005 i.e. firm years with reported net income of between 0% and 0.5% of total assets. The range of earnings interval in this figure is truncated between -0.075 and 0.075 and contains a total of 14,955 firm years.

Table 1: Sample Statistics

Panel A: Zero Earnings Target firms (N = 567)					
Variable	Mean	Std Dev	Minimum	Median	Maximum
Inv_t/A_{t-1}	0.076	0.084	0.003	0.049	0.837
Q_{t-1}	1.298	0.808	0.522	1.103	12.500
Cash flow_t/A_{t-1}	0.057	0.031	0.009	0.051	0.261
IBEI/A_{t-1}	0.002	0.001	0.000	0.002	0.005
ROA_t	0.099	0.053	-0.178	0.094	0.458
Size_t	5.702	1.909	1.242	5.479	12.185
Leverage_t	0.365	0.224	0.000	0.353	1.449
DA_t	0.002	0.076	-0.282	-0.001	0.275

Panel B: Rest of the Firm Sample (N = 27,068)					
Variable	Mean	Std Dev	Minimum	Median	Maximum
Inv_t/A_{t-1}	0.090	0.097	0.000	0.062	3.227
Q_{t-1}	1.819	1.304	0.191	1.445	50.816
Cash flow_t/A_{t-1}	0.109	0.122	-2.526	0.115	1.035
IBEI/A_{t-1}	0.052	0.120	-2.565	0.061	0.649
ROA_t	0.169	0.124	-1.797	0.167	1.199
Size_t	5.979	1.825	-2.900	5.872	12.722
Leverage_t	0.286	0.226	0.000	0.253	4.692
DA_t	-0.003	0.087	-2.143	-0.002	0.803

Inv_t(Item128) is the capital expenditure in period t, A_{t-1}(Item6) is beginning of period capital stock in period t-1, Q_{t-1}((Item6+Item24*Item25-Item60-Item74)/Item6) is Tobin's Q in period t-1, Cash Flow_t (Item18+Item14) is the earnings plus depreciation, IBEI_t (Item18) is the earnings interval as defined in Figure 1; ROA_t (Item13)/lagged Item6 is the return on underlying asset, Size_t (log of Item12) is the firm performance proxy, Leverage_t is (Item9+Item34/ lagged Item 6) is the debt level proxy, DA_t is the earnings quality variable measured by discretionary accruals.

Table 2: Pearson Correlations of Key Variables

	Inv_t/A_{t-1}	Q_{t-1}	$Cash\ Flow_t/A_{t-1}$	$IBEI_t/A_{t-1}$	ROA_t	$Size_t$	$Leverage_t$	DA_t
Inv_t/A_{t-1}	1.00							
Q_{t-1}	0.12	1.00						
$Cash\ Flow_t/A_{t-1}$	0.22	0.11	1.00					
$IBEI_t/A_{t-1}$	0.07	0.11	0.96	1.00				
ROA_t	0.24	0.19	0.87	0.82	1.00			
$Size_t$	-0.16	0.02	0.19	0.24	0.21	1.00		
$Leverage_t$	0.11	-0.14	-0.17	-0.20	-0.20	-0.04	1.00	
DA_t	-0.01	-0.05	0.30	0.35	0.35	0.05	0.05	1.00

Inv_t (Item128) is the capital expenditure in period t , A_{t-1} (Item6) is beginning of period capital stock in period $t-1$, Q_{t-1} ((Item6+Item24*Item25-Item60-Item74)/Item6) is Tobin's Q in period $t-1$, $Cash\ Flow_t$ (Item18+Item14) is the earnings plus depreciation, $IBEI_t$ (Item18) is the earnings interval as defined in Figure 1; ROA_t (Item13)/lagged Item6 is the return on underlying asset, $Size_t$ (log of Item12) is the firm performance proxy, $Leverage_t$ is (Item9+Item34/ lagged Item 6) is the debt level proxy, DA_t is the earnings quality variable measured by discretionary accruals.

Table 3: Investment – Cash Flow Regression

$$\text{Inv}_t/A_{t-1} = \alpha_1 Q_{t-1} + \alpha_2 \text{Cash Flow}_t/A_{t-1} + \varepsilon_{i,t}$$

	Predicted Sign	Coefficients (t-stat)	
		Regression (1)	Regression (2)
Q_{t-1}	(+)	0.024 (23.43)	0.024 (26.11)
Cash Flow_t	(+)	0.268 (19.03)	
CFO_t	(+)		0.301 (26.01)
Adjusted R2		0.433	0.441
N		27,391	27,391

Inv_t(Item128) is the capital expenditure in period t, A_{t-1}(Item6) is beginning of period capital stock in period t-1, Q_{t-1}((Item6 + Item 24*Item 25 – Item 60 – Item 74) / Item 6) is Tobin's Q in period t-1, Cash Flow_t (Item 18 + Item 14) is the earnings plus depreciation, CFO_t (Item 308 - 304) is the Cash Flow from Operations.

Table 4: Investment Regression with ZET

$$INV_t = \alpha_1 Q_{t-1} + \alpha_2 \text{Cash Flow}_t / A_{t-1} + \alpha_3 ZET_t + \alpha_4 \text{Size}_t + \varepsilon_{i,t}$$

	Predicted Sign	Coefficients (t-stat)	
		Regression (1)	Regression (2)
Q_{t-1}	+	0.024 (23.31)	0.016 (15.37)
Cash Flow_t	+	0.268 (19.04)	0.206 (15.01)
ZET_t	?	0.030 (8.53)	0.016 (4.43)
Size_t	+		0.005 (16.14)
Adjusted R2		0.434	0.450
N		27,390	27,390

Inv_t(Item128) is the capital expenditure in period t, A_{t-1}(Item6) is beginning of period capital stock in period t-1, Q_{t-1}((Item 6 + Item 24*Item 25 – Item 60 – Item 74) / Item 6) is Tobin's Q in period t-1, Cash Flow_t (Item 18 + Item 14) is the earnings plus depreciation, ZET_t is an indicator variable that takes on the value of 1 for IBEI_t/A_{t-1}(Item 18 / lagged Item 6) of between 0.000 and 0.005, Size_t (log of Item12) is the firm performance proxy.

Table 5: ROA Regression with ZET

$$ROA_t = \alpha_1 Q_{t-1} + \alpha_2 ZET_{t-1} + \alpha_3 INV_{t-1}/K_{t-2} + \alpha_4 (INV_{t-1}/K_{t-2} * ZET_{t-1}) + \alpha_5 Size_{t-1} + \alpha_6 Leverage_{t-1} + \varepsilon_{i,t}$$

	Predicted Sign	Coefficients (t-stat)		
		Regression (1)	Regression (2)	Regression (3)
Q_{t-1}	+	0.025 (13.90)	0.022 (12.70)	0.022 (12.70)
ZET_{t-1}	?	-0.022 (-4.81)	-0.020 (-4.46)	-0.011 (-2.04)
INV_{t-1}	+		0.258 (18.59)	0.260 (18.41)
ZET_{t-1}*INV_{t-1}	?			-0.113 (-2.02)
Size_{t-1}	+	0.018 (35.77)	0.017 (36.00)	0.016 (35.95)
Leverage_{t-1}	?	0.026 (7.32)	0.000 (0.00)	0.000 (0.00)
Adjusted R2		0.648	0.663	0.663
N		27,390	27,390	27,390

Inv_t(Item128) is the capital expenditure in period t, A_{t-1}(Item6) is beginning of period capital stock in period t-1, Q_{t-1}((Item 6 + Item 24*Item 25 – Item 60 – Item 74) / Item 6) is Tobin's Q in period t-1, Cash Flow_t (Item 18 + Item 14) is the earnings plus depreciation, ZET_t is an indicator variable that takes on the value of 1 for IBET_t/A_{t-1}(Item 18 / lagged Item 6) of between 0.000 and 0.005, Size_t (log of Item12) is the firm performance proxy and Leverage_t (Item9+Item34/ lagged Item 6) is the debt level proxy.

Table 6: Pearson Correlations of Control Variables

	Leverage	Big4	MFG
Leverage	1.00		
Big4	-0.03	1.00	
MFG	-0.07	-0.02	1.00

Leverage is $(\text{Item 9} + \text{Item34} / \text{lagged Item 6})$ is the debt level proxy, Big4 is an indicator variable that takes on the value of 1 for Big4 auditing firms, MFG is an indicator variable that takes on the value of 1 for firms with SIC two digit code of between 20 and 39.

Table 7: Robustness Check with Additional Controls

$$\text{Inv}_t/A_{t-1} = \alpha_1 Q_{t-1} + \alpha_2 \text{Cash Flow}_t/A_{t-1} + \alpha_3 \text{ZET}_t + \alpha_4 \text{Size}_t + \alpha_5 \text{Leverage}_t + \alpha_6 \text{Big4}_t + \alpha_7 \text{MFG}_t + \alpha_8 \text{Leverage}_t * \text{ZET}_t + \alpha_9 \text{Big4}_t * \text{ZET}_t + \alpha_{10} \text{MFG}_t * \text{ZET}_t + \varepsilon_{i,t}$$

	Predicted Sign	Coefficients (t-stat)
Q_{t-1}	+	0.014 (14.76)
Cash flow_t	+	0.232 (17.43)
ZET_t	+	0.080 (5.91)
Size_t	+	-0.004 (-12.06)
Leverage_t	?	0.107 (26.16)
Big4_t	?	0.046 (20.17)
MFG_t	?	-0.023 (-20.14)

Table 7: Robustness Check with Additional Controls (continues)

	Predicted Sign	Coefficients (t-stat)
Leverage_t*ZET_t	?	-0.063 (-2.79)
Big4_t*ZET_t	?	-0.053 (-5.07)
MFG_t*ZET_t	?	-0.016 (-2.24)
Adjusted R2		0.513
N		27,391

Inv_t(Item128) is the capital expenditure in period t, A_{t-1}(Item6) is beginning of period capital stock in period t-1, Q_{t-1}((Item6+Item24*Item25-Item60-Item74)/Item6) is Tobin's Q in period t-1, Cash Flow_t (Item18+Item14) is the earnings plus depreciation, IBEI_t (Item18) is the earnings; ROA_t (Item172)/lagged Item6 is the return on asset, Size_t (log of Item12) is the firm performance proxy, Leverage_t is (Item9+Item34/ lagged Item 6) is the debt level proxy, Big4_t is an indicator variable that takes on the value of 1 for Big 4 auditing firms, MFG_t is an indicator variable that takes on the value of 1 for firms with SIC two digit code of between 20 and 39.

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