**The investment perspective of accruals: Do theories of investment under uncertainty provide insight into the factors that shape a firm's level of accruals?**

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## Abstract

Accounting research has long relied on accruals-based measures of earnings management. However, there is little understanding of the economic forces that shape a firm's accruals over time. We consider accruals in their role as a form of investment and examine whether theories of investment under uncertainty shed light on whether accruals are affected by changes in the business environment over time. Specifically, theories of investment under uncertainty posit that higher uncertainty leads firms to withhold investment, leading to a negative relation between investment and uncertainty. Consistent with the theory, we document a significant negative relation between working capital accruals and uncertainty. Furthermore, we find that the negative relation between accruals and uncertainty is more pronounced for firms with longer operating cycles. The sensitivity of specific accruals to uncertainty also strengthens as the horizon of the accrual increases. Lastly, we document a robust negative relation between abnormal accruals and uncertainty, which strengthens as the operating cycle increases. These results suggest that abnormal accruals are systematically associated with the level of uncertainty faced by the firm and that researchers should consider the effect of uncertainty, the components of accruals, and the firm's operating cycle when relying on abnormal accrual models to capture earnings management.

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## 1. Introduction

A vast body of accounting research relies on accruals-based measures of earnings management. This literature distinguishes 'normal', or 'expected' accruals from 'abnormal', or 'discretionary' accruals by directly modeling the accrual generating process. However, there is little theoretical understanding of the fundamental economic forces that shape the level of a firm's expected accruals (e.g. Dechow et al (2010), Defond (2010)). Moreover, commonly employed abnormal accrual models tend to be estimated in the cross-section, despite the fact that the accrual generating process is likely to be dynamic. Indeed, recent research highlights that little is known empirically and theoretically about the time-varying process that characterizes accruals (Owens, Wu and Zimmerman (2013); Gerakos (2012)).

In this paper, we employ the rich theoretical framework of investment under uncertainty found in the economics literature to study whether the theory can explain intertemporal variation in the level of a firm's accruals. Additionally, we exploit the theory to study when the impact of uncertainty on accruals is particularly pronounced. Prior research on accruals notes that accruals can be viewed as a component of investment. Thus, accruals at least partially reflect a deliberate investment choice by the firm (Fairfield et. al., 2003; Zhang, 2007; Wu et al., 2010; Bushman et. al., 2011; Allen et al., 2013; Momentè et al., 2013). Adopting this perspective of accruals suggests that economic theories of investment may provide insight into the behavior of accruals. As such, we note at the very outset that our study is a joint test of the extent to which accruals reflect investment decisions and the extent to which theories of investment under uncertainty provide insight into accrual behavior.

In investment under uncertainty theory, time-varying uncertainty plays a critical role in investment decisions because firms cannot perfectly forecast the future. Firms must therefore make investment decisions in the face of uncertainty, and uncertainty enters as a key variable in investment decision making (e.g., Bernanke, 1983; McDonald and Siegel, 1986; Ingersoll and Ross, 1992; Dixit and Pindyck, 1994; Schwartz and Trigeorgis, 2004; Grenadier and Malenko, 2010).

Using a real options approach, the theory suggests that the investment-uncertainty relation is negative. The underlying intuition is that when firms make investment decisions under uncertainty, they trade off the returns earned from investing today against the benefit from delaying investment to the future, when information or business conditions may be better. The benefit of postponing investment – known as the “option to wait” – implies that when uncertainty rises, the value of the option to wait is higher. Higher uncertainty thereby has a dampening effect on investment as firms prefer to “wait and see” instead of investing immediately. Thus, the theory predicts a negative relation between investment and uncertainty. Accordingly, our first set of tests focuses on testing the relation between net working capital accruals and uncertainty.

At a broad level, we recognize that accounting accruals are shaped by a multitude of forces besides managers’ investment decisions. First, accruals may be subject to intentional manipulation by managers (Dechow et al, 2010) and/or unintentional mismeasurement (Richardson et al 2005). Second, accruals are used to resolve the timing and matching issues related to cash flows as a performance metric (Dechow 1994), and are therefore shaped by the accounting standards that pertain to each specific accrual (Healy and Wahlen 1999). Third, accruals may be affected by parties outside of the firm, including customers (through accounts receivables) and suppliers (through accounts payables).[1] Therefore, even if accruals are partially shaped by investment decisions, the simultaneous actions of these diverse forces may obscure any relation between uncertainty and accruals as asserted by investment under uncertainty theory.

To empirically test our predictions, we examine the relation between working capital accruals and uncertainty for firms with available annual data from 1965 through 2010. We examine three measures of uncertainty; namely, total volatility of stock returns, industry volatility of stock returns, and analyst forecast dispersion. These measures of uncertainty are consistent with those used in the prior literature to capture uncertainty about the firm's future prospects (e.g. Ang et. al., 2006; Eisdorfer, 2008; Diether et. al., 2002). Additionally, the use of industry-level volatility alleviates concern that our results are driven by reverse causality. Based on prior literature addressing corporate investment decisions (Hayashi, 1982; Lamont, 1997; Eisdorfer, 2008), our regression model includes controls for the firm's prior and current cash flows, prior and current stock returns, book-to-market, size, and leverage. In addition, since the economic theory relates to explaining the level of accruals within a firm over time, we include firm fixed effects in all our regressions. This has the added benefit of removing firm-level correlated omitted variables that are invariant over the sample period.

Our first key result is that there is a robust negative relation between net working capital accruals and uncertainty. This result is consistent with the economic theory, and suggests that

[1] We note that because net working capital accruals are equal to current asset accruals net of current liability accruals, it is not clear that the relation between net working capital accruals and uncertainty will be negative. For example, if the firm's creditors are less (more) willing to extend credit to the firm when uncertainty rises (declines), then accounts payables and other current liabilities will be negatively associated with uncertainty. This would contribute *positively* to the association between net working capital accruals and uncertainty. Therefore, the overall relation between net working capital accruals and uncertainty may be *positive* if the sensitivity of current liability accruals to uncertainty is reliably more negative compared to the sensitivity of current assets accruals to uncertainty.

managers withhold investment in working capital accruals when uncertainty rises. We next decompose net working capital accruals into its constituent accrual components to further investigate which accruals drive the overall negative relation. We find that inventory accruals and accounts receivables have the strongest negative relation with uncertainty. This indicates that when uncertainty rises, managers invest less in inventory and invest less in granting credit to their customers.[2] Interestingly, accounts payable is also negatively associated with uncertainty. However, the negative coefficient on accounts payable is attenuated compared to the negative coefficient on inventory and accounts receivable. In other words, when uncertainty rises, the lower net investment in working capital arises because the lower investments in inventory and accounts receivables are only partially offset by lower accounts payables.

We next exploit the theory's real options framework to form predictions on the types of firms where uncertainty has the largest impact on accruals. The operating cycle measures the average time between the disbursement of cash to produce a product and the receipt of cash from the sale of the product (Dechow, 1994). Firms with longer operating cycles will have a wider range of possible investment outcomes and greater exposure to changing business conditions. This suggests that the option to wait is more valuable for firms with longer operating cycles. Thus, under the hypothesized economic framework, we expect uncertainty to have a stronger dampening effect on net investment in working capital for firms with a longer operating cycle. We find evidence consistent with this conjecture. More specifically, we find that the working capital accruals of firms in the longest quintile of operating cycle are at least twice as sensitive to uncertainty compared to those of firms in the shortest quintile of operating cycle.

[2] The fact that accounts receivable is negatively associated with uncertainty does not mean that firms are willing to forgo sales when uncertainty rises. Untabulated tests show that the fraction of sales made on credit declines when uncertainty rises, indicating that firms are less willing to invest in granting credit to customers, and that they make more sales on cash, when uncertainty rises.

We further exploit the theory to investigate when the effect of uncertainty is likely to be more or less pronounced. Specifically, we study whether the sensitivity of individual accruals to uncertainty is a function of the accrual's horizon. We independently sort firms into quintiles based on accounts receivable days, inventory days, and accounts payable days. We then calculate the sensitivity of their accounts receivable accrual, inventory accrual, and accounts payable accrual to uncertainty within each horizon quintile (respectively). Consistent with our hypothesis, we find that the longer the horizon of the specific accrual, the more sensitive the accrual is to uncertainty. In other words, the accounts receivables of firms in the longest quintile of accounts receivable days are much more sensitive to uncertainty than the accounts receivables of firms in the shortest quintile of accounts receivable days (similarly for inventory and accounts payable).

Finally, we examine the relation between uncertainty and commonly employed measures of both normal and abnormal accruals. If extant accrual models fail to purge fundamental economic forces from abnormal accruals, then uncertainty may be systematically associated with abnormal accruals. Moreover, given that economic theory suggests that the effect of uncertainty is particularly pronounced for firms with a longer operating cycle, we expect the bias in abnormal accruals to be exacerbated for firms with a longer operating cycle. On the other hand, our empirical tests may lack power given that prior empirical accounting research suggests that firms with longer operating cycles have greater absolute levels of earnings management (e.g. Dechow and Dichev 2002).

Using six different abnormal accrual models found in prior work, we decompose net working capital accruals into normal and abnormal components and test the relation with uncertainty. Across all six models, we document a robust negative relation between normal accruals and uncertainty. Furthermore, we document a robust negative relation between abnormal accruals and uncertainty across all six models. Lastly, we find that the abnormal accruals of firms in the longest operating cycle quintile are at least twice as sensitive to uncertainty compared to those of firms in the shortest quintile of operating cycle. Collectively, these results suggest that extant abnormal accrual models fail to cleanly separate between earnings management activities and the fundamental economic forces that shape accruals.

We contribute to the literature in several ways. First, understanding the properties of accruals is among the chief goals of financial accounting research. Dechow et al (2010), Defond (2010), Ball (2013) and others express concern that there is little theory to guide researchers in understanding the factors that shape the level of a firm's accruals. We draw on investment under uncertainty theories and examine the extent to which these theories apply to the behavior of accruals. To our knowledge, our study is the first to link accounting accruals to the investment under uncertainty literature. Our empirical results provide important insight into accrual behavior vis-à-vis the level of uncertainty faced by the firm. Consistent with economic theory, we document a robust negative relation between accruals and uncertainty. Furthermore, we exploit the theory to identify the types of firms where uncertainty has the largest impact on accruals. We predict and find evidence that the effect of uncertainty on accruals is particularly pronounced in firms with long operating cycles. Moreover, this holds true even for abnormal accruals.

Our findings provide valuable insights for researchers seeking to use abnormal accruals as a proxy for earnings management (Healy, 1985; DeAngelo, 1986; Jones, 1991; Dechow et. al., 1995; Dechow et. al., 2003). Our analyses show that abnormal accruals vary systematically with the uncertainty faced by the firm. This contributes to recent research that attempts to identify and correct for systematic biases in abnormal accrual models (e.g., Owens, Wu, and Zimmerman, 2013), and suggests that researchers should potentially consider the role of uncertainty and accrual horizon when calculating accruals-based proxies for earnings management. Lastly, we believe that future research could perhaps combine the investment under uncertainty predictions with other relevant economic theories to further identify systematic biases in abnormal accruals models and to enhance models of expected accruals.

The paper proceeds as follows. Section 2 presents the background and hypothesis development. Section 3 presents variable definitions and descriptive statistics. Section 4 presents empirical results, and Section 5 concludes.

## 2. Background and hypotheses development

### *2.1. Prior literature on accruals*

Accruals are fundamental to financial reporting and are the underlying innovation of accounting. The accounting literature generally considers accruals from one of three perspectives. Under the first perspective, accruals arise as a secondary outcome of the earnings reporting process. For example, Dechow (1994) focuses on the role of accruals in mitigating the timing problems associated with cash flows as a performance metric. The second perspective views accruals as a component of profitability and highlights that the accrual component of earnings involves greater subjectivity than the cash flow component. Based on this characterization of accruals, the research asserts that at least some portion of accruals reflects intentional and unintentional mismeasurement (Sloan, 1996; Xie, 2001). The third perspective considers the role of accruals as a component of investment. Fairfield et. al. (2003) note that growth in net operating assets can be disaggregated into accruals and growth in long-term net operating assets. They note, therefore, that accruals are not only a component of profitability but also a component of investment. Zhang (2007) supports the investment role of accruals and concludes that the accrual anomaly documented by Sloan (1996) is primarily attributable to the role of accruals as a form of investment. Bushman et al. (2011) note that working capital accruals reflect investment decisions and examine the implications of this for investment-cash flow sensitivities.

While these views of accruals have been examined in the context of explaining the differential persistence of accruals and operating cash flows and the market mispricing of accruals (Dechow and Dichev, 2002; Fairfield et al., 2003; Zhang, 2007; Allen et al., 2013), little research has exploited these perspectives to aid in understanding the factors that shape a firm's level of accruals. In this study, we rely on the investment perspective of accruals and examine whether theories of investment under uncertainty provide insight into the relation between the level of accruals and uncertainty. We note that our analyses, therefore, provide a joint test of the extent to which accruals reflect investment and whether the finance theories of investment under uncertainty apply to working capital accruals.[3]

### *2.2. Hypotheses development*

Real-world investment decisions tend to share three features, which collectively motivate theories of investment under uncertainty (Dixit, 1992). First, firms cannot perfectly forecast the

[3] Prior research has examined the relation between the volatility and absolute value of discretionary accruals and uncertainty. Ghosh and Olsen (2009) suggest that the absolute value of discretionary accruals rises with environmental uncertainty. Chen et al. (2012) find that idiosyncratic return volatility rises with the volatility of discretionary accruals. However, this prior work does not study the relation between uncertainty and the *level* of a firm's accruals.

future because the business environment has ongoing uncertainty and information arrives gradually. Second, investment is costly and difficult to reverse, i.e. investment tends to be "irreversible". Third, an investment opportunity does not generally disappear if no investment is made immediately, i.e. firms generally have the option to postpone investment to the future. Motivated by these observations, a large theoretical literature examines investment under uncertainty and generally finds a negative relation between investment and uncertainty (e.g. Bernanke, 1983; McDonald and Siegel, 1986; Ingersoll and Ross, 1992; Dixit and Pindyck, 1994; and Schwartz and Trigeorgis, 2004).

Relying on real options logic, the general intuition underlying theoretical models of investment under uncertainty is as follows. A manager's investment decision involves a tradeoff between investing immediately or instead postponing investment to the future. The benefit of immediate investment is that the firm is able to start enjoying returns from the investment. On the other hand, the benefit of waiting is that the manager can gain more information about the value of the investment and take advantage of any improvements in business conditions that occur in the meantime. This benefit of waiting introduces an opportunity cost to investing today. At the point when the benefits of waiting equal the costs of waiting, investment occurs.[4] When uncertainty is higher, the benefit of waiting (commonly referred to in the literature as the "option to wait") is higher. Firms therefore become more cautious in their investment behavior because they prefer to "wait and see" what happens in the future. Thus, the models predict a negative investment-uncertainty relation. Empirical research in finance generally supports the negative relation between investment and uncertainty (e.g. Leahy and Whited, 1996; Guiso and Parigi,

[4] This logic demonstrates that in the presence of uncertainty, investment decisions are not simply based on the common net present value rule that suggests investment in a project when the net present value of the project is positive. Instead, investment occurs if the net present value of the investment project exceeds the value of the option to wait. Thus, incorporating uncertainty into the decision process leads to a more nuanced approach to investment.

1999; Minton and Schrand, 1999; and Bond and Cummins, 2004). To the extent that accruals reflect a component of investment, we expect working capital accruals (i.e., growth in working capital) to be negatively associated with uncertainty.

We note, however, that it is not clear that we will find a negative relation between accruals and uncertainty empirically given that accounting accruals are shaped by a multitude of forces. Accruals may be subject to intentional or unintentional manipulation by managers (Dechow et al, 2010; Richardson et al 2005). Accruals are also used to resolve the timing and matching issues related to cash flows as a performance metric and are shaped by the accounting standards that pertain to each specific accrual (Dechow 1994; Healy and Wahlen 1999). Accruals may also be affected by parties such as customers and suppliers. Therefore, even if accruals are partially shaped by investment decisions, the simultaneous actions of these other diverse forces may obscure any relation between uncertainty and accruals as asserted by the investment under uncertainty theory. Despite this caveat, we predict a negative relation between uncertainty and accruals. This leads to our first hypothesis:

H1: *The level of working capital accruals is negatively associated with the level of uncertainty.*

Our second hypothesis predicts an increasing relation between the sensitivity of accruals to uncertainty and the length of the firm's operating cycle. The operating cycle measures the average time between the disbursement of cash to produce a product and the receipt of cash from the sale of the product (Dechow, 1994). A firm with a longer operating cycle has greater exposure to changing business conditions. More specifically, a longer operating cycle leads to a wider range of possible investment outcomes, which makes the option to wait more valuable. Thus, we expect that uncertainty has a stronger dampening effect on working capital accruals in firms with longer operating cycles.

There are, however, reasonable arguments to assert that the negative accrual-uncertainty relation weakens for firms with longer operating cycles. Zang (2012) asserts that accruals-based earnings management is a positive function of the opportunities and a negative function of the costs associated with this form of earnings management. Zang (2012), therefore, suggests that greater flexibility leads to more accrual-based earnings management, and consistent with this notion, documents a positive relation between abnormal accruals and the length of the firm's operating cycle. Given that uncertainty and the length of the firm's operating cycle lead to greater flexibility and more opportunities for earnings management, these results suggest that the negative accrual-uncertainty relation weakens for firms with longer operating cycles. Despite this reasonable argument for the null hypothesis, we present our second hypothesis based on our theoretical economic framework as follows:

H2: *The negative association between the level of working capital accruals and uncertainty is more pronounced for firms with longer operating cycles.*

Finally, we predict that the relation between accruals and uncertainty leads to systematic biases in abnormal accruals measures, which are widely used as a proxy for earnings management. In capturing earnings management, one is generally concerned when accruals deviate from the expected amount. The most popular proxy for earnings management—abnormal accruals, estimated using some version of the Jones (1991) model—builds on this idea and adjusts total accruals (i.e., growth in working capital less depreciation expense) for the amount of accruals explained by changes in sales and property, plant and equipment.

There are several variations of this model. For example, Dechow, et al. (2003) enhance the model by including an estimation of the relation between the change in receivables and the change in sales—to avoid the assumption implicit in the Jones model that earnings are not managed through sales—and by including prior total accruals in the model. Kothari, Leone and

Wasley (2005) suggest that to isolate "abnormal" accruals researchers should control for firm performance in the estimation model as well. Regardless of the specific model, the model parameters are generally estimated using annual, cross-sectional regressions within industries. The estimates are then used to calculate nondiscretionary accruals as the predicted value of total accruals, and the difference between total accruals and nondiscretionary accruals is deemed discretionary and is used as a proxy for managed earnings.

Bernard and Skinner (1996, 316-7) argue that there are likely to be important omitted variables in explaining working capital accruals, which create measurement error in estimating discretionary accruals. For example, extant abnormal accrual models assume that the accrual process is not affected by the business environment, and that the accrual process is stationary. In contrast, we recognize that the accrual process is not stationary, and, based on economic theory, we posit that accruals vary intertemporally with the level of uncertainty faced by the firm. If accruals are systematically associated with the level of uncertainty and if accrual models do not take into account the uncertainty faced by the firm, then the extant measures of abnormal accruals will be systematically biased based on the level of uncertainty. In addition, if the negative relation between accruals and uncertainty is more pronounced for firms with a longer operating cycle, then the systematic bias in abnormal accruals is associated with the firm's operating cycle. Based on the notion that accruals at least partially reflect investment, we predict a negative relation between abnormal accruals and uncertainty. This leads to our third hypothesis:

H3: *Abnormal accruals are negatively associated with the level of uncertainty and this relation is more pronounced for firms with a longer operating cycle.*

## 3. Variable definitions, sample, and descriptive statistics

### *3.1 Model and variable definitions*

We examine the relation between working capital accruals and uncertainty and, for comparison to prior finance literature, the relation between long-term investment and uncertainty. To test our first two hypotheses, we rely on the models used in the corporate investment literature (e.g. Hayashi, 1982; Lamont, 1997; Eisdorfer, 2008) and run variations of the following regression model:

$$\Delta WIC_{i,t} = \alpha + \beta_1\, UNCERTAINTY_{i,t} + \beta_2\, CFO_{i,t} + \beta_3\, LAGCFO_{i,t} + \beta_4\, ANNRET_{i,t} + \beta_5\, LAGANNRET_{i,t} + \beta_6\, BTM_{i,t} + \beta_7\, SIZE_{i,t} + \beta_8\, LEV_{i,t} + \varepsilon_{i,t} \quad (1)$$

where the dependent variable is $\Delta WIC$, which reflects operating accruals before depreciation for the firm and year, defined as growth in operating working capital (other than tax liabilities) scaled by average total assets. This definition of accruals are consistent with prior research (Sloan, 1996; Fairfield et. al., 2003).[5] *UNCERTAINTY* reflects one of three different measures of the uncertainty faced by the firm: total stock return volatility (*TOTVOL*), industry stock return volatility (*INDVOL*), and analyst forecast dispersion (*DISPERSION*). *TOTVOL* is calculated as the standard deviation of daily returns over the current fiscal year. *INDVOL* is calculated as the stock return volatility of the firms in the same two-digit SIC code. *DISPERSION* is calculated as the standard deviation of analyst forecasts as of the fourth month of the fiscal year, scaled by the

[5] We note that the results are qualitatively similar when we examine alternative definitions of working capital accruals, such as the statement of cash flow approach suggested in Hribar and Collins (2002). This suggests that our results are not driven by measurement error in the accrual estimates. Further, results are also qualitatively similar when we examine total operating accruals, defined as growth in working capital less depreciation and amortization expense, scaled by total assets. We report the results for working capital accruals in order to focus on the component of accruals that is more likely to reflect short-term investment decisions rather than the depreciation/amortization component that is related to long-term investment decisions.

mean of the same forecasts.[6] The use of these measures and our definitions of these measures is consistent with prior finance research (e.g. Diether et. al., 2002; Ang et. al., 2006; Eisdorfer, 2008). We note that while total stock return volatility and analyst forecast dispersion are intended to capture the uncertainty faced by the firm, industry volatility is intended to capture the volatility faced by the firm's industry. Therefore, the examination of industry volatility is included to reduce concerns of endogeneity or reverse causality given that an individual firm's level of accruals is not likely to affect the industry's stock return volatility.

In our analyses of accruals, our regression model includes variables that capture the firm's past and current operating cash flows, past and current stock returns, expected growth, size, and leverage. This model is based on the models used in prior research on corporate investment decisions (e.g. Hayashi, 1982; Lamont, 1997; Eisdorfer, 2008). Specifically, we rely on the model of investment under uncertainty used in Eisdorfer (2008) which includes firm's expected growth (*BTM*), size (*SIZE*), leverage (*LEV*), and lagged cash flows (*LAGCFO*).[7] We augment the model by including current cash flows from operations (*CFO*) given the literature in finance that contemporaneous cash flows are an important factor associated with investment decisions (Lamont, 1997). We also include current and lagged annual stock returns (*ANNRET* and *LAGANNRET*) given that both the average Tobin's *q* and the marginal Tobin's *q* are important factors for corporate investment decisions (Hayashi, 1982; Barro, 1990). Finally, we include firm and year fixed effects. We note that our hypotheses rely on the notion that uncertainty influences the firm's level of investment. Because of this, we include firm fixed effects so that the analyses provide insight into whether differences in uncertainty across time for

[6] We include analyst forecasts as of the fourth month of the year to ensure that the information from the previous fiscal year's annual report (10-K) has been released and incorporated into the forecasts.

[7] We note that Eisdorfer (2008) also includes variables to capture the annual default spread, annual interest rate, and a recession dummy. We do not include these variables in our model because we include year fixed effects.

a given firm are associated with differences in the level of working capital accruals. We cluster the standard errors by firm and year.

To compare the relation between working capital accruals and uncertainty with the relation between investment and uncertainty examined in prior research, we use a similar regression model with growth in long-term net operating assets as the dependent variable:

$$GrLTNOA_{i,t} = \alpha + \beta_1\, UNCERTAINTY_{i,t} + \beta_2\, CFO_{i,t} + \beta_3\, LAGCFO_{i,t} + \beta_4\, ANNRET_{i,t} + \beta_5\, LAGANNRET_{i,t} + \beta_6\, BTM_{i,t} + \beta_7\, SIZE_{i,t} + \beta_8\, LEV_{i,t} + \varepsilon_{i,t} \quad (2)$$

where *GrLTNOA* is defined as growth in net operating assets less working capital accruals and depreciation and amortization expense, scaled by average total assets.[8]

In our tests of H3 regarding systematic relations between uncertainty and normal and abnormal accruals, we rely on extant abnormal accruals models. Following prior literature, we disaggregate *ΔWIC* into 'Normal' and 'Abnormal' components using models which we estimate for each industry-year grouping. The 'Normal' component is calculated as the fitted value from the regression, and the 'Abnormal' component is the residual. The six models that we estimate are as follows:

*(1)ΔWIC=1/AT+(Δsales-ΔAR)+ROA;*

*(2)ΔWIC=1/AT+(Δsales-ΔAR)+LagΔWIC+ROA;*

*(3)ΔWIC=1/AT+(Δsales-ΔAR)+LagΔWIC+GR_Sales+ROA;*

*(4)ΔWIC=1/AT+(Δsales-ΔAR)+PPE+ROA;*

*(5)ΔWIC=1/AT+(Δsales-ΔAR)+PPE+LagΔWIC+ROA;*

*(6)ΔWIC=1/AT+(Δsales-ΔAR)+PPE+LagΔWIC+GR_Sales+ROA*.

[8] We note that the results are qualitatively similar if we exclude depreciation and amortization expense, consistent with Fairfield et al. (2003).

We define the variables used in these models as follows: *1/AT* is one divided by the average total assets; *Δsales* is the change in sales (*SALE*) from the previous year to the current year scaled by average total assets; *ROA* is the operating income after depreciation (*OIADP*) divided by average total assets; *GR_Sales* is the change in sales (*SALE*) from the current year to next year scaled by current sales; *PPE* is the end of year property, plant and equipment (*PPENT*), scaled by average total assets.

The models are based on the models examined in Dechow, Richardson and Tuna (2003). They reflect variations of the modified Jones (1991) model with the exception that we examine working capital accruals, i.e. operating accruals excluding depreciation expense. Each of the models includes firm size and growth in sales less growth in accounts receivable (Dechow et al 1995). The models also control for firm performance (Kothari, Leone and Wasley, 2005). The models also include lagged working capital accruals, property, plant and equipment, percentage sales growth, or a combination of these additional variables. Model (6) includes all the variables to estimate normal accruals, reflecting the most comprehensive model of accruals. Each of the models is estimated using annual, cross-sectional regressions within four-digit *SIC* codes.

*3.2 Sample and descriptive statistics*

Table 1 provides the details of our sample selection. Our sample begins with all observations on Compustat from 1965 to 2010 that meet the data requirements for the dependent and explanatory variables. This leads to 181,064 firm-year observations. We delete 48,512 firm-year observations that do not have CRSP data available. We also delete 6,296 observations that are not U.S. corporations or that have other than ordinary common stock. We exclude 5,870 (138) firm-year observations that do not have data to calculate size or book to market (Z-score) at the beginning of the fiscal year. Finally, we delete 7 (35) observations that do not have returns (volatility) measures available during the year. This leads to 120,206 firm-year observations for our analyses of uncertainty that are based on return volatility measures. We delete an additional 66,196 observations that do not have at least two analyst forecasts to result in 54,010 firm-year observations for our analyses of uncertainty that are based on analyst dispersion measures. We winsorize the remaining observations at the first and 99$^{th}$ percentiles to control for extreme observations.

[Please place Table 1 about here]

The Appendix presents the detailed variable definitions. Table 2 presents the descriptive statistics for our measures of uncertainty, working capital accruals, growth in long-term net operating assets, the components of working capital accruals, and the control variables. Panel A reports the statistics on the variables. The mean (median) total volatility is 0.0359 (0.0305) and the mean (median) industry volatility is 0.0168 (0.0142). The mean (median) analyst forecast dispersion is 0.1740 (0.0571). Consistent with prior research, the mean (median) of working capital accruals of 0.0143 (0.0090) is positive. The mean (median) growth in long-term net operating assets is 0.0394 (0.0181), suggesting positive long-term investment over the sample period.

With respect to the other variables in the model, we find a mean (median) cash flow from operations of 0.0783 (0.1100) and a mean (median) annual stock return of 0.1578 (0.0575). The descriptive statistics also suggest that the mean (median) operating cycle is 153.5 (117.3) days.

Panel B reports the Spearman Rank (Pearson) correlation coefficients above (below) the diagonal between the variables. We find that total volatility and industry volatility are positively correlated (0.390 Spearman; 0.380 Pearson), suggesting that these variables capture similar dimensions of uncertainty. We find a positive Spearman (Pearson) correlation of 0.337 (0.251) between total volatility and analyst forecast dispersion, suggesting that volatility and analyst dispersion also capture some similarity in uncertainty. We find that both working capital accruals and growth in long-term net operating assets exhibit negative correlations with total volatility, industry volatility, and analyst forecast dispersion. We also find that each of the components of working capital accruals exhibit negative correlations with each of the uncertainty measures. Consistent with the finance literature and our assertions, these univariate findings provide initial support for negative associations between uncertainty and working capital accruals and long-term investment.

[please place Table 2 about here]

## 4. Empirical results

### *4.1 Test of hypothesis H1*

Table 3 provides the results from multivariate analyses to test Hypothesis H1 that working capital accruals are negatively associated with uncertainty using equation (1).[9] The first, second, and third set of analyses reports the results using total volatility, industry volatility, and analyst dispersion, respectively. For comparison with prior research on investment under uncertainty, within each set of analyses, we first report the results for working capital accruals and then for growth in long-term investment.

First turning to the relation between working capital accruals and uncertainty, we find an adjusted $R^2$ of 0.535 when total volatility, 0.530 when industry volatility, and 0.584 when analyst dispersion are used as proxies for uncertainty.  For all three measures of uncertainty, we find

[9] We also examined the relation between operating accruals and uncertainty. In untabulated results, we find a significant negative relation between operating accruals and uncertainty.

significant positive coefficients on *LAGCFO*, *ANNRET* and *LAGANNRET*, which is consistent with prior research on investment behavior (Eisdorfer, 2008; Hayashi, 1982). This suggests that firms invest more in working capital accruals when they experience greater prior cash flow performance and greater current and prior stock return performance. We also find a significant negative coefficient on *CFO*, suggesting that companies have smaller working capital accruals when they experience larger current cash flows from operations. This finding is consistent with the findings in prior research on accruals (e.g., Fairfield et. al., 2003). We find a significant negative coefficient on *BTM*, which is consistent with prior research on investment behavior (Eisdorfer, 2008) and suggests that firms exhibit greater working capital investment when they experience higher expected growth. We find a significant positive coefficient on *SIZE*, which is consistent with Eisdorfer (2008). Finally, we find a significant negative coefficient on *LEV* and working capital accruals, suggesting that companies invest less in working capital accruals in periods in which their leverage is higher.

The first column in Table 3 provides the results with total volatility included in the model as a proxy for uncertainty. Consistent with our hypothesis, we find a negative coefficient of -0.1451 on *TOTVOL* which is significant at the one percent significance level. In column (3), we present the results with industry volatility included as the proxy for uncertainty. Again, consistent with our first hypothesis, we find a negative coefficient of -0.0417 on *INDVOL*, which is significant at the one percent significance level. Finally, column (5) presents the results when analyst forecast dispersion is included as the measure of uncertainty. We find a coefficient of -0.0567 on *DISPERSION*, which is significant at the one percent level. The results, therefore, provide strong evidence to support our first hypothesis that there is a negative relation between working capital accruals and the level of uncertainty.

For comparison to prior research on investment under uncertainty, we also report the results with growth in long-term net operating assets as the proxy for investment. Consistent with the prior research, we find a significant negative relation between total volatility, industry volatility, and analyst dispersion and growth in long-term net operating assets. We also find that the relation is the same relative magnitude as the relation between uncertainty and working capital accruals. This provides support for the theory that uncertainty leads to lower investment and for the notion that working capital accruals at least partially reflect investment decisions.

[please place Table 3 about here]

In order to provide greater insight into the sources of the negative relation between working capital accruals and uncertainty, in Table 4, we present results of regression analyses in which we examine the components of $\Delta$*WIC* as the dependent variables. Table 4 provides the regression results when growth in working capital is further disaggregated into growth in accounts receivables ($\Delta$*AR*), growth in inventory ($\Delta$*INV*), growth in accounts payable ($\Delta$*AP*), growth in other current assets ($\Delta$*OTHERCA*), and growth in other current liabilities ($\Delta$*OTHERCL*). Each dependent and independent variable is standardized so that the coefficients can be compared across regressions. Panel A, Panel B, and Panel C reports the results with *TOTVOL*, *INDVOL*, and *DISPERSION* as the proxy for uncertainty, respectively. We find a negative relation between the asset components (inventory, accounts receivable, other current assets) and between the liability components (accounts payable, other current liabilities) of working capital accruals and uncertainty. This suggests that changes in current liabilities do not behave in an opposite fashion compared to assets with respect to uncertainty, because investment decisions and growth in the balance sheet are likely to affect current liabilities also. We also find that the relation is strongest between $\Delta$*AR* and uncertainty, and then between $\Delta$*INV* and uncertainty when both *TOTVOL* and *INDVOL* are used as proxies for uncertainty. The relatively lower association between uncertainty and other current assets suggest that these items are less likely to reflect investment. The overall results are consistent with the investment perspective of accruals and suggest that the relation between working capital accruals and uncertainty is driven by the level of inventory and accounts receivables. Notably, when *DISPERSION* is used as the proxy for uncertainty, the differences in the relations across the components are less pronounced.

[please place Table 4 about here]

In untabulated analyses, we also investigated whether the relation between uncertainty and working capital accruals is driven by estimated allowance accounts included within the working capital accounts. For example, the negative relation between uncertainty and changes in accounts receivables ($\Delta$*AR*) might not be due to firms granting less credit to customers but may instead be due to firms estimating a greater allowance for bad debts during periods of uncertainty. To address this possibility, we first separate $\Delta$*AR* into the change in allowance for doubtful accounts ($\Delta$*ADD*) and the change in gross accounts receivables ($\Delta$*GAR*). We find that for companies with non-missing $\Delta$*ADD*, the mean (median) $\Delta$*ADD* is 4.1 (1.6) percent of the mean (median) $\Delta$*GAR*, suggesting that the estimated allowance is a minor portion of accounts receivables and, therefore, working capital accruals.

Second, in untabulated analyses, we examine the relation between uncertainty and $\Delta$*AR* as well as $\Delta$*GAR* to assess whether the relations differ. We find that the relation between uncertainty is similar for $\Delta$*GAR* and $\Delta$*AR*. The Pearson (Spearman) correlation between $\Delta$*GAR* and *TOTVOL*, *IVOL*, and *DISPERION* is -0.1058 (-0.0978), -0.1040 (-0.0921) and -0.1119 (-0.1715), respectively which is similar to the correlations for $\Delta$*AR* reported in Table 2. Finally, in untabulated regression analyses similar to those reported in Table 4, we find a significant coefficient of -0.4748 on *TOTVOL* and -0.0126 on *DISPERSION* when (unstandardized) Δ*GAR* is the dependent variable and a significant coefficient of -0.4424 on *TOTVOL* and -0.0109 on *DISPERSION* when (unstandardized) Δ*AR* is the dependent variable. These results suggest that the negative relation between the change in accounts receivable and uncertainty is not driven by changes in the allowance for doubtful accounts.

*4.2 Test of hypothesis H2*

Our second hypothesis predicts that the sensitivity of working capital accruals to uncertainty is increasing in the length of the firm's operating cycle. To provide insight into the validity of this prediction, Table 5 presents the coefficient on uncertainty when Δ*WIC* is regressed on each uncertainty proxy and the control variables by operating cycle quintile. The results are reported when *TOTVOL*, *INDVOL*, and *DISPERSION* are used as the uncertainty proxy, respectively. Within each set of results, the first column reports the coefficient on the uncertainty measure, the second column reports the t-statistic for the coefficient, and the third column reports the adjusted R-squared for the regression. We exclude the coefficients on the other variables in the regression for brevity. In addition to reporting the relation between uncertainty and Δ*WIC*, we report the relation for each of the working capital accrual components.

We find that, for each measure of uncertainty, the coefficient on the uncertainty proxy generally decreases across the operating cycle quintiles for growth in working capital as well as for growth in accounts receivable, growth in inventory, and growth in accounts payable. For example, for total working capital accruals, the coefficient on *TOTVOL* decreases from -0.0566 for the lowest to -0.2124 for the highest operating cycle quintile and the coefficient on *INDVOL* decreases from -0.0272 for the lowest to -0.0648 for the highest operating cycle quintile.

Similarly, the coefficient on *DISPERSION* decreases from -0.0225 to -0.0767 across the quintiles based on the firm's operating cycle. These results provide strong support for our second hypothesis that the negative association between working capital accruals and uncertainty increases as the operating cycle lengthens.

The results for the components of working capital suggest that the influence of the length of the operating cycle is generally most pronounced for the change in accounts receivables and the change in inventory than for the other components. This finding is consistent with these components being more likely to reflect investment decisions and suggests that the relation between working capital accruals and uncertainty depends on the components of working capital as well as the length of the operating cycle.

[please place Table 5 about here]

*4.3 Test of hypothesis H3*

Our third hypothesis predicts a negative relation between abnormal accruals and uncertainty and that this relation is more pronounced for firms with longer operating cycles. That is, we examine whether abnormal accruals, a widely used proxy for earnings management, are systematically related to the uncertainty faced by the firm. We decompose accruals into their normal and abnormal components and examine the relation of each individual component with uncertainty. We note at the outset that prior literature expresses concern that standard abnormal accrual methodologies may be misspecified and assume a stationary accruals generating process; as a result, they may produce poor proxies for earnings management (e.g. McNichols, 2000; Gerakos, 2012; Ball, 2013). We use the standard methodologies found in the literature to decompose accruals into both the normal and abnormal components and examine the relations to these components of accruals and uncertainty.

Table 6 presents the results of regressions of normal and abnormal accruals on uncertainty and control variables. To conserve space, for each regression we report only the coefficient and t-statistic on the uncertainty proxy (since we are interested in whether normal and abnormal accruals are associated with uncertainty). The regression adjusted R-squared is also reported. We run a total of 36 regressions, since we have six abnormal accrual models, two accrual components (normal and abnormal), and three uncertainty proxies (total return volatility, industry volatility, and analyst forecast dispersion). To facilitate coefficient comparisons, we standardize each variable in these regressions. We also report the difference in uncertainty coefficients across regressions.

Two main results emerge. First, regardless of the accrual decomposition and uncertainty proxy, there is a negative and statistically significant relation between the accrual measure and uncertainty. That is, we find that uncertainty is significantly negatively associated with *both* normal and abnormal accruals. Second, there is no systematic evidence indicating that the abnormal accrual-uncertainty relation is stronger than the normal accrual-uncertainty relation. For each pair of regressions, we compute the difference in uncertainty coefficients across the normal and abnormal accruals regressions. When the uncertainty proxy is total return volatility, the abnormal accrual-uncertainty relation is stronger than the normal accrual-uncertainty relation. However, this flips when using industry volatility and analyst forecast dispersion as the uncertainty proxy: when industry volatility or analyst forecast dispersion is the uncertainty proxy, the abnormal accrual-uncertainty relation is weaker than the normal accrual-uncertainty relation. In other words, we do not find systematic evidence that the negative accrual-uncertainty relation is driven by the normal or the abnormal component of accruals.

To summarize, the results of our tests suggest that proxies for earnings management are systematically associated with the level of uncertainty faced by the firm. Our results tie in neatly with the predictions of the theoretical investment uncertainty literature that both normal and abnormal accruals are negatively associated with the level of uncertainty. These results suggest that earnings management proxies are misspecified and that researchers should take into account the level of uncertainty faced by the firm when calculating abnormal accruals.

[please place Table 6 here]

Our third hypothesis also predicts that the negative relation between uncertainty and both normal and abnormal accruals is increasing in the firm's operating cycle. For this analysis, we rely on the most comprehensive abnormal accruals model and report the relation between uncertainty and the accruals measure by operating cycle quintile. The results are reported in Table 7. We report the results for normal accruals in panel A and abnormal accruals in panel B. Within each panel, we report the results for uncertainty proxied by total volatility, industry volatility, and analyst dispersion, respectively.

Consistent with our hypothesis, we find that the negative coefficient on *TOTVOL* is exacerbated as the operating cycle lengthens for both normal and abnormal accruals. We find a significant negative coefficient on *TOTVOL* for explaining abnormal accruals for each of the quintiles and that the coefficient for the longest quintile is three times that for the shortest quintile. When uncertainty is captured by *INDVOL*, we also find a generally increasing coefficient on uncertainty as the operating cycle lengthens for explaining abnormal accruals. In addition, the coefficient on *INDVOL* is significant for the highest two operating cycle quintiles.

When *DISPERSION* is used to proxy for uncertainty, we find an increase in the coefficients as the operating cycle lengthens and that the coefficient is significant in all but the lowest operating cycle quintile.

These results suggest that abnormal accruals models are systematically biased given the level of uncertainty faced by the firm, and that the bias is more pronounced the longer the firm's operating cycle. The findings suggest that research that relies on abnormal accrual models to proxy for earnings management should consider the negative relation between abnormal accruals and the level of uncertainty, the components of working capital accruals that comprise accruals, and the firm's operating cycle to remove systematic biases from the abnormal accruals measures that are associated with accruals as a form of investment.

[please place Table7 here]

Our hypotheses are based on the notion that uncertainty drives the level of working capital accruals rather than the level of working capital accruals driving uncertainty. We address the problem of endogenetiy in a number of ways. First, we include firm fixed effects in the regressions to remove firm-level correlated omitted variables that are invariant over the sample period. This has the added benefit of providing insight into the behavior of accruals vis-a-vis uncertainty across time for a given firm. Second, we include industry volatility in our tests since a firm's level of accruals are unlikely to affect the volatility of stock returns for the industry. Third, we highlight that if a higher level of accruals leads to a higher level of uncertainty, then the direction of the relation would be positive instead of negative, as hypothesized in the investment under uncertainty literature and documented above.

Lastly, we also address the possibility of endogeneity bias by performing analyses where lagged total stock return volatility (*LAGTOTVOL*) is used as the proxy for uncertainty. As such, it can be considered predetermined (i.e. orthogonal to the current error term), with the associated coefficient consistently estimated in a large sample (Hayashi, 2000, p.109).[10] We find results (untabulated) that are consistent with those reported in the tables. Specifically, when we run equation (1), we find a negative coefficient on *LAGTOTVOL* that is significant at the one percent level. This indicates that the accrual-uncertainty relation is not driven by a correlated omitted variable that is contemporaneously associated with both accruals and uncertainty. Second, we find a monotonically decreasing coefficient on *LAGTOTVOL* for explaining $\Delta WIC$ across operating cycle quintiles. These results are consistent with those reported in the tables and suggest that our results are not driven by endogeneity bias.

## 5. Conclusions

In the real world, firms cannot perfectly forecast the future. The business environment is continually evolving, and information arrives gradually. Firms must therefore make investment decisions in the face of uncertainty. In this study, we view working capital accruals as a form of investment and examine whether theories in finance on investment under uncertainty are informative about the relation between accruals and uncertainty. In particular, we are guided by the rich extant literature in economics and finance on investment under uncertainty (e.g. Bernanke, 1983; McDonald and Siegel, 1986; Ingersoll and Ross, 1992; Dixit, 1992; Dixit and Pindyck, 1994; and Schwartz and Trigeorgis, 2004). To our knowledge, we are the first to link the literature on accounting accruals with the literature on investment under uncertainty.

The theory predicts a negative relation between investment and uncertainty because firms become more cautious about investing when uncertainty is higher. Consistent with this, we

[10] Hennessy et al. (2007) use a similar line of reasoning.

document a significant negative relation between working capital accruals and uncertainty. Furthermore, we find that inventory and accounts receivable have the highest sensitivity to uncertainty and that the negative relation between accounts receivables and uncertainty is not driven by changes in the allowance for bad debts. These results support the view that working capital accruals reflect investment decisions and that these decisions are associated with the level uncertainty faced by the firm. We also predict and find that the negative relation between working capital accruals and uncertainty is more pronounced for firms with longer operating cycles.

We believe that our findings provide important contributions to the accounting literature on accruals and to the economics and finance literature on investment and uncertainty. Specifically, we believe that our findings are an important initial step in understanding the factors that drive a firm's level of accruals. Given that accruals are central to the accounting discipline, understanding the factors that shape the level of a firm's accruals is of great importance.

Furthermore, we believe that viewing accruals as a form of investment and taking into account the role of uncertainty in understanding accruals has the potential to provide insight into when the extant abnormal accrual models are likely to be systematically biased. As recent research points out, extant approaches to modeling expected accruals are generally ad hoc, supported by little theory, and assume stationarity in the accrual process over time and within industries (e.g. McNichols, 2000; Gerakos, 2012; Ball, 2013, Owens, et al., 2013). Exploiting the fact that accruals are a form of investment - and drawing on the rich theory provided by the investment under uncertainty literature – can aid researchers in removing these biases from the earnings management proxies.

Our findings also contribute to the economics and finance literature on investment under uncertainty. This literature has focused on firms' long-term investment decisions. In contrast, accrual-based investment has received little attention in this literature. We believe that distinguishing between accruals and long-term investment provides a fertile testing ground for assessing the validity of various theories that have been proposed in the literature on investment under uncertainty.

A variety of other avenues for future research remain. In particular, future research could examine other measures of uncertainty to determine how different aspects of investment and accruals relate to uncertainty. For example, research could distinguish between shorter term and longer term measures of uncertainty. Incorporating other aspects of the economic environment to further improve models of expected accruals would also be fruitful. We hope to shed light on some of these aspects in future work.

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## Appendix

### Variable definitions

| Variable | Definition of Variable |
|---|---|
| | *Uncertainty Variables:* |
| *TOTVOL* | Stock return volatility, calculated as the standard deviation of daily returns over the current fiscal year for the firm's stock. |
| *LAGTOTVOL* | Lagged return volatility, calculated as the standard deviation of daily returns over the prior fiscal year for the firm's stock. |
| *INDVOL* | Industry stock return volatility, calculated as the standard deviation of daily returns over the current fiscal year for an equal-weighted portfolio of stocks in the same 4-digit SIC code. |
| *DISPERSION* | Analyst earnings forecast dispersion, calculated as of the fourth month of the fiscal year. *DISPERSION* is calculated as the standard deviation of analyst earnings estimates for the current fiscal year divided by the absolute value of the mean of the same estimates. |
| | *Accrual/Investment Variables:* |
| *ΔAR* | Change in accounts receivable *(RECT)*, scaled by average total assets. |
| *ΔINV* | Change in inventories *(INVT)*, scaled by average total assets. |
| *ΔAP* | Change in accounts payable *(AP)*, scaled by average total assets. |
| *ΔOTHERCA* | Change in other current assets *(ACO)*, scaled by average total assets. |
| *ΔOTHERNCA* | Change in other current liabilities *(LCO)*, scaled by average total assets. |
| *ΔWIC* | Growth (net change) in operating working capital, scaled by average total assets: *ΔWIC=(ΔAR+ ΔINV+ ΔOTHERCA)-(ΔAP+ ΔOTHERCL).* |
| *GrLTNOA* | Growth in long-term net operating assets, i.e. growth in net operating assets less growth in working capital, scaled by average total assets. *GrLTNOA* is defined following Fairfield et. al. (2003) as *ΔPPE+ΔINTANG+ΔAO-ΔLO* and is scaled by average total assets |
| | *Control Variables:* |
| *CFO* | Cash flow from operations, as defined in Fairfield et. al. (2003), or operating income less accruals, scaled by average total assets. Operating income is defined as operating income after depreciation and amortization *(OIADP)*. Formally, *CFO=(OIADP/avg. tot. assets)-ACC.* |
| *LAGCFO* | *CFO* for the prior fiscal year. |

| | |
|---|---|
| *ANNRET* | The current fiscal year return for the firm's stock, calculated by compounding monthly *CRSP* returns. |
| *LAGANNRET* | The prior fiscal year's return for the firm's stock. |
| *BTM* | Book-to-market ratio, calculated at the beginning of the fiscal year. *BTM* is calculated as the ratio of equity book value (*CEQ*) to the equity market value, per *CRSP*. |
| *SIZE* | Natural log of the market value of equity for the firm at the beginning of the fiscal year. |
| *LEV* | Leverage at the beginning of the fiscal year, calculated as the book value of total debt *(DLC+DLTT)* divided by the book value of total assets *(AT)*. |
| | *Horizon Variables:* |
| *OPERCYCLE* | Operating cycle, as defined in Dechow (1994), or average accounts receivable divided by (sales/360), plus average inventory divided by (cost of goods sold/360). |
| *AR_DAYS* | Accounts receivable days, or average accounts receivable divided by (sales/360). |
| *INV_DAYS* | Inventory days, or average inventory divided by (cost of goods sold/360). |
| *AP_DAYS* | Accounts payable days, or average accounts payable divided by (purchases/360), where purchases is cost of good sold plus *ΔINV*. |

## Table 1
## Sample selection

| | SAMPLE Reductions | Cumulative SAMPLE Total |
|---|---|---|
| Observations that meet *COMPUSTAT* requirements (i.e., Fairfield et. al. 2003 accrual variable requirements) *[1965 - 2010]* | 181,064 | |
| No Link to CRSP | (48,512) | 132,552 |
| Include Only Ordinary Common Shares in U.S. Incorporated Companies (*SHRCD='10' or '11'*) | (6,296) | 126,256 |
| SIZE, BTM at beginning of FY not available | (5,870) | 120,386 |
| Components to calculate Z_SCORE at beginning of year not available | (138) | 120,248 |
| Returns Unvailable in Monthly Stock File | (7) | 120,241 |
| Volatility Measures Not Available | (35) | 120,206 |
| | | **120,206** |
| Total sample for analyses where return volatility proxies for uncertainty | **120,206** | |
| Require at least 2 analyst forecasts | (66,196) | **54,010** |
| Total sample for analyses where analyst dispersion proxies for uncertainty | **54,010** | |

**Notes:** This table presents an overview of the sample selection procedure. The table begins with the total number of observations on Compustat from 1965 to 2010 that meet the data requirements for the dependent and explanatory variables. We then narrow the population to observations that meet the CRSP data requirements for U.S. ordinary common share firms. This results in the total sample for analyses where return volatility proxies for uncertainty. Next, we require at least two analyst forecasts for each firm-year observations. This yields the total sample for analyses where analyst dispersion proxies for uncertainty.

**Table 2**
**Descriptive statistics and correlations**

***Panel A: Descriptive statistics***

| | *n* | Mean | Median | First Quartile | Third Quartile | Min | Max | Std Dev |
|---|---|---|---|---|---|---|---|---|
| ***Uncertainty Variables*** | | | | | | | | |
| *TOTVOL* | *120,206* | 0.0359 | 0.0305 | 0.0208 | 0.0448 | 0.0088 | 0.1205 | 0.0214 |
| *INDVOL* | *120,160* | 0.0168 | 0.0142 | 0.0104 | 0.0202 | 0.0041 | 0.0588 | 0.0098 |
| *DISPERSION* | *54,010* | 0.1740 | 0.0571 | 0.0265 | 0.1429 | 0.0000 | 2.7778 | 0.3829 |
| ***Accrual/Investment Variables*** | | | | | | | | |
| *ΔAR* | *120,206* | 0.0176 | 0.0097 | -0.0081 | 0.0407 | -0.2126 | 0.2858 | 0.0691 |
| *ΔINV* | *120,206* | 0.0133 | 0.0014 | -0.0032 | 0.0282 | -0.1895 | 0.2505 | 0.0597 |
| *ΔAP* | *120,206* | 0.0095 | 0.0050 | -0.0071 | 0.0226 | -0.1310 | 0.1856 | 0.0431 |
| *ΔOTHERCA* | *120,206* | 0.0031 | 0.0012 | -0.0023 | 0.0076 | -0.0782 | 0.0937 | 0.0201 |
| *ΔOTHERCL* | *120,206* | 0.0102 | 0.0054 | -0.0040 | 0.0211 | -0.1242 | 0.1789 | 0.0396 |
| *ΔWIC* | *120,206* | 0.0143 | 0.0090 | -0.0234 | 0.0520 | -0.3135 | 0.3383 | 0.0939 |
| *GrLTNOA* | *120,206* | 0.0394 | 0.0181 | -0.0150 | 0.0740 | -0.4079 | 0.6495 | 0.1400 |
| ***Control Variables*** | | | | | | | | |
| *CFO* | *120,206* | 0.0783 | 0.1100 | 0.0275 | 0.1787 | -0.8076 | 0.4613 | 0.1918 |
| *LAGCFO* | *120,206* | 0.0758 | 0.1099 | 0.0248 | 0.1796 | -0.8425 | 0.4691 | 0.1989 |
| *ANNRET* | *120,206* | 0.1579 | 0.0575 | -0.2333 | 0.3808 | -0.8286 | 3.1250 | 0.6398 |
| *LAGANNRET* | *120,206* | 0.1540 | 0.0456 | -0.2273 | 0.3675 | -0.8088 | 3.1150 | 0.6311 |
| *BTM* | *120,206* | 0.8031 | 0.6081 | 0.3263 | 1.0558 | -0.2956 | 3.9096 | 0.7182 |
| *SIZE* | *120,206* | 4.5165 | 4.3518 | 2.8669 | 6.0223 | 0.2889 | 10.0314 | 2.1650 |
| *LEV* | *120,206* | 0.2345 | 0.2137 | 0.0559 | 0.3623 | 0.0000 | 0.8337 | 0.1962 |
| ***Horizon Variables*** | | | | | | | | |
| *OPERCYCLE* | *119,167* | 153.5 | 117.3 | 73.0 | 178.5 | 7.0 | 1,269.5 | 163.0 |
| *AR_DAYS* | *119,303* | 69.5 | 53.7 | 36.6 | 73.9 | 0.1 | 708.8 | 87.1 |
| *INV_DAYS* | *119,364* | 77.9 | 58.5 | 14.7 | 108.3 | 0.0 | 539.2 | 87.4 |
| *AP_DAYS* | *119,524* | 58.8 | 35.1 | 23.0 | 53.6 | 2.7 | 759.2 | 98.0 |

**Notes:** This panel presents descriptive statistics. We provide variable definitions in the Appendix. We winsorize each variable at the 1 percent and 99 percent levels.

## Table 2 (Continued)

### *Panel B: Univariate correlations (Spearman coefficients in the upper triangle; Pearson coefficients in the lower triangle)*

| Variable | *(1)* | *(2)* | *(3)* | *(4)* | *(5)* | *(6)* | *(7)* | *(8)* | *(9)* | *(10)* | *(11)* | *(12)* | *(13)* | *(14)* | *(15)* | *(16)* | *(17)* | *(18)* | *(19)* | *(20)* | *(21)* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *(1) TOTVOL* | *1* | 0.390 | 0.340 | -0.080 | -0.110 | -0.060 | -0.030 | -0.040 | -0.070 | -0.170 | -0.330 | -0.360 | -0.210 | -0.260 | -0.110 | -0.420 | -0.060 | 0.100 | 0.160 | -0.010 | 0.160 |
| *(2) INDVOL* | 0.380 | *1* | 0.080 | -0.060 | -0.040 | -0.050 | -0.010 | -0.040 | -0.030 | -0.090 | -0.070 | -0.070 | -0.110 | -0.110 | -0.060 | 0.000 | -0.020 | 0.040 | 0.020 | 0.020 | 0.010 |
| *(3) DISPERSION* | 0.250 | 0.090 | *1* | -0.150 | -0.170 | -0.090 | -0.100 | -0.080 | -0.150 | -0.190 | -0.310 | -0.320 | -0.080 | -0.230 | 0.200 | -0.260 | 0.030 | 0.030 | 0.080 | -0.010 | 0.090 |
| *(4) ΔAR* | -0.090 | -0.060 | -0.100 | *1* | 0.320 | 0.440 | 0.150 | 0.330 | 0.560 | 0.300 | -0.110 | 0.080 | 0.170 | 0.180 | -0.130 | 0.010 | -0.080 | 0.010 | 0.060 | -0.020 | -0.050 |
| *(5) ΔINV* | -0.100 | -0.050 | -0.110 | 0.310 | *1* | 0.380 | 0.130 | 0.210 | 0.560 | 0.300 | -0.130 | 0.090 | 0.090 | 0.180 | -0.080 | 0.010 | -0.060 | 0.080 | -0.100 | 0.180 | -0.100 |
| *(6) ΔAP* | -0.060 | -0.040 | -0.070 | 0.470 | 0.420 | *1* | 0.150 | 0.200 | 0.090 | 0.300 | 0.020 | 0.040 | 0.120 | 0.130 | -0.070 | 0.000 | -0.040 | -0.040 | -0.050 | -0.010 | 0.020 |
| *(7) ΔOTHERCA* | -0.040 | -0.020 | -0.070 | 0.100 | 0.070 | 0.110 | *1* | 0.240 | 0.230 | 0.180 | -0.020 | 0.090 | 0.060 | 0.110 | -0.120 | 0.060 | -0.070 | -0.030 | -0.020 | -0.010 | -0.030 |
| *(8) ΔOTHERCL* | -0.030 | -0.040 | -0.060 | 0.320 | 0.180 | 0.170 | 0.240 | *1* | -0.050 | 0.250 | 0.130 | 0.030 | 0.130 | 0.110 | -0.110 | 0.050 | -0.080 | -0.050 | -0.020 | -0.030 | -0.070 |
| *(9) ΔWIC* | -0.100 | -0.050 | -0.100 | 0.600 | 0.620 | 0.090 | 0.230 | -0.120 | *1* | 0.180 | -0.330 | 0.100 | 0.080 | 0.150 | -0.090 | -0.020 | -0.060 | 0.090 | 0.010 | 0.110 | -0.090 |
| *(10) GrLTNOA* | -0.120 | -0.060 | -0.110 | 0.260 | 0.220 | 0.270 | 0.120 | 0.240 | 0.120 | *1* | 0.130 | 0.180 | 0.090 | 0.220 | -0.190 | 0.140 | -0.070 | -0.110 | -0.080 | -0.070 | -0.030 |
| *(11) CFO* | -0.370 | -0.060 | -0.180 | -0.140 | -0.160 | -0.020 | -0.040 | 0.090 | -0.290 | 0.080 | *1* | 0.570 | 0.230 | 0.150 | -0.010 | 0.210 | 0.080 | -0.190 | -0.210 | -0.050 | -0.140 |
| *(12) LAGCFO* | -0.380 | -0.060 | -0.180 | 0.030 | 0.040 | -0.010 | 0.050 | -0.030 | 0.090 | 0.080 | 0.690 | *1* | 0.140 | 0.210 | -0.040 | 0.230 | -0.020 | -0.210 | -0.220 | -0.070 | -0.160 |
| *(13) ANNRET* | -0.040 | -0.050 | -0.020 | 0.160 | 0.090 | 0.110 | 0.050 | 0.110 | 0.090 | 0.080 | 0.130 | 0.060 | *1* | 0.000 | 0.170 | -0.020 | 0.010 | -0.060 | -0.070 | -0.020 | -0.060 |
| *(14) LAGANNRET* | -0.140 | -0.060 | -0.120 | 0.140 | 0.150 | 0.110 | 0.090 | 0.090 | 0.130 | 0.170 | 0.070 | 0.110 | -0.050 | *1* | -0.240 | 0.210 | -0.050 | -0.060 | -0.070 | -0.030 | -0.070 |
| *(15) BTM* | 0.010 | 0.010 | 0.120 | -0.120 | -0.090 | -0.060 | -0.070 | -0.090 | -0.100 | -0.170 | 0.080 | 0.060 | 0.150 | -0.240 | *1* | -0.360 | 0.110 | 0.060 | -0.050 | 0.120 | -0.140 |
| *(16) SIZE* | -0.390 | -0.030 | -0.160 | 0.000 | -0.010 | -0.010 | 0.040 | 0.030 | -0.010 | 0.080 | 0.180 | 0.200 | -0.090 | 0.130 | -0.390 | *1* | -0.030 | -0.140 | -0.070 | -0.120 | 0.020 |
| *(17) LEV* | 0.000 | 0.020 | 0.040 | -0.080 | -0.070 | -0.050 | -0.050 | -0.070 | -0.060 | -0.060 | 0.100 | 0.020 | 0.010 | -0.060 | 0.060 | -0.040 | *1* | -0.050 | -0.070 | 0.020 | 0.030 |
| *(18) OPERCYCLE* | 0.110 | 0.040 | 0.020 | -0.020 | 0.010 | -0.030 | -0.020 | -0.040 | 0.010 | -0.070 | -0.190 | -0.210 | -0.040 | -0.040 | 0.030 | -0.080 | 0.030 | *1* | 0.590 | 0.780 | 0.310 |
| *(19) AR_DAYS* | 0.110 | 0.030 | 0.020 | 0.020 | -0.070 | -0.010 | -0.020 | -0.020 | -0.030 | -0.050 | -0.180 | -0.190 | -0.030 | -0.020 | -0.020 | -0.020 | 0.020 | 0.750 | *1* | 0.090 | 0.310 |
| *(20) INV_DAYS* | 0.060 | 0.020 | 0.010 | -0.060 | 0.080 | -0.040 | -0.010 | -0.050 | 0.050 | -0.070 | -0.100 | -0.120 | -0.030 | -0.040 | 0.060 | -0.110 | 0.010 | 0.680 | 0.110 | *1* | 0.150 |
| *(21) AP_DAYS* | 0.140 | 0.000 | 0.070 | -0.030 | -0.090 | 0.030 | -0.020 | -0.030 | -0.090 | 0.010 | -0.140 | -0.150 | -0.020 | -0.020 | -0.080 | -0.020 | 0.010 | 0.360 | 0.410 | 0.130 | *1* |

**Notes:** This panel presents univariate correlations. Spearman correlation coefficients are in the upper triangle and Pearson correlation coefficients are in the lower triangle. We provide variable definitions in the Appendix.

# Table 3
## Regression analyses of change in working capital on uncertainty and control variables

| *Dependent Variable:* | *ΔWIC* | | *GrLTNOA* | | *ΔWIC* | | *GrLTNOA* | | *ΔWIC* | | *GrLTNOA* | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | (1) | | (2) | | (3) | | (4) | | (5) | | (6) | |
| | Coef. | *t-stat* | Coef. | *t-stat* | Coef. | *t-stat* | Coef. | *t-stat* | Coef. | *t-stat* | Coef. | *t-stat* |
| ***Uncertainty*** | | | | | | | | | | | | |
| *TOTVOL* | -0.1451 | *-12.12* *** | -0.1223 | *-11.50* *** | | | | | | | | |
| *INDVOL* | | | | | -0.0417 | *-5.42* *** | -0.0266 | *-3.67* *** | | | | |
| *DISPERSION* | | | | | | | | | -0.0567 | *-6.79* *** | -0.0518 | *-5.29* *** |
| ***Other Controls*** | | | | | | | | | | | | |
| *CFO* | -0.9273 | *-37.34* *** | 0.0341 | *3.20* *** | -0.9211 | *-36.37* *** | 0.0392 | *3.60* *** | -0.9734 | *-23.57* *** | 0.0143 | *0.60* |
| *LAGCFO* | 0.3445 | *42.12* *** | -0.0057 | *-0.62* | 0.3505 | *41.82* *** | -0.0006 | *-0.06* | 0.3573 | *22.71* *** | 0.0674 | *4.07* *** |
| *ANNRET* | 0.2272 | *17.68* *** | 0.1170 | *18.35* *** | 0.2315 | *17.03* *** | 0.1206 | *16.11* *** | 0.2037 | *10.35* *** | 0.1103 | *8.68* *** |
| *LAGANNRET* | 0.0884 | *11.80* *** | 0.0938 | *12.33* *** | 0.0916 | *11.28* *** | 0.0963 | *12.71* *** | 0.0919 | *9.38* *** | 0.0935 | *7.56* *** |
| *BTM* | -0.1996 | *-20.65* *** | -0.2077 | *-9.87* *** | -0.2041 | *-21.73* *** | -0.2113 | *-10.07* *** | -0.2748 | *-14.91* *** | -0.3585 | *-11.26* *** |
| *SIZE* | 0.0770 | *3.61* *** | 0.0460 | *1.66* * | 0.1426 | *6.82* *** | 0.1025 | *4.12* *** | 0.1043 | *3.74* *** | 0.0170 | *0.44* |
| *LEV* | -0.0460 | *-5.72* *** | -0.2741 | *-20.83* *** | -0.0572 | *-6.70* *** | -0.2834 | *-21.54* *** | -0.0334 | *-3.18* *** | -0.2854 | *-18.38* *** |
| *Clustered Standard Errors* | *Firm and Year* | | *Firm and Year* | | *Firm and Year* | | *Firm and Year* | | *Firm and Year* | | *Firm and Year* | |
| *Fixed Effects* | *Firm and Year* | | *Firm and Year* | | *Firm and Year* | | *Firm and Year* | | *Firm and Year* | | *Firm and Year* | |
| *Adj. R-Square* | *0.535* | | *0.294* | | *0.530* | | *0.290* | | *0.584* | | *0.342* | |
| *N* | *120,206* | | *120,206* | | *120,160* | | *120,160* | | *54,010* | | *54,010* | |

**Notes:** This table presents the multivariate regression analyses to test Hypothesis H1 that the change in working capital is negatively associated with uncertainty. For comparisons with prior research on investment under uncertainty, within each set of analyses, we first report the results for working capital accruals and then for growth in long-term investment. We consider three alternative uncertainty proxies. All variables are standardized and we provide definitions in the Appendix. We provide variable definitions in the Appendix.

***/**/* represent significance at the 1%, 5%, and 10% levels, respectively, according to two-sided tests.

## Table 4
## Regression analyses to investigate the disaggregation of change in working capital

### *Panel A: Stock return volatility as the uncertainty proxy*

| *Dependent Variable:* | *ΔAR* | | | *ΔINV* | | | *ΔAP* | | | *ΔOTHERCA* | | | *ΔOTHERCL* | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | (1) | | | (2) | | | (3) | | | (4) | | | (5) | | |
| | Coef. | *t-stat* | | Coef. | *t-stat* | | Coef. | *t-stat* | | Coef. | *t-stat* | | Coef. | *t-stat* | |
| ***Uncertainty*** | | | | | | | | | | | | | | | |
| *TOTVOL* | -0.1497 | *-15.74* | *** | -0.1401 | *-12.48* | *** | -0.1082 | *-12.14* | *** | -0.0532 | *-7.27* | *** | -0.0425 | *-4.19* | *** |
| ***Other Controls*** | | | | | | | | | | | | | | | |
| *CFO* | -0.4746 | *-22.17* | *** | -0.5094 | *-16.26* | *** | -0.0537 | *-4.54* | *** | -0.2064 | *-16.68* | *** | 0.2281 | *15.67* | *** |
| *LAGCFO* | 0.1195 | *12.76* | *** | 0.1504 | *12.84* | *** | -0.0189 | *-2.14* | ** | 0.1049 | *10.35* | *** | -0.1591 | *-13.97* | *** |
| *ANNRET* | 0.2441 | *22.65* | *** | 0.1979 | *12.57* | *** | 0.1422 | *15.48* | *** | 0.0943 | *13.86* | *** | 0.1129 | *17.11* | *** |
| *LAGANNRET* | 0.0972 | *12.40* | *** | 0.1018 | *11.78* | *** | 0.0783 | *10.77* | *** | 0.0594 | *11.01* | *** | 0.0606 | *8.87* | *** |
| *BTM* | -0.1483 | *-15.37* | *** | -0.1692 | *-15.86* | *** | -0.0589 | *-7.79* | *** | -0.0258 | *-2.50* | ** | -0.0181 | *-2.92* | *** |
| *SIZE* | 0.0365 | *2.16* | ** | 0.0585 | *3.52* | *** | -0.0290 | *-1.90* | * | 0.1415 | *8.20* | *** | 0.0855 | *5.18* | *** |
| *LEV* | -0.0654 | *-9.21* | *** | -0.1152 | *-12.33* | *** | -0.0932 | *-14.16* | *** | -0.0290 | *-3.88* | *** | -0.0819 | *-12.80* | *** |
| *Clustered Standard Errors* | *Firm and Year* | | | *Firm and Year* | | | *Firm and Year* | | | *Firm and Year* | | | *Firm and Year* | | |
| *Fixed Effects* | *Firm and Year* | | | *Firm and Year* | | | *Firm and Year* | | | *Firm and Year* | | | *Firm and Year* | | |
| *Adj. R-Square* | *0.339* | | | *0.353* | | | *0.206* | | | *0.132* | | | *0.211* | | |
| *N* | *120,206* | | | *120,206* | | | *120,206* | | | *120,206* | | | *120,206* | | |

**Notes:** This table presents the results of multivariate regression analyses in which the components of *ΔWIC* are examined as dependent variables. We present this analysis to provide greater insight into the sources of the relation between the change in working capital and uncertainty. Panel A presents the results where *TOTVOL* is the proxy for uncertainty; Panel B presents the results where *INDVOL* is the proxy for uncertainty; and Panel C presents the results where *INDVOL* is the proxy for uncertainty.

We standardize each of the variables included in these regressions and provide variable definitions in the Appendix.

*/**/*** represent significance at the 10 percent, 5 percent, and 1 percent levels, respectively, according to two-sided tests.

## Table 4 (Continued)

### *Panel B: Industry return volatility as the uncertainty proxy*

| *Dependent Variable:* | *ΔAR* | | | *ΔINV* | | | *ΔAP* | | | *ΔOTHERCA* | | | *ΔOTHERCL* | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | (1) | | | (2) | | | (3) | | | (4) | | | (5) | | |
| | Coef. | *t-stat* | | Coef. | *t-stat* | | Coef. | *t-stat* | | Coef. | *t-stat* | | Coef. | *t-stat* | |
| ***Uncertainty*** | | | | | | | | | | | | | | | |
| *INDVOL* | -0.0456 | *-5.00* | *** | -0.0455 | *-5.76* | *** | -0.0369 | *-5.00* | *** | -0.0081 | *-1.19* | | -0.0115 | *-1.61* | |
| ***Other Controls*** | | | | | | | | | | | | | | | |
| *CFO* | -0.4681 | *-21.48* | *** | -0.5036 | *-15.96* | *** | -0.0491 | *-4.13* | *** | -0.2039 | *-16.63* | *** | 0.2300 | *15.74* | *** |
| *LAGCFO* | 0.1257 | *13.65* | *** | 0.1558 | *13.26* | *** | -0.0150 | *-1.66* | * | 0.1071 | *10.35* | *** | -0.1572 | *-13.87* | *** |
| *ANNRET* | 0.2485 | *21.29* | *** | 0.2021 | *12.33* | *** | 0.1454 | *15.09* | *** | 0.0960 | *13.57* | *** | 0.1142 | *16.85* | *** |
| *LAGANNRET* | 0.1004 | *12.12* | *** | 0.1049 | *11.83* | *** | 0.0808 | *11.06* | *** | 0.0604 | *10.69* | *** | 0.0613 | *9.10* | *** |
| *BTM* | -0.1529 | *-15.97* | *** | -0.1735 | *-16.76* | *** | -0.0621 | *-8.45* | *** | -0.0274 | *-2.66* | *** | -0.0195 | *-3.19* | *** |
| *SIZE* | 0.1037 | *6.13* | *** | 0.1218 | *7.30* | *** | 0.0200 | *1.49* | | 0.1669 | *10.07* | *** | 0.1048 | *7.41* | *** |
| *LEV* | -0.0770 | *-10.43* | *** | -0.1257 | *-12.65* | *** | -0.1014 | *-14.96* | *** | -0.0331 | *-4.42* | *** | -0.0850 | *-13.22* | *** |
| *Clustered Standard Errors* | *Firm and Year* | | | *Firm and Year* | | | *Firm and Year* | | | *Firm and Year* | | | *Firm and Year* | | |
| *Fixed Effects* | *Firm and Year* | | | *Firm and Year* | | | *Firm and Year* | | | *Firm and Year* | | | *Firm and Year* | | |
| *Adj. R-Square* | *0.334* | | | *0.348* | | | *0.203* | | | *0.131* | | | *0.211* | | |
| *N* | *120,160* | | | *120,160* | | | *120,160* | | | *120,160* | | | *120,160* | | |

**Notes:** This table presents the results of multivariate regression analyses in which the components of *ΔWIC* are examined as dependent variables. We present this analysis to provide greater insight into the sources of the relation between the change in working capital and uncertainty. Panel A presents the results where *TOTVOL* is the proxy for uncertainty; Panel B presents the results where *INDVOL* is the proxy for uncertainty; and Panel C presents the results where *INDVOL* is the proxy for uncertainty.

We standardize each of the variables included in these regressions and provide variable definitions in the Appendix.

*/**/*** represent significance at the 10 percent, 5 percent, and 1 percent levels, respectively, according to two-sided tests.

## Table 4 (Continued)

### *Panel C: Analyst dispersion as the uncertainty proxy*

| *Dependent Variable:* | *ΔAR* | | | *ΔINV* | | | *ΔAP* | | | *ΔOTHERCA* | | | *ΔOTHERCL* | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | (1) | | | (2) | | | (3) | | | (4) | | | (5) | | |
| | Coef. | *t-stat* | | Coef. | *t-stat* | | Coef. | *t-stat* | | Coef. | *t-stat* | | Coef. | *t-stat* | |
| ***Uncertainty*** | | | | | | | | | | | | | | | |
| *DISPERSION* | -0.0422 | *-5.90* | *** | -0.0539 | *-7.24* | *** | -0.0226 | *-3.96* | *** | -0.0502 | *-6.55* | *** | -0.0302 | *-3.82* | *** |
| ***Other Controls*** | | | | | | | | | | | | | | | |
| *CFO* | -0.4868 | *-14.74* | *** | -0.4843 | *-12.69* | *** | -0.0078 | *-0.47* | | -0.2945 | *-12.46* | *** | 0.2898 | *13.39* | *** |
| *LAGCFO* | 0.1281 | *10.03* | *** | 0.1559 | *9.65* | *** | 0.0131 | *0.96* | | 0.1938 | *8.70* | *** | -0.1718 | *-9.99* | *** |
| *ANNRET* | 0.2480 | *14.56* | *** | 0.1670 | *8.98* | *** | 0.1501 | *12.76* | *** | 0.1016 | *10.02* | *** | 0.1153 | *12.30* | *** |
| *LAGANNRET* | 0.1074 | *9.51* | *** | 0.0971 | *9.15* | *** | 0.0724 | *8.48* | *** | 0.0624 | *7.13* | *** | 0.0700 | *6.28* | *** |
| *BTM* | -0.2171 | *-15.34* | *** | -0.2424 | *-11.91* | *** | -0.1128 | *-7.97* | *** | -0.0748 | *-3.67* | *** | -0.0404 | *-3.36* | *** |
| *SIZE* | 0.0469 | *2.47* | ** | 0.0292 | *1.40* | | -0.0589 | *-2.69* | *** | 0.1146 | *4.29* | *** | 0.0219 | *0.71* | |
| *LEV* | -0.0835 | *-9.15* | *** | -0.0830 | *-8.58* | *** | -0.0849 | *-9.73* | *** | -0.0333 | *-3.07* | *** | -0.1055 | *-9.08* | *** |
| *Clustered Standard Errors* | *Firm and Year* | | | *Firm and Year* | | | *Firm and Year* | | | *Firm and Year* | | | *Firm and Year* | | |
| *Fixed Effects* | *Firm and Year* | | | *Firm and Year* | | | *Firm and Year* | | | *Firm and Year* | | | *Firm and Year* | | |
| *Adj. R-Square* | *0.411* | | | *0.413* | | | *0.299* | | | *0.181* | | | *0.285* | | |
| *N* | *54,010* | | | *54,010* | | | *54,010* | | | *54,010* | | | *54,010* | | |

**Notes:** This table presents the results of multivariate regression analyses in which the components of *ΔWIC* are examined as dependent variables. We present this analysis to provide greater insight into the sources of the relation between the change in working capital and uncertainty. Panel A presents the results where *TOTVOL* is the proxy for uncertainty; Panel B presents the results where *INDVOL* is the proxy for uncertainty; and Panel C presents the results where *INDVOL* is the proxy for uncertainty.

We standardize each of the variables included in these regressions and provide variable definitions in the Appendix.

*/**/*** represent significance at the 10 percent, 5 percent, and 1 percent levels, respectively, according to two-sided tests.

## Table 5
## Regression analyses of change in working capital and its components on uncertainty by horizon

### *Panel A: Stock return volatility as the uncertainty proxy*

| *Dependent Variable:* | *ΔWIC* | | | *ΔAR* | | | *ΔINV* | | | *ΔAP* | | | *ΔOTHERCA* | | | *ΔOTHERCL* | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Coef. | *t-stat* | R-Sqr | Coef. | *t-stat* | R-Sqr | Coef. | *t-stat* | R-Sqr | Coef. | *t-stat* | R-Sqr | Coef. | *t-stat* | R-Sqr | Coef. | *t-stat* | R-Sqr |
| ***Horizon Quintile*** | | | | | | | | | | | | | | | | | | |
| *1 (Shortest)* | -0.0566 | *-4.52* | 0.552 | -0.0399 | *-3.28* | 0.386 | -0.0038 | *-1.62* | 0.434 | -0.0374 | *-3.42* | 0.370 | -0.0457 | *-2.21* | 0.252 | 0.0006 | *0.03* | 0.374 |
| *2* | -0.0819 | *-4.54* | 0.647 | -0.0934 | *-6.60* | 0.506 | -0.0527 | *-3.56* | 0.424 | -0.0780 | *-5.11* | 0.390 | -0.0618 | *-3.82* | 0.310 | -0.0299 | *-1.33* | 0.417 |
| *3* | -0.1193 | *-7.36* | 0.695 | -0.1072 | *-5.69* | 0.541 | -0.1526 | *-6.30* | 0.489 | -0.1182 | *-5.63* | 0.410 | -0.0344 | *-1.79* | 0.327 | -0.0353 | *-1.91* | 0.424 |
| *4* | -0.1540 | *-7.75* | 0.686 | -0.1510 | *-8.38* | 0.540 | -0.1929 | *-9.10* | 0.538 | -0.1189 | *-4.96* | 0.390 | -0.0581 | *-2.68* | 0.308 | -0.0500 | *-2.34* | 0.379 |
| ***5 (Longest)*** | -0.2124 | *-11.78* | 0.683 | -0.2435 | *-10.54* | 0.488 | -0.2427 | *-9.85* | 0.536 | -0.1146 | *-5.45* | 0.350 | -0.0316 | *-2.08* | 0.260 | -0.0492 | *-2.69* | 0.302 |
| *Controls* | *CFO, LAGCFO, ANNRET, LAGANNRET, BTM, SIZE, LEV* | | | *CFO, LAGCFO, ANNRET, LAGANNRET, BTM, SIZE, LEV* | | | *CFO, LAGCFO, ANNRET, LAGANNRET, BTM, SIZE, LEV* | | | *CFO, LAGCFO, ANNRET, LAGANNRET, BTM, SIZE, LEV* | | | *CFO, LAGCFO, ANNRET, LAGANNRET, BTM, SIZE, LEV* | | | *CFO, LAGCFO, ANNRET, LAGANNRET, BTM, SIZE, LEV* | | |
| *Fixed Effects* | *Firm and Year* | | | *Firm and Year* | | | *Firm and Year* | | | *Firm and Year* | | | *Firm and Year* | | | *Firm and Year* | | |
| *Clustered Standard Errors* | *Firm and Year* | | | *Firm and Year* | | | *Firm and Year* | | | *Firm and Year* | | | *Firm and Year* | | | *Firm and Year* | | |

### *Panel B: Industry return volatility as the uncertainty proxy*

| *Dependent Variable:* | *ΔWIC* | | | *ΔAR* | | | *ΔINV* | | | *ΔAP* | | | *ΔOTHERCA* | | | *ΔOTHERCL* | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Coef. | *t-stat* | R-Sqr | Coef. | *t-stat* | R-Sqr | Coef. | *t-stat* | R-Sqr | Coef. | *t-stat* | R-Sqr | Coef. | *t-stat* | R-Sqr | Coef. | *t-stat* | R-Sqr |
| ***Horizon Quintile*** | | | | | | | | | | | | | | | | | | |
| *1 (Shortest)* | -0.0272 | *-2.76* | 0.551 | -0.0240 | *-2.85* | 0.386 | 0.0003 | *0.15* | 0.434 | -0.0109 | *-1.20* | 0.370 | -0.0066 | *-0.34* | 0.251 | 0.0127 | *0.84* | 0.373 |
| *2* | -0.0162 | *-1.40* | 0.645 | -0.0281 | *-2.22* | 0.504 | -0.0280 | *-2.88* | 0.423 | -0.0131 | *-0.95* | 0.388 | -0.0045 | *-0.27* | 0.308 | -0.0323 | *-1.99* | 0.418 |
| *3* | -0.0363 | *-3.43* | 0.693 | -0.0462 | *-3.20* | 0.540 | -0.0654 | *-4.63* | 0.486 | -0.0383 | *-2.75* | 0.407 | -0.0144 | *-0.87* | 0.327 | -0.0029 | *-0.22* | 0.424 |
| *4* | -0.0280 | *-2.32* | 0.681 | -0.0323 | *-2.20* | 0.536 | -0.0369 | *-2.64* | 0.533 | -0.0340 | *-1.58* | 0.388 | -0.0099 | *-0.62* | 0.307 | -0.0062 | *-0.49* | 0.378 |
| ***5 (Longest)*** | -0.0648 | *-4.26* | 0.676 | -0.1029 | *-4.08* | 0.483 | -0.0668 | *-3.45* | 0.529 | -0.0861 | *-3.76* | 0.349 | -0.0105 | *-0.61* | 0.260 | -0.0192 | *-1.26* | 0.302 |
| *Controls* | *CFO, LAGCFO, ANNRET, LAGANNRET, BTM, SIZE, LEV* | | | *CFO, LAGCFO, ANNRET, LAGANNRET, BTM, SIZE, LEV* | | | *CFO, LAGCFO, ANNRET, LAGANNRET, BTM, SIZE, LEV* | | | *CFO, LAGCFO, ANNRET, LAGANNRET, BTM, SIZE, LEV* | | | *CFO, LAGCFO, ANNRET, LAGANNRET, BTM, SIZE, LEV* | | | *CFO, LAGCFO, ANNRET, LAGANNRET, BTM, SIZE, LEV* | | |
| *Fixed Effects* | *Firm and Year* | | | *Firm and Year* | | | *Firm and Year* | | | *Firm and Year* | | | *Firm and Year* | | | *Firm and Year* | | |
| *Clustered Standard Errors* | *Firm and Year* | | | *Firm and Year* | | | *Firm and Year* | | | *Firm and Year* | | | *Firm and Year* | | | *Firm and Year* | | |

**Notes:** This table presents the results of multivariate regression analyses to test Hypothesis H2 that the relation between uncertainty and the change in working capital will be more pronounced for firms that have longer operating cycles. We present the coefficient on uncertainty when the dependent variable is regressed on each uncertainty proxy and control variables by horizon quintiles. Panel A uses *TOTVOL* as the uncertainty proxy; Panel B uses *INDVOL* as the uncertainty proxy; and Panel C uses analyst dispersion as the uncertainty proxy. We use the following proxies for horizon: operating cycle for *ΔWIC*; accounts receivable days for *ΔAR*; inventory days for *ΔINV*; accounts payable days for operating cycle for *ΔAP*; and operating cycle for *ΔOTHERCA* and *ΔOTHERCL*. We standardize all variables and provide definitions in the Appendix.
***/**/* represent significance at the 1%, 5%, and 10% levels, respectively.

## Table 5 (Continued)

### *Panel C: Analyst dispersion as the uncertainty proxy*

| *Dependent Variable:* | *ΔWIC* | | | *ΔAR* | | | *ΔINV* | | | *ΔAP* | | | *ΔOTHERCA* | | | *ΔOTHERCL* | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Coef. | *t-stat* | R-Sqr | Coef. | *t-stat* | R-Sqr | Coef. | *t-stat* | R-Sqr | Coef. | *t-stat* | R-Sqr | Coef. | *t-stat* | R-Sqr | Coef. | *t-stat* | R-Sqr |
| ***Horizon Quintile*** | | | | | | | | | | | | | | | | | | |
| *1 (Shortest)* | -0.0225 | *-1.70* | 0.602 | -0.0293 | *-3.88* | 0.416 | -0.0015 | *-1.53* | 0.398 | -0.0167 | *-1.85* | 0.424 | -0.0467 | *-2.48* | 0.284 | -0.0322 | *-1.33* | 0.424 |
| *2* | -0.0436 | *-4.62* | 0.673 | -0.0236 | *-2.40* | 0.566 | -0.0149 | *-2.19* | 0.448 | -0.0012 | *-0.10* | 0.459 | -0.0529 | *-4.61* | 0.336 | -0.0072 | *-0.40* | 0.470 |
| *3* | -0.0508 | *-3.75* | 0.715 | -0.0191 | *-1.45* | 0.610 | -0.0520 | *-4.22* | 0.509 | -0.0022 | *-0.15* | 0.473 | -0.0209 | *-1.48* | 0.372 | -0.0022 | *-0.14* | 0.453 |
| *4* | -0.0570 | *-3.77* | 0.747 | -0.0190 | *-1.30* | 0.603 | -0.0860 | *-4.79* | 0.566 | -0.0196 | *-1.38* | 0.489 | -0.0825 | *-4.96* | 0.355 | -0.0307 | *-1.73* | 0.455 |
| ***5 (Longest)*** | -0.0767 | *-4.52* | 0.749 | -0.0603 | *-3.67* | 0.559 | -0.0940 | *-4.70* | 0.599 | -0.0346 | *-2.23* | 0.450 | -0.0492 | *-1.99* | 0.302 | -0.0403 | *-2.40* | 0.361 |
| *Controls* | *CFO, LAGCFO, ANNRET, LAGANNRET, BTM, SIZE, LEV* | | | *CFO, LAGCFO, ANNRET, LAGANNRET, BTM, SIZE, LEV* | | | *CFO, LAGCFO, ANNRET, LAGANNRET, BTM, SIZE, LEV* | | | *CFO, LAGCFO, ANNRET, LAGANNRET, BTM, SIZE, LEV* | | | *CFO, LAGCFO, ANNRET, LAGANNRET, BTM, SIZE, LEV* | | | *CFO, LAGCFO, ANNRET, LAGANNRET, BTM, SIZE, LEV* | | |
| *Fixed Effects* | *Firm and Year* | | | *Firm and Year* | | | *Firm and Year* | | | *Firm and Year* | | | *Firm and Year* | | | *Firm and Year* | | |
| *Clustered Standard Errors* | *Firm and Year* | | | *Firm and Year* | | | *Firm and Year* | | | *Firm and Year* | | | *Firm and Year* | | | *Firm and Year* | | |

**Notes:** This table presents the results of multivariate regression analyses to test Hypothesis H2 that the relation between uncertainty and the change in working capital will be more pronounced for firms that have longer operating cycles. We present the coefficient on uncertainty when the dependent variable is regressed on each uncertainty proxy and control variables by horizon quintiles. Panel A uses *TOTVOL* as the uncertainty proxy; Panel B uses *INDVOL* as the uncertainty proxy; and Panel C uses analyst dispersion as the uncertainty proxy. We use the following proxies for horizon: operating cycle for *ΔWIC*; accounts receivable days for *ΔAR*; inventory days for *ΔINV*; accounts payable days for operating cycle for *ΔAP*; and operating cycle for *ΔOTHERCA* and *ΔOTHERCL*. We standardize all variables and provide definitions in the Appendix.

***/**/* represent significance at the 1%, 5%, and 10% levels, respectively.

## Table 6
## Regression analyses to compare the relation between normal ΔWIC and uncertainty to the relation between abnormal ΔWIC and uncertainty

***Dependent Variable: 'Normal' ΔWIC or 'Abnormal' ΔWIC***

| | Uncertainty Measure | TOTVOL | | | | INDVOL | | | | DISPERSION | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Coef. | *t-stat* | | R-Sqr | Coef. | *t-stat* | | R-Sqr | Coef. | *t-stat* | | R-Sqr |
| Model | ΔWIC Type | | | | | | | | | | | | |
| *(1)* | *Normal* | -0.1051 | *-8.67* | *** | 0.413 | -0.0358 | *-3.76* | *** | 0.410 | -0.0589 | *-8.01* | *** | 0.497 |
| *(1)* | *Abnormal* | -0.1126 | *-11.82* | *** | 0.548 | -0.0328 | *-5.79* | *** | 0.544 | -0.0341 | *-4.97* | *** | 0.600 |
| *(1)* | *Difference* | 0.0076 | | | | -0.0030 | | | | -0.0248 | | | |
| *(2)* | *Normal* | -0.0923 | *-7.86* | *** | 0.383 | -0.0317 | *-3.01* | *** | 0.381 | -0.0474 | *-7.52* | *** | 0.451 |
| *(2)* | *Abnormal* | -0.1116 | *-10.51* | *** | 0.521 | -0.0310 | *-4.95* | *** | 0.518 | -0.0350 | *-4.42* | *** | 0.572 |
| *(2)* | *Difference* | 0.0193 | | | | -0.0008 | | | | -0.0124 | | | |
| *(3)* | *Normal* | -0.0958 | *-7.49* | *** | 0.389 | -0.0313 | *-2.71* | *** | 0.387 | -0.0437 | *-6.29* | *** | 0.451 |
| *(3)* | *Abnormal* | -0.1061 | *-9.98* | *** | 0.498 | -0.0300 | *-5.05* | *** | 0.496 | -0.0368 | *-4.35* | *** | 0.554 |
| *(3)* | *Difference* | 0.0103 | | | | -0.0013 | | | | -0.0069 | | | |
| *(4)* | *Normal* | -0.1050 | *-8.84* | *** | 0.413 | -0.0408 | *-4.15* | *** | 0.411 | -0.0572 | *-8.21* | *** | 0.490 |
| *(4)* | *Abnormal* | -0.1107 | *-11.44* | *** | 0.543 | -0.0293 | *-5.07* | *** | 0.540 | -0.0331 | *-4.78* | *** | 0.592 |
| *(4)* | *Difference* | 0.0057 | | | | -0.0115 | | | | -0.0241 | | | |
| *(5)* | *Normal* | -0.0900 | *-7.71* | *** | 0.386 | -0.0357 | *-3.43* | *** | 0.492 | -0.0462 | *-7.32* | *** | 0.449 |
| *(5)* | *Abnormal* | -0.1113 | *-10.38* | *** | 0.517 | -0.0278 | *-4.34* | *** | 0.514 | -0.0345 | *-4.40* | *** | 0.564 |
| *(5)* | *Difference* | 0.0213 | | | | -0.0078 | | | | -0.0118 | | | |
| *(6)* | *Normal* | -0.0939 | *-7.54* | *** | 0.393 | -0.0332 | *-2.97* | | 0.391 | -0.0439 | *-6.64* | *** | 0.451 |
| *(6)* | *Abnormal* | -0.1061 | *-9.82* | *** | 0.494 | -0.0282 | *-4.80* | | 0.492 | -0.0358 | *-4.24* | *** | 0.547 |
| *(6)* | *Difference* | 0.0122 | | | | -0.0049 | | | | -0.0081 | | | |
| | *Controls* | *CFO, LAGCFO, ANNRET, LAGANNRET, BTM, SIZE, LEV* | | | | *CFO, LAGCFO, ANNRET, LAGANNRET, BTM, SIZE, LEV* | | | | *CFO, LAGCFO, ANNRET, LAGANNRET, BTM, SIZE, LEV* | | | |
| | *Fixed Effects* | *Firm and Year* | | | | *Firm and Year* | | | | *Firm and Year* | | | |
| | *Clustered Standard Errors* | *Firm and Year* | | | | *Firm and Year* | | | | *Firm and Year* | | | |

**Notes:** This table presents the results of multivariate regression analyses to compare the sensitivities of normal and abnormal accruals to uncertainty.

Following prior literature, we split *ΔWIC* into 'Normal' and 'Abnormal' components using a series of models, which we estimate for each industry-year grouping. The 'Normal' component is calculated as the fitted value from the regression, and the 'Abnormal' component is the residual. The six models that we estimate are as follows:

*(1)ΔWIC=1/AT+(Δsales-ΔAR)+ROA;*
*(2)ΔWIC=1/AT+(Δsales-ΔAR)+LagΔWIC+ROA;*
*(3)ΔWIC=1/AT+(Δsales-ΔAR)+LagΔWIC+GR_Sales+ROA;*
*(4)ΔWIC=1/AT+(Δsales-ΔAR)+PPE+ROA;*
*(5)ΔWIC=1/AT+(Δsales-ΔAR)+PPE+LagΔWIC+ROA;*
*(6)ΔWIC=1/AT+(Δsales-ΔAR)+PPE+LagΔWIC+GR_Sales+ROA.*

We define the variables used in these models as follows: *1/AT* is one divided by the average total assets; *Δsales* is the change in sales (*SALE*) from the previous year to the current year scaled by average total assets; *ROA* is the operating income after depreciation (*OIADP*) divided by average total assets; *GR_Sales* is the change in sales (*SALE*) from the current year to next year scaled by current sales; *PPE* is the end of year property, plant and equipment (*PPENT*), scaled by average total assets. We define all other variables in the Appendix.

We standardize each of the variables included in these regressions.

*/**/*** represent significance at the 10 percent, 5 percent, and 1 percent levels, respectively, according to two-sided tests.

## Table 7
## Regression analyses to compare the relation between normal ΔWIC and uncertainty to the relation between abnormal ΔWIC and uncertainty by horizon

### *Panel A: Normal ΔWIC*

| *Uncertainty Proxy:* | *TOTVOL* | | | *INDVOL* | | | *DISPERSION* | | |
|---|---|---|---|---|---|---|---|---|---|
| | Coef. | *t-stat* | R-Sqr | Coef. | *t-stat* | R-Sqr | Coef. | *t-stat* | R-Sqr |
| ***Horizon Quintile*** | | | | | | | | | |
| *1 (Shortest)* | -0.0210 | *-1.21* | 0.451 | -0.0231 | *-1.15* | 0.451 | 0.0006 | *0.04* | 0.487 |
| *2* | -0.0649 | *-3.02* | 0.534 | -0.0280 | *-1.71* | 0.534 | -0.0291 | *-2.72* | 0.570 |
| *3* | -0.0930 | *-4.18* | 0.573 | -0.0336 | *-1.98* | 0.572 | -0.0489 | *-3.12* | 0.599 |
| *4* | -0.1004 | *-5.63* | 0.565 | 0.0037 | *0.24* | 0.563 | -0.0335 | *-2.72* | 0.627 |
| ***5 (Longest)*** | -0.1165 | *-5.47* | 0.536 | -0.0349 | *-1.52* | 0.534 | -0.0552 | *-3.46* | 0.612 |
| *Controls* | *CFO, LAGCFO, ANNRET, LAGANNRET, BTM, SIZE, LEV* | | | *CFO, LAGCFO, ANNRET, LAGANNRET, BTM, SIZE, LEV* | | | *CFO, LAGCFO, ANNRET, LAGANNRET, BTM, SIZE, LEV* | | |
| *Fixed Effects* | *Firm and Year* | | | *Firm and Year* | | | *Firm and Year* | | |
| *Clustered Standard Errors* | *Firm and Year* | | | *Firm and Year* | | | *Firm and Year* | | |

**Notes:** This table presents the results of multivariate regression analyses to compare the sensitivities of normal and abnormal accruals to uncertainty by horizon. Panel A presents the results by horizon for the 'Normal' component, whereas Panel B presents the results by horizon for the 'Abnormal' component.

Following prior literature, we split *ΔWIC* into 'Normal' and 'Abnormal' components using the following model, which we estimate for each industry-year grouping. The 'Normal' component is calculated as the fitted value from the regression, and the 'Abnormal' component is the residual. We use the most comprehensive model (model 6) identified in table 6 for this analysis. The model is as follows:

$$\Delta WIC = 1/AT + (\Delta sales - \Delta AR) + PPE + Lag\Delta WIC + GR\_Sales + ROA.$$

We define the variables used in these models as follows: *1/AT* is one divided by the average total assets; *Δsales* is the change in sales (*SALE*) from the previous year to the current year scaled by average total assets; *ROA* is the operating income after depreciation (*OIADP*) divided by average total assets; *GR_Sales* is the change in sales (*SALE*) from the current year to next year scaled by current sales; *PPE* is the end of year property, plant and equipment (*PPENT*), scaled by average total assets. We define all other variables in the Appendix.

We standardize each of the variables included in these regressions.

*/**/*** represent significance at the 10 percent, 5 percent, and 1 percent levels, respectively, according to two-sided tests.

***Panel B: Abnormal ΔWIC***

| *Uncertainty Proxy* | *TOTVOL* | | | *INDVOL* | | | *DISPERSION* | | |
|---|---|---|---|---|---|---|---|---|---|
| | Coef. | *t-stat* | R-Sqr | Coef. | *t-stat* | R-Sqr | Coef. | *t-stat* | R-Sqr |
| ***Horizon Quintile*** | | | | | | | | | |
| *1 (Shortest)* | -0.0529 | *-3.89* | 0.488 | -0.0201 | *-1.58* | 0.487 | -0.0200 | *-1.50* | 0.550 |
| *2* | -0.0499 | *-2.86* | 0.592 | -0.0009 | *-0.07* | 0.591 | -0.0288 | *-2.25* | 0.614 |
| *3* | -0.0827 | *-4.72* | 0.636 | -0.0170 | *-1.50* | 0.635 | -0.0320 | *-2.35* | 0.664 |
| *4* | -0.1081 | *-4.54* | 0.651 | -0.0228 | *-1.88* | 0.649 | -0.0425 | *-2.34* | 0.707 |
| ***5 (Longest)*** | -0.1583 | *-7.42* | 0.614 | -0.0499 | *-2.81* | 0.610 | -0.0453 | *-2.01* | 0.679 |
| *Controls* | *CFO, LAGCFO, ANNRET, LAGANNRET, BTM, SIZE, LEV* | | | *CFO, LAGCFO, ANNRET, LAGANNRET, BTM, SIZE, LEV* | | | *CFO, LAGCFO, ANNRET, LAGANNRET, BTM, SIZE, LEV* | | |
| *Fixed Effects* | *Firm and Year* | | | *Firm and Year* | | | *Firm and Year* | | |
| *Clustered Standard Errors* | *Firm and Year* | | | *Firm and Year* | | | *Firm and Year* | | |

**Notes:** This table presents the results of multivariate regression analyses to compare the sensitivities of normal and abnormal accruals to uncertainty by horizon. Panel A presents the results by horizon for the 'Normal' component, whereas Panel B presents the results by horizon for the 'Abnormal' component.

Following prior literature, we split *ΔWIC* into 'Normal' and 'Abnormal' components using the following model, which we estimate for each industry-year grouping. The 'Normal' component is calculated as the fitted value from the regression, and the 'Abnormal' component is the residual. We use the most comprehensive model (model 6) identified in table 6 for this analysis. The model is as follows:

$$\Delta WIC = 1/AT + (\Delta sales - \Delta AR) + PPE + Lag\Delta WIC + GR\_Sales + ROA.$$

We define the variables used in these models as follows: *1/AT* is one divided by the average total assets; *Δsales* is the change in sales (*SALE*) from the previous year to the current year scaled by average total assets; *ROA* is the operating income after depreciation (*OIADP*) divided by average total assets; *GR_Sales* is the change in sales (*SALE*) from the current year to next year scaled by current sales; *PPE* is the end of year property, plant and equipment (*PPENT*), scaled by average total assets. We define all other variables in the Appendix.

We standardize each of the variables included in these regressions.

*/**/*** represent significance at the 10 percent, 5 percent, and 1 percent levels, respectively, according to two-sided tests.