Accounting Quality, Stock Price Delay and Future Stock Returns

Jeffrey L. Callen
University of Toronto

Mozaffar Khan
University of Minnesota

Hai Lu
University of Toronto

September 15, 2010

Abstract
We test the hypotheses that (i) poor accounting quality is associated with delayed stock price adjustment to information, and (ii) investors require higher future stock returns for the price delay associated with poor accounting quality. We define accounting quality as the precision with which financial reporting informs equity investors about future cash flows. Consistent with our hypotheses, the results suggest poor accounting quality is economically costly in that it is associated with less timely price adjustment and a higher cost of equity.

Callen is at the Rotman School, 105 St. George St., Toronto, ON M5S 3E6, Ph. 416-946-5641, callen@rotman.utoronto.ca.
Khan is at the Carlson School, 321 19th Ave S.., 3-115, Minneapolis, MN 55455, Ph. 612-626-8625, khanm@umn.edu.
Lu is at the Rotman School, 105 St. George St., Toronto, ON M5S 3E6, Ph. 416-946-5641, hai.lu@rotman.utoronto.ca.

Helpful comments were received from participants at the BANDS Boston-area Research Conference (Boston College, Boston University, Harvard and MIT), seminar participants at City University of Hong Kong, Louisiana State, Notre Dame, MIT, Penn State, Texas A&M, University of Minnesota, University of Southern California, and Brian Akins, Randy Beatty, Rei-Ning Chen, Zhaoyang Gu, Michelle Hanlon, Chandra Kanodia, Stephannie Larocque, Maria Ogneva, Sugata Roychowdhury, Devin Shanthikumar, KR Subramanyam, Rodrigo Verdi, Ross Watts, Joe Weber and Franco Wong. We especially thank Feng Li both for helpful comments and for providing us with access to his data set. We further thank Yiwei Dou, Yanju Liu and Yuri Loktionov for excellent research assistance.

1. Introduction

In frictionless capital markets with complete information and rational investors, stock prices adjust to new information instantaneously and completely. However, a substantial body of research studies information imperfections such as asymmetric information and incomplete information (e.g., Barry and Brown, 1984; Merton, 1987; Easley *et al*., 2002; Hou and Moskowitz, 2005; Lambert *et al*., 2007). Information imperfections potentially hinder timely price discovery and are associated with delayed stock price adjustment to information (e.g., Verrecchia, 1980; Callen *et al.*, 2000). Hence, our first research question is whether the quality of accounting information (or "accounting quality") is one such information imperfection that is associated with cross-sectional variation in stock price delay.

If value-relevant information appeared at discrete and infrequent intervals, delay would be a news-specific or temporary characteristic of stocks. However, systematic and firm-specific value-relevant information appears frequently, so that delay is an 'on-average' stock-specific characteristic (e.g., Hou and Moskowitz, 2005). A delayed stock is potentially risky to a buyer because there may be adverse public information that has yet to be fully processed and incorporated in price, and hence this buyer is likely to require a return premium to compensate for adverse selection.[1] Our second research question therefore is whether the portion of price delay associated with poor accounting quality predicts stock returns. The emphasis of this question is on poor accounting quality. Since delay likely is associated with both non-accounting and accounting firm characteristics, any return premium for delay is also likely associated with

[1] While there may also be unincorporated good news, buyers are more concerned with unincorporated bad news or downside risk, and likely to discount price for a delayed stock relative to a stock that is not delayed. This is analogous to the price discount or return premium for other risks: a risky stock may turn out to be a great investment for a buyer, but buyers discount the price of a riskier stock relative to that of a less risky one because they are more concerned about downside risk.

both non-accounting and accounting firm characteristics. Our research design allows us to parse out the delay premium associated with accounting versus non-accounting sources, and thereby to provide evidence on the relation between cost of equity and poor accounting quality.

We define accounting quality as the precision with which financial reporting conveys information to equity investors about the firm's expected cash flows. To facilitate the following discussion we distinguish between investors' *pre-existing* information set and *newly arriving* information. Investors use their existing information set to forecast cash flows and arrive at a price estimate. As new value-relevant information arrives, they update their cash flow forecasts to determine the new price. In this paper we hypothesize that, since accounting information is part of the information set investors use to forecast cash flows, poor accounting quality likely is associated with a lower quality *pre-existing* information set and hence with lower quality cash flow forecasts. When new value-relevant information, whether systematic or firm-specific, arrives, revising cash flow forecasts derived from a poor quality accounting information set likely leads to a more uncertain price estimate than revising cash flow forecasts derived from a high quality accounting information set. When there is uncertainty in the price estimate, investors are likely over time to revise their initial price assessment based on improved understanding and also learning from the assessments of other investors, until prices converge to fundamental values. This is what we refer to as delayed price adjustment (Verrecchia, 1980; Callen *et al*., 2000). Empirically therefore, we examine the delay in price adjustment across stocks with differences in the quality of their existing accounting information set.

Our study is related to a theoretical paper by Verrecchia (1980), who examines the speed of price adjustment as the quality of *newly arriving* information varies, holding constant the quality of investors' *existing* information set. In contrast, we empirically examine the speed of price adjustment across stocks with differences in the quality of their *existing* accounting information set, holding constant across stocks the quality of *newly arriving* information. Another way to see this is that, as in Verrecchia (1980), our dependent variable is the speed of stock price adjustment, and our independent variable is the ratio of the quality of *newly arriving* information to the quality of investors' *existing* information set. The difference is that we examine the effect of the denominator in the independent variable, while Verrecchia (1980) examines the effect of the numerator. Section 2 motivates our hypotheses in detail.

Our study is also motivated by the incomplete information models of Barry and Brown (1984) and Merton (1987). In these models, investors have better quality information about some securities than others, and require higher future stock returns for the former than for the latter. In this paper, we examine the relation between poor quality accounting information, or accounting-associated incomplete information, and future stock returns.

Our tests require empirical measures of the two main theoretical constructs: price delay and accounting quality. We measure price delay based on correlations of firm-specific returns with lagged market or firm-specific returns, as in Hou and Moskowitz (2005). We measure accounting quality using the quantitative information in financial statements, such as accrual quality (AQ), special items, recent loss frequency and earnings surprise. The price delay and accounting quality measures are described in detail in Section 3. Consistent with our prediction, we find that firm-years with poor accrual quality, large negative special items, and more frequent losses are associated with significantly greater stock price delay. In particular, a one-standard-deviation deterioration in accrual quality is associated with a 9% increase in stock price delay. The regressions control for firm distress, as well as a number of different proxies for both stock liquidity and investor attention. Results are robust to using AQ as the sole measure of accounting quality, to controlling for a number of different proxies for the firm's growth options, and to controlling for innate determinants of AQ (Francis et al., 2005).

As an additional test we measure accounting quality using the FOG index of Li (2008), which is a measure of the readability of qualitative information in annual reports. Qualitative information is forward-looking (e.g., Management Discussion and Analysis), helps in interpreting financial statement numbers and therefore aids in predicting cash flows. Poor or fuzzy qualitative information is likely associated with lower-quality cash flow forecasts. Hence we expect the FOG index to be associated with more delayed (less timely) incorporation of value-relevant information into stock prices (e.g., Grossman and Stiglitz, 1980; Bloomfield, 2002; Li, 2008). Results indicate that firms with annual reports that are difficult to read, i.e., firms with a high FOG index, have significantly higher price delay.

We subsequently examine whether firms with high accounting-associated delay have higher future stock returns arising from adverse selection faced by buyers of delayed stocks (e.g., Diamond and Verrecchia, 1991; Easley and O'Hara, 2004; Aboody *et al*., 2005; Francis *et al.*, 2005). We estimate accounting-associated delay, D_{Acct}, as the fitted portion of stock price delay explained by accounting quality. In Fama-MacBeth (1973) regressions of one-year-ahead monthly excess stock returns on a number of firm characteristics known to predict returns, including size, book-to-market ratio, accruals and return momentum, we find that both total delay, denoted D, and D_{Acct} have significantly positive predictive ability. This suggests firms with high stock price delay in general, and firms with high accounting-associated delay in particular, have higher future stock returns.

In addition to the cross-sectional return regressions above, we also conduct time-series asset pricing tests of return predictability following Fama and French (1993). One key difference between these two methodologies is that the cross-sectional return regressions control for firm characteristics that predict future returns, while the Fama-French (1993) tests control for risk factor betas under the theory that returns depend on covariances (betas). Under the Fama and French (1993) approach, we expect significantly positive alphas for high D_{Acct} minus low D_{Acct} portfolios if there is an accounting-associated delay premium in stock returns. We find that accounting-associated delay has a significant annual return premium of 6% when both accounting and non-accounting delay are severe. This suggests poor accounting quality is associated with higher cost of equity when non-accounting frictions such as stock illiquidity and lack of investor attention are also severe.

This paper contributes to the literature in a number of ways. First, this is the first paper to empirically study how the speed of price adjustment is related to accounting quality. Our results shed light on the role of accounting quality in the price formation process. Understanding price delay is important because slow price adjustment can impact capital allocation efficiency by affecting equity investor's investment decisions or corporate investment decisions.

Second, we show that poor accounting quality is associated with higher cost of equity indirectly, through price delay. The prior literature (e.g., Francis et al., 2005; Core et al., 2008) has examined whether accounting quality is directly associated with future returns, with conflicting findings. Our results clarify the mapping between accounting quality and higher cost of equity.

Third, we show the negative association between accounting quality and cost of equity is conditional on the presence of non-accounting delay. The prior literature has examined the unconditional relation between accounting quality and cost of equity. Our results suggest accounting-associated delay on its own is diversifiable, but it is associated with a return premium when it coexists with other non-accounting determinants of delay. One interpretation of this result is that the effects of poor accounting quality on its own can be offset by other non-accounting information sources that act as substitutes in enabling the firm to maintain a transparent information environment. However, when these substitutes are themselves deficient, i.e., when accounting- and non-accounting- associated delay coexist, investors demand a return premium for the overall poor information quality.

The rest of this paper proceeds as follows. Section 2 develops our hypotheses. Section 3 motivates the accounting quality proxies and describes the measurement of price delay. Section 4 examines the cross-sectional relation between price delay and accounting quality. Section 5 examines the relation between future returns and the accounting quality component of price delay. Section 6 describes a battery of robustness tests. Section 7 concludes. The Appendix presents variable definitions.

2. Hypothesis Development

Investors use their pre-existing information set to forecast firms' cash flows, in order to arrive at equity price estimates. As systematic or firm-specific value-relevant news arrives, investors update their cash flow forecasts to arrive at a new price estimate. In the traditional perfect capital markets paradigm, this price adjustment occurs quickly and completely. Our paper relaxes the perfect capital markets assumption of complete information, and is related to the following theoretical papers.

Verrecchia (1980) analyzes the speed of price adjustment as the quality of *newly arriving* information varies across firms, holding constant across firms the quality of investors' *pre-existing* information set. He shows that as the quality of newly arriving value-relevant information increases, the speed of price adjustment increases. Our work is related to the framework in Verrecchia (1980) in that we examine the speed of price adjustment when the quality of the *pre-existing* accounting information set, i.e., accounting quality, varies across firms. In order to do this, we hold constant across firms the quality of the *newly arriving* information, by using the same or identical news for all firms – systematic news.

Our work is also motivated by the incomplete information models of Barry and Brown (1984) and Merton (1987). In these models, investors have better quality information about some securities than others, and require a larger return premium for the latter relative to the former. Hou and Moskowitz (2005) show that incomplete information is one determinant of delayed stock price adjustment to newly arriving information. In this paper, we examine the role of accounting quality, or the pre-existing accounting information set, in explaining cross-sectional variation in price delay and future stock returns.

Our work is further related to Callen *et al*. (2000), who analyze the convergence of noisy prices to fundamental values. Noisy prices could result when for example investors' existing information set is poor. They show that convergence to fundamental value occurs as the noise in stock returns declines, suggesting that price adjustment occurs as investors learn from each other and reduce heterogeneity of opinion. They also show that the speed of convergence is slower the noisier are stock returns, suggesting a cross-sectional relation between adjustment speed and the quality of investors' existing information set.

In particular, we hypothesize that poor accounting quality is associated with a lower quality *pre-existing* information set. When the pre-existing information set is poor or imprecise, investors' cash flow forecasts are poor or imprecise, and there is also likely heterogeneity in investor opinion about the amounts, timing and uncertainty of future cash flows. As systematic or firm-specific value-relevant news arrives, investors likely have an initial assessment of its price implications, and this is impounded in price. In the subsequent days and weeks investors' understanding of the news likely improves, and they also learn from each other, giving rise to continued price adjustment.[2,3] Consider as an example, the Dubai debt crisis of 2009. News arrives that Dubai's debt defaulted. But it is not readily apparent which firms are exposed and by how much. There is an extensive nexus of financial connections between firms, which makes any one firm's exposure difficult to readily ascertain, and is especially problematic for firms with more opaque accounting and financial reporting. Prices likely react initially for all 'suspected' firms, and as time progresses and the extent of exposure is determined more accurately, prices adjust. This process likely takes longer for firms with a poor quality pre-existing accounting information set, and hence their stock is more delayed in our terminology.

We therefore test the null hypothesis of no relation between accounting quality and stock price delay against the following alternative hypothesis.

H1: Poor accounting quality is associated with higher stock price delay.

---

[2] Prior papers show a link between accounting quality and stock liquidity (e.g., Ng, 2008) or between accounting quality and measures of information asymmetry (e.g., Bhattacharya, Desai and Venkataraman, 2008; Jayaraman, 2008). However, none of these papers tests the hypothesis that poor accounting quality is associated with delayed stock price adjustment. In addition, we show that accounting quality affects stock price delay after controlling for stock liquidity and information asymmetry.

[3] Jiang et al. (2005) and Zhang (2006) examine the relation between information uncertainty proxies, return momentum and future returns. Their information uncertainty proxies are non-accounting firm characteristics such as turnover, analyst coverage, size and cash flow volatility. In addition, their hypotheses are motivated by psychological biases such as investor overconfidence. In contrast to them, our focus is on the relation between accounting information quality, price delay and future returns, and we provide evidence on the role of accounting quality after controlling for their non-accounting information uncertainty proxies. Further, our hypotheses are based on rational theories under incomplete information as described in the text.

H1 posits that a firm's accounting quality affects stock price delay through a lower quality *pre-existing* information set. Hence, *testing H1 requires that we hold constant in the cross-section the quality of arriving information* (or 'news'). We do so by examining cross-sectional variation in the speed of price adjustment to newly arriving market-wide or systematic (as opposed to firm-specific) news.

We subsequently examine whether the component of price delay due to poor accounting quality is associated with higher cost of equity. Buyers of delayed stocks face the prospect that there may be adverse information not currently impounded in price, and likely demand a risk premium to compensate for adverse selection. This is an empirical question given the mixed findings in both the theoretical and empirical prior literatures on the relation between information risk and cost of equity. For example, Diamond and Verrecchia (1991), Easley and O'Hara (2004), Francis *et al*. (2005), Aboody *et al*. (2005), Chen *et al*. (2007) and Ogneva (2008) lead us to expect a relation between accounting-associated delay and the cost of equity, while Hughes *et al.* (2007), Core *et al*. (2008) and Mohanram and Rajgopal (2009) lead us to expect no relation. Hence we test the null hypothesis of no relation against the following alternative hypothesis.

H2: Poor accounting quality is associated with higher costs of equity capital (future stock returns).

3. Measuring Accounting Quality and Price Delay

In Section 3.1 we describe our accounting quality proxies. We then describe the measurement of accrual quality in Section 3.2 and of price delay in Section 3.3. Section 3.4

describes our data and sample.

3.1. Accounting Quality Proxies

Consistent with our definition of accounting quality, we use proxies that capture uncertainty in the mapping between current financial statement numbers and future cash flows. We use four financial statement-based proxies for accounting quality – accrual quality, the frequency of recent losses, special items and earnings surprise – but all results are robust to use of only one proxy, accrual quality, as reported in Section 6.2. In further robustness tests described in Section 6.2, we also use a measure of the qualitative characteristics of non-financial statement information in annual reports to proxy for accounting quality.

Accrual Quality (AQ). Accruals are estimates of non-cash earnings resulting from timing differences between the provision or consumption of goods and services and the receipt or disbursement of cash for those goods or services. Accruals reverse once the associated cash is received or disbursed. Therefore, accrual quality is defined as the uncertainty associated with the accrual-to-cash flow mapping. We use the AQ measure of Francis *et al*. (2005), which is the variability of accruals unexplained by the Dechow and Dichev (2002) model, as one proxy for accounting quality. Firms with high AQ have poor accounting quality, since AQ increases with large unexplained changes, both positive and negative, in accruals. We expect a positive relation between AQ and stock price delay.

Doyle *et al.* (2007) and Ashbaugh-Skaife *et al*. (2008) provide evidence that firms with poor internal controls have high AQ, while Hutton *et al*. (2009) and Dechow *et al.* (2009) provide evidence that versions of AQ are associated with a higher likelihood of restatements and material misstatements in financial reports. This suggests AQ is associated with poor accounting quality. In addition, AQ has been used as an accounting quality proxy in several papers, including Francis *et al.* (2004, 2005), Aboody *et al*. (2005), Chen *et al*. (2007), Chen *et al.* (2008), Rajgopal and Venkatachalam (2008), Beatty *et al*. (2008), Bharath *et al.* (2008), Bhattacharya *et al.* (2008) and Biddle *et al*. (2009).

Loss Frequency. Losses are unusual in that persistent losses are not sustainable. Persistent losses represent an unusual economic event for the firm and are likely associated with poor accounting quality, since it becomes more difficult to predict cash flows under such circumstances. We measure the relative frequency of annual losses in the last three years (number of loss years divided by three) and expect a positive relation between loss frequency (denoted 'Loss') and price delay.[4]

Special Items. Special items include restructuring charges and write-offs, for example. Special items are likely to arise when the firm is discontinuing certain operations or has suffered large declines in asset values due to uncertainty about future prospects. In such circumstances, predicting cash flows from financial statement numbers is likely more difficult and hence accounting quality is likely poor. We therefore expect firms with more negative special items (SI) to have higher price delay, implying a negative relation between the two variables.

Earnings Surprise. Earnings surprises (both negative and positive) increase uncertainty and signal unexpected events severe enough that they cannot be smoothed. Therefore, circumstances where an earnings surprise becomes unavoidable are likely associated with poor cash flow predictability from financial statement numbers. We expect a positive relation between the absolute value of earnings surprise (ES) and price delay.

---

[4] Results are robust to using a loss dummy that equals 1 for loss firm-years and 0 otherwise.

3.2. Measuring Accrual Quality (AQ)

Following Francis et al (2005), AQ is the variability of unexplained accruals from the Dechow and Dichev (2002) and McNichols (2002) models. Specifically, the following cross-sectional model is estimated annually:

$$CAcc_t = \gamma_{1,t} + \gamma_{2,t}\, CFO_{t-1} + \gamma_{3,t}\, CFO_t + \gamma_{4t}\, CFO_{t+1} + \gamma_{5,t}\, \Delta rev_t + \gamma_{6,t}\, PPE_t + e_t \quad (1)$$

CAcc is current accruals or the change in working capital, CFO is operating cash flows, Δrev is the change in revenues, PPE is property, plant and equipment, and all variables are scaled by total assets. Firm subscripts are suppressed for convenience. Model (1) is estimated separately for each of the 48 industry groups defined in Fama and French (1997), if the industry has at least 20 firms in year t. The AQ metric in year t for firm j is the standard deviation, over the last 5 years, of firm j's unexplained current accruals (the residuals from (1)). A high AQ implies high uncertainty in the accrual to cash flow mapping, so high AQ represents poor accrual quality. Note that AQ pertains to the variability, rather than the level, of unexplained accruals. To avoid look-ahead bias due to the use of CFO_{t+1} in eqn. (1), we use one-year-lagged AQ in all our tests.

3.3. Measuring Price Delay

Following Hou and Moskowitz (2005), we calculate the average delay with which information is impounded into stock prices by first regressing stock returns for each firm on contemporaneous and four lagged market returns as follows:

$$r_{i,t} = \alpha_i + \beta_i\, R_{m,t} + \sum_{n=1 \text{ to } 4} \delta_{i,n}\, R_{m,t-n} + \varepsilon_{i,t} \quad (2)$$

where $r_{i,t}$ is the return on stock i and $R_{m,t}$ is the market return in week t. If the stock price response to information is delayed, some of the $\delta_{i,n}$ will differ from zero and lagged returns will add explanatory power to the regression. Equation (2) is estimated as above (unrestricted regression), as well as with the restriction that all $\delta_{i,n}$ are zero (restricted regression). Price delay, D, is then calculated as one minus the ratio of the restricted to the unrestricted R^2:

$$D = 1 - (R^2_{restricted} / R^2_{unrestricted}) \quad (3)$$

D is similar to an F-test of the joint significance of the lagged terms in (2). D is larger when the proportion of return variation explained by the lagged terms in (2) is higher, so price delay is increasing in D.

Equation (2) is estimated using weekly returns from $July_{t-1}$ to $June_t$, to calculate D_t. Lower return frequencies (such as monthly) are not used since most stocks complete their response to information within a month, while higher return frequencies (such as daily) introduce market microstructure problems such as non-synchronous trading and bid-ask bounce (Hou and Moskowitz, 2005).

Equation (2) uses market returns, or systematic news, as the stimulus to which stock i responds. This allows us to hold constant in the cross-section the quality of newly arriving information, as discussed earlier in Section 2. In further tests reported in Section 6.3, we also estimate a second delay measure, D_fs, in which firm-specific news is the stimulus to which investors respond.

To reduce estimation error, the delay measure is estimated at the portfolio-level. We first calculate firm-level delay measures, and sort firms into deciles of size in June of year t and then into deciles of firm-level delay in June of year t within each size decile. This yields 100 portfolios in June of year t. We use post-formation portfolio returns to estimate the portfolio delay, and assign the portfolio delay to each firm in the portfolio. Since firms switch portfolios from year to year, each firm's level of delay varies over time. This procedure follows Hou and

Moskowitz (2005) and is analogous to the method commonly used to calculate portfolio betas (e.g., Fama and French, 1992).

3.4. Data and Sample

We obtain returns and liquidity measures from CRSP, accounting data from Compustat, analyst coverage and earnings surprise data from IBES and institutional ownership and mutual fund data from Thomson Financial. IBES annual data is available from 1976 and institutional ownership data is available from 1981, so our sample covers 1981 to 2006 and has 29,345 observations. All variable definitions are presented in the Appendix.

Table 1 shows descriptive statistics for our sample. The mean delay, D, is 0.093, implying a 9.3% decline in R^2 when equation (2) is restricted by not including lagged terms, relative to the unrestricted model. The median D is 0.042. Therefore, a subset of firms in the cross-section appears to be substantially delayed, but the majority of firms are fairly informationally efficient. This result, and the distribution of D, is consistent with Hou and Moskowitz (2005).

Also in Table 1, the mean accrual quality, AQ, is 0.039 and its distribution is similar to that reported in Francis et al. (2005). The mean of special items, SI, is -0.013 or -1.3% of total assets. The mean absolute earnings surprise normalized by the five-year standard deviation of surprises, ES, is 1.942. The mean relative loss frequency, Loss, is 0.199, suggesting the average firm has a 19.9% probability of a loss in the last three years. Table 2 reports means of annual cross-sectional correlations between the various variables used in this paper. The Pearson correlation between AQ and Loss is 0.25, suggesting firms with poor accrual quality are more likely to experience losses, while the correlation between Loss and SI is -0.21, suggesting loss firms have more negative special items. The low correlations between our accounting quality proxies suggest that they capture non-overlapping information.

4. The Relation between Accounting Quality and Price Delay

We rank firm-years into quintiles of stock price delay annually and examine the univariate relation between the delay ranking, our accounting quality variables and various control variables suggested as cross-sectional determinants of delay in Hou and Moskowitz (2005). The objective is to examine whether there are any potential non-linearities in the relation between delay and our accounting quality variables.

Table 3 shows that the mean accrual quality (AQ) is monotonically increasing in delay, suggesting more delayed firms have worse accrual quality. Loss is monotonically increasing in delay, suggesting more delayed firms are more likely to have experienced recent losses. Earnings surprise (ES) is monotonically increasing in delay, while special items (SI) are weakly monotonically decreasing, suggesting that firms with large earnings surprises and large negative special items are associated with higher delay. In summary, Table 3 documents that the relations between our accounting quality variables and stock price delay are monotonic and in the predicted directions.

Turning to the non-accounting quality variables in Table 3, a number of variables that proxy for investor attention vary monotonically in the predicted direction with stock price delay. More delayed firms are covered by fewer analysts (Analyst), have lower levels of institutional ownership (InstOwn), fewer employees (Empl) and lower levels of advertising (Adv). Further, the most delayed quintile of firms is associated with a reduction in the breadth of mutual fund ownership (CBreadth), suggesting an increase in short sales constraints (Chen *et al*., 2002). A number of variables that proxy for stock liquidity also vary monotonically (or nearly so) with stock price delay. More delayed firms are more likely to be traded on the NASDAQ (NASDAQ), have lower stock turnover (Turn) and fewer trading days or more non-trading days (Traday).[5]

As a proxy for economic distress in Table 3 we use BSM, the probability of default, measured as the probability of the firm's assets falling below the value of its liabilities, based on the Black-Scholes-Merton option pricing model (Black and Scholes, 1973; Merton, 1974). BSM is a market-based distress measure that has been shown in Hillegeist *et al.* (2004) to have higher information content than accounting-based distress measures. In addition, using accounting-based distress measures in studying the effect of accounting variables on price delay may confound inferences about the relative roles of distress versus accounting. Table 3 shows BSM is monotonically increasing in delay, suggesting that distressed firms are associated with higher delay. Overall, Table 3 does not indicate the presence of any non-linearities between delay and its various determinants that we examine.

To test multivariate relations, we estimate pooled (cross-sectional and time-series) regressions of stock price delay on accounting quality, including controls for firm distress, liquidity and investor attention variables:

$$D_{i,t} = a_t + b_{1,t}\, AQ_{i,t} + b_{2,t}\, Loss_{i,t} + b_{3,t}\, SI_{i,t} + b_{4,t}\, ES_{i,t} + \sum_{j>4} b_{j,t}\, Controls_{j,i,t} + e_{i,t} \qquad (4)$$

[5] We note that in comparing Table 3 to Hou and Moskowitz (2005, Table 1, p.686), the results are qualitatively similar but the magnitudes differ because of sample differences. In particular, our calculation of AQ and ES requires that our sample firms survive five years, and hence our sample firms are much larger on average than those in Hou and Moskowitz (2005). As a result, the most delayed quintile of firms in our sample has higher institutional ownership and analyst coverage, for example, than the most delayed quintile of firms in Hou and Moskowitz (2005). However, having larger and surviving firms in our sample biases against our finding a relation between accounting quality, price delay and future returns.

Table 4 shows the coefficients from estimation of equation (4), along with t-statistics based on standard errors clustered by firm and year to control for cross-sectional and serial correlation (Petersen, 2009).[6] The table shows results for two specifications: one with only accounting quality variables, and the other with a full set of controls. The first (second) specification has an R-square of 6.28% (35.42%), indicating that accounting quality explains a non-trivial proportion of the variation in stock price delay.

We discuss results from the fully-specified model only. AQ is significantly positive at less than 1%, suggesting firms with poor accrual quality have higher stock price delay. In particular, a one-standard-deviation deterioration in AQ is associated with an increase in delay of 0.026 x 0.309 = 0.008. Dividing this by the mean of delay from Table 1 implies an increase in delay of 0.008/0.093 = 9%. Loss is significantly positive at less than 5%, indicating loss firm-years have higher delay. SI is significantly negative at less than 1%, suggesting firms with large negative special items have higher stock price delay. ES is insignificant.[7]

To ensure our accounting quality variables are not simply capturing firm distress, we control for the distress measure, BSM. Table 4 shows that BSM loads significantly positively, suggesting more distressed firms have higher price delay. In particular, distress does not subsume the effect of our accounting quality measures on price delay. Turning to the investor attention variables suggested in Hou and Moskowitz (2005), firms with high institutional ownership, high analyst following, more employees and higher advertising levels are likely to be

---

[6] Following Petersen (2009) we compare White (1984)-adjusted standard errors with each of firm-clustered and time-clustered standard errors, and find that the former are more than twice the White-adjusted standard errors. This indicates the presence of a firm effect that cannot be corrected for using Fama and MacBeth (1973) regressions, but can be addressed through double clustering.

[7] Controlling for positive and negative earnings surprises separately, instead of the absolute value of earnings surprises, does not alter the result.

followed more broadly and to have a richer information environment, thereby having less stock price delay. Consistent with this, InstOwn, Analyst and Empl are all significantly negative at less than 1% in Table 4. Adv is insignificant. CBreadth, or change in the breadth of mutual fund ownership, captures the extent of short sale constraints (Chen *et al*., 2002). Short sale constraints impede the timely flow of (adverse) information into stock prices (e.g., Diamond and Verrecchia, 1987). Table 4 shows that CBreadth is significantly negative at less than 5%, suggesting a reduction in the breadth of mutual fund ownership is associated with higher stock price delay.

We also control for stock liquidity as in Hou and Moskowitz (2005) using turnover, the exchange on which the stock is traded and the number of days the stock is actively traded (Traday). Stocks with lower turnover, less frequent trading or more non-trading days, and NASDAQ stocks are less liquid. Turnover is indicated separately for NYSE/AMEX[8] (Turn-NYAM) and NASDAQ (Turn-NASD) stocks. The exchange is controlled for by including an intercept dummy that equals one for NASDAQ stocks and zero otherwise. We expect less liquid stocks to have higher price delay. Table 4 shows that Turn-NASD is significantly negative at less than 1%, but Turn-NYAM is insignificant, suggesting stock turnover is an important determinant of price delay for NASDAQ firms but not for NYSE/AMEX firms. Since NYSE/AMEX firms are larger and older than NASDAQ firms on average, this is consistent with the marginal importance of liquidity for price delay being higher for smaller firms with poor information environments. The exchange dummy NASDAQ is significantly positive at less than 1%, consistent with NASDAQ firms having higher average price delay. Traday is significantly negative at less than 5%, suggesting less frequently traded stocks have higher price delay.

[8] There are 906 AMEX firm-years in our sample.

We control for firm size (indirectly) by the number of firm employees. Size is also correlated with (and therefore controlled for by) other independent variables such as analyst following and institutional ownership. Nevertheless, as Panel A of Table 11 shows, after controlling for firm size measured as log market value of equity, AQ and SI continue to be significantly associated with price delay, with p-values less than 1% and 5%, respectively.

Overall Table 4 shows that poor accounting quality is associated with significantly higher stock price delay. This result suggests that financial reporting quality plays an important role in price discovery in equity markets.

5. The Relation between Stock Price Delay and Future Returns

In this section we isolate the accounting quality component of stock price delay, and examine its predictive ability for future stock returns. Delayed firms are neglected by investors, have low liquidity and poor accounting quality as described above. Delay imposes adverse selection risk on investors trading in delayed stocks that potentially have adverse information not currently impounded in price, and this risk may be compensated through a higher risk premium in expected returns (e.g., Easley and O'Hara 2004).

We calculate the accounting quality component of delay for each firm-year, D_{Acct}, as the fitted value of delay from the fully-specified model in Table 4. From equation (4), using empirical estimates of b_1 to b_4 (denoted by hats):

$$D_{Acct\ i,t} = \hat{b}_{1,t}\, AQ_{i,t} + \hat{b}_{2,t}\, Loss_{i,t} + \hat{b}_{3,t}\, SI_{i,t} + \hat{b}_{4,t}\, ES_{i,t} \qquad (5)$$

Since our interest is in the accounting component of delay, we do not further distinguish between the components of delay due to investor attention, stock liquidity and firm distress.

We begin by examining univariate relations between D_{Acct}, future stock returns and various cross-sectional determinants of future returns suggested in the prior literature, including the CAPM beta, size and book-to-market (Fama and French, 1992), prior returns (Jegadeesh and Titman, 1993) and accruals (Sloan, 1996). Table 5 shows means by quintiles of D_{Acct}. Total delay (D) is monotonically increasing in D_{Acct}, indicating that firms with high total delay also have high accounting-associated delay. Firms in the top quintile of D_{Acct} have higher betas, are smaller (Size) and have more negative accruals than firms in the bottom quintile, though the relation between accruals and D_{Acct} quintiles is not monotonic. The differences between high and low D_{Acct} firms for other variables are statistically insignificant.

To examine the multivariate relation between accounting-associated delay and future stock returns, we estimate cross-sectional (Fama and MacBeth, 1973) regressions of one-year-ahead monthly stock returns in excess of the risk-free rate on D_{Acct}, including controls for other return determinants described above. Since the monthly stock return is the dependent variable, serial correlation is not expected to be an issue and Fama-MacBeth regressions are well specified in this case (Petersen, 2009).[9] Table 6 shows mean coefficients for two regression specifications, with t-statistics based on Fama-MacBeth standard errors. In the first specification we include total delay, D. In the second specification we decompose D into its accounting component, D_{Acct}, and the remaining component, $D_{NonAcct}$. Total delay, D, loads significantly positively (p-value<1%) in Table 6, indicating that delayed firms have higher average future returns. When delay is decomposed into its accounting and non-accounting components, both D_{Acct} and $D_{NonAcct}$ load significantly positively (p-value<1%), indicating that firms with high accounting-associated delay have higher average future returns. Comparing the marginal effect of a one-standard-deviation change in D_{Acct} to a one-standard-deviation change in $D_{NonAcct}$, we find that the return

[9] In untabulated tests we estimate Panel regressions with double-clustered (time and firm) standard errors to control for both cross-sectional and time-series correlation, and verify that results are robust.

premium for D_{Acct} is 28% of the sum of the return premiums for D_{Acct} and $D_{NonAcct}$, suggesting 28% of the return premium for price delay is associated with poor accounting quality.

Also in Table 6, the log book-to-market ratio (B/M) and log size (Size) load significantly positively (p-values<1%). The prior one month return, $Ret_{[-1]}$, intended to control for the one-month return reversal effect of Jegadeesh (1990), is significantly negatively associated with future returns (p-values<1%). The prior three year return excluding the most recent year, $Ret_{[-36,-13]}$, intended to control for longer horizon return reversal, is significantly negative. The prior one year return excluding the most recent month, $Ret_{[-12,-2]}$, intended to control for the momentum effect of Jegadeesh and Titman (1993), is insignificant. Finally, accruals load significantly negatively, consistent with Sloan (1996).

Overall, Table 6 indicates firms with higher accounting-associated delay have higher future stock returns, suggesting that poor accounting quality is associated with higher cost of equity.

6. Robustness Tests

We conduct a battery of robustness tests as enumerated below.

6.1. Calendar-time Fama-French Regressions

The cross-sectional Fama-MacBeth return regressions of Section 5 control for firm characteristics that predict future returns. As an alternative, we estimate the delay premium as the alpha from a calendar-time Fama and French (1993) (time-series) regression. The Fama-French (1993) tests control for risk factor betas under the theory that returns depend on covariances (betas). The alpha of a test portfolio is the portion of returns unexplained by the portfolio's exposure to Fama-French risk factors, so the difference in alphas between high and low delay portfolios represents a premium for delay.

We sort firms into quintiles of total delay, D, in June of year t, and then estimate the equal-weighted monthly portfolio returns for the next twelve months. Repeating this each year yields a time series of monthly portfolio returns for quintiles of total delay. We then estimate time series regressions of the quintile portfolio monthly returns on the monthly returns to the three Fama-French factors and an intercept or alpha. Panel A of Table 7 reports the alphas and t-statistics for each quintile of D, as well as the difference in alphas for the top and bottom quintiles (High-Low). The most delayed firms have significantly positive alphas, and the high-low delay portfolio has a significant alpha of 0.42% monthly (p-value<1% one-tailed). This translates into an annual return premium to high delay firms, relative to low delay firms, of about 5%, consistent with Hou and Moskowitz (2005).

Next we examine whether there is a return premium for accounting-associated delay. We sort firms into quintiles of D_{Acct} and quintiles of $D_{NonAcct}$. The intersection of these sorts yields 5 x 5 = 25 portfolios each year, and allows us to capture return variation due to accounting-associated delay while controlling for the level of non-accounting delay. As above, we estimate time series regressions of monthly portfolio returns on the monthly returns to the three Fama-French factors, and report alphas and t-statistics for the 25 portfolios.

In Panel B of Table 7, D_{Acct} is increasing downwards while $D_{NonAcct}$ is increasing from left to right. For example, the first row shows the alphas and t-statistics for the lowest quintile of D_{Acct} within each quintile of $D_{NonAcct}$, while the fifth row shows results for the highest quintile of D_{Acct} within each quintile of $D_{NonAcct}$. Similarly, the first column shows alphas for the lowest quintile of $D_{NonAcct}$ within each quintile of D_{Acct}, while the fifth column shows alphas for the highest quintile of $D_{NonAcct}$ within each quintile of D_{Acct}. The left panel reports alphas, while the right panel reports t-statistics. The last row reports alphas and t-statistics for the high D_{Acct} – low D_{Acct} quintiles, while the last column reports t-statistics for the high $D_{NonAcct}$ – low $D_{NonAcct}$ quintiles. Firms with high D_{Acct} have high accounting-associated delay and therefore are low accounting quality firms. The high-low alpha can be interpreted as the return premium associated with low accounting quality.

In Panel B of Table 7, the t-statistics for the high-low alphas are significantly positive when both D_{Acct} and $D_{NonAcct}$ are high. In particular, when $D_{NonAcct}$ is also high, accounting-associated delay commands a monthly return premium of 0.5% (6% annualized, p-value<5%). This suggests poor accounting quality is associated with a higher cost of equity when non-accounting frictions such as stock illiquidity and lack of investor attention are also severe.

To reconcile this result with some findings in the prior literature that AQ is not a priced risk factor, note that we show the relation between accounting quality and future stock returns is (i) indirect, and (ii) conditional. The relation is indirect because accounting quality is associated with higher future stocks returns through stock price delay (i.e., the projection of price delay on accounting quality has a return premium). The relation is conditional because accounting quality predicts stock returns only when non-accounting frictions are high. In contrast, prior papers examine direct and unconditional relations between accounting quality and future stock returns.

6.2. Alternative Accounting Quality Measures

6.2.1. Accrual Quality (AQ) as the Sole Measure of Accounting Quality

We examine whether the relation between accounting quality and stock price delay is robust to using AQ as the sole measure of accounting quality. Table 8, Panel A, re-estimates the delay regression of Table 4 using AQ only, and omitting ES, SI and Loss. AQ loads significantly positively at less than 1%, indicating that firms with poor accrual quality are associated with higher stock price delay as expected. Table 8, Panel B, re-estimates the return prediction regression of Table 6 using AQ as the sole measure of accounting quality. The fitted component of delay (from Panel A of Table 8) due to AQ, denoted $D_{AQ,}$ loads significantly positively at less than 1% in Panel B, indicating that firms with higher accounting-associated delay have higher future returns. Thus, results are robust to using AQ as the sole measure of accounting quality.

6.2.2. Annual Reports' Lexical Properties as a Measure of Accounting Quality

We examine whether the relation between accounting quality and stock price delay is robust to using the FOG index of Li (2008), which is a measure of the readability of qualitative information in annual reports. The qualitative information is forward-looking (e.g., MD&A), helps in interpreting financial statement numbers and is useful in forecasting cash flows. Annual reports that are more difficult to read are likely associated with lower quality cash flow forecasts and more delayed (less timely) incorporation of value-relevant information into stock prices (e.g., Grossman and Stiglitz, 1980; Bloomfield, 2002; Li, 2008).

The U.S. Securities and Exchange Commission (SEC) has long encouraged and provided guidelines for the use of plain English in disclosures and annual reports, suggesting the lexical properties of disclosures affect investors' information processing costs. Li (2008) uses innovations from the computational linguistics literature to measure text complexity based on the number of words per sentence and the number of syllables per word. He computes a FOG index of readability, and provides evidence that managers appear to strategically use annual report readability to obfuscate poor performance and low earnings persistence. This suggests firms with poor earnings quality have a higher FOG score.

We re-estimate the delay regression in Table 4 by substituting FOG in place of our four main accounting quality proxies. We also control for the length of the annual report using the number of words (NWords). Li (2008) suggests longer reports may be less readable or may have more information, so the effect of NWords on delay is an empirical question. Results shown in Panel A of Table 9 indicate that firms with a high FOG score have significantly higher stock price delay (t-stat=1.94, one-tailed p-value<5%), while NWords loads significantly negatively consistent with longer reports having more information.[10] This result is consistent with Table 4, and suggests the relation between accounting quality and price delay is robust. Panel B of Table 9 shows that, using FOG and NWords to proxy for accounting quality, firms with high accounting-associated delay (D_{Lex}) have higher future stock returns, suggesting the results in Table 6 are robust.

6.3. Alternative Delay Measure

Recall that D is estimated from equation (2) using market returns as the news to which stock i responds. We also estimate a second delay measure, D_fs, in which firm-specific news is the stimulus to which investors respond. In this case, investors attempt to assess the implications of firm-specific news (e.g., loss of foreign market share) for the firm's future cash flows. To estimate D_fs we replace the four lagged market return terms in equation (2) with four lagged firm-specific returns, and use equation (3) applied to this model.

---

[10] Both FOG and NWords data were graciously provided to us by Feng Li.

In untabulated results the distribution of firm-specific news delay, D_fs, is similar to that of D, suggesting that stock price delay is a characteristic of the firm (i.e., of the firm's information environment) rather than of the particular type of news (market or firm-specific news). We therefore expect our results are robust, but verify as shown in Table 10. Panel A of Table 10 shows that when D_fs is the dependent variable, all four accounting quality proxies (ES, AQ, SI and Loss) load significantly in the predicted direction, suggesting the results in Table 4 are robust to the delay measure. Panel B of Table 10 shows that the component of D_fs associated with poor accounting quality (D_fs_{Acct}) is significantly positively associated with future stock returns (p-value<1%), suggesting the results in Table 6 are robust to this alternative delay measure.

6.4. Alternative Liquidity Controls

We re-estimate the regression in Table 4 after adding the Amihud (2002) illiquidity measure to the reported set of independent variables. The Amihud (2002) measure is the absolute stock return per dollar trading volume, or essentially a price impact metric. More illiquid stocks are expected to experience higher price impact per dollar trading volume. The results are shown in Table 11. The first pair of columns in Panel A shows that the Amihud (2002) measure (Illiquidity) loads significantly positively (p-value<1%), but the accounting quality loadings are robust. In particular, AQ loads significantly positively (p-value<1%), SI loads significantly negatively (p-value<1%), Loss loads significantly positively (p-value<10%) and ES is insignificant. This implies the relation between accounting quality and stock price delay is robust to the Amihud (2002) measure of illiquidity. We further re-estimate the regression in Table 6 after including the Amihud (2002) illiquidity measure in the non-accounting determinants of delay. The first pair of columns in Panel B of Table 11 indicates that the accounting-associated delay, D_{Acct}, continues to be robustly associated with future stock returns, with a p-value less than 1%.

In untabulated tests we find that results are robust to a host of other liquidity controls, including: (i) dropping stocks with price per share less than $5; (ii) dropping firms with market capitalization less than $5m; (iii) dropping stocks with monthly trading volume less than $200k; and (iv) keeping only NYSE firms. We conclude that our results are robust to a number of different controls for liquidity suggested in the prior literature.

6.5. Controlling for Innate Determinants of AQ

To address any potential concern that AQ captures the firm's innate operating characteristics, rather than accounting quality, we re-estimate the delay regression of Table 4 and the return prediction regression of Table 6 controlling for the innate determinants of AQ suggested in Francis et al. (2005): cash flow volatility, sales volatility, length of the operating cycle, loss frequency and size. The results are shown in Table 11. The middle pair of columns in Panel A shows that AQ and SI (Loss is now considered an innate factor) continue to be robustly associated with price delay, with p-values less than 1% and 5%, respectively. .

The middle pair of columns in Panel B shows that D_{Acct}, measured as the fitted portion of D associated with ES, AQ and SI, continues to load significantly positively as predicted, with a p-value less than 1%. In summary, our results are robust to controlling for the innate determinants of AQ.

6.6. Controlling for the Firm's Growth Options

We test whether our accounting quality variables are capturing the firm's growth options by controlling for five growth option proxies used in Cao, Simin and Zhao (2008): Tobin's Q; R&D to Sales ratio; capital expenditures to fixed assets ratio; debt to equity ratio; and the present value of growth options. Table 11 shows the results, and the notes to the table define all five variables. The last pair of columns in Panel A of Table 11 shows AQ and special items continue to be robustly associated with price delay, with p-values less than 1% and 5%, respectively.

The last pair of columns in Panel B of Table 11 shows that, after controlling for growth options (as well as innate factors and the Amihud illiquidity measure), accounting-associated delay (D_{Acct}) continues to be robustly associated with future stock returns with a p-value less than 1%. In summary, the results are robust to controlling for the firm's growth options.

7. Conclusion

We examine whether poor accounting quality is associated with delayed price adjustment to information. We hypothesize that poor accounting quality is associated with a lower quality pre-existing information set that investors use to forecast cash flows. In particular, we hypothesize that processing the price implications of newly-arriving value-relevant information takes longer when accounting quality is poor, leading to delayed stock price adjustment. Using the Hou and Moskowitz (2005) metric of price delay, we present evidence that accounting quality is negatively associated with price delay.

We refer to the precision with which accounting information informs equity investors about future cash flows as accounting quality. Using four proxies for accounting quality based on quantitative financial statement information – accrual quality, loss frequency, special items and earnings surprises – we find that firms with poor accrual quality, more frequent losses and large negative special items are associated with significantly higher price delay. Results are robust to using AQ as the sole measure of accounting quality. Results are also robust to measuring accounting quality by the FOG index of Li (2008), which is a measure of the readability of qualitative (non-financial-statement) information in annual reports.

We find that high delay firms have a significant return premium of about 5% annually relative to low delay firms. We also find that poor accounting quality in particular is associated with a statistically significant return premium of about 6% annualized in firms with the highest non-accounting-induced delay. Our results suggest poor accounting quality is associated with higher cost of equity.

These results suggest several opportunities for future research. One opportunity is to examine whether poor accounting quality is associated with a delay in bond prices. Another opportunity, along the lines of Verrecchia (1980), is to examine the types of news that are associated with greater stock price delay.

Appendix: Variable Definitions

Delay Variables

D: Average delay with which market news is impounded into stock price, estimated as described in Section 3.3.

D_{Acct}: The accounting quality component of price delay, estimated as the fitted portion of delay associated with accounting quality, and described in Section 5.

D_{AQ}: The accounting quality component of price delay, estimated as the fitted portion of delay associated with accrual quality (as the sole measure of accounting quality).

D_{Lex}: The accounting quality component of price delay, estimated as the fitted portion of delay associated with FOG and NWords.

$D_{NonAcct}$: The difference between *D* and D_{Acct}.

D_{NonAQ}: The difference between *D* and D_{AQ}.

D_{NonLex}: The difference between *D* and D_{Lex}.

D_fs: Average delay with which firm-specific news is impounded into stock price, estimated as described in Section 6.3.

D_fs_{Acct}: The fitted portion of *D_fs* associated with accounting quality.

$D\_fs_{NonAcct}$: The difference between *D_fs* and D_fs_{Acct}.

Accounting Quality Variables:

AQ: Accrual quality as measured by the uncertainty in the accrual-to-cash flow mapping, and described in Section 3.2.

ES: The absolute value of annual earnings surprise scaled by the standard deviation of annual earnings surprises in the last five years. Earnings surprise is the difference between the consensus earnings forecast and actual earnings reported in IBES. The calculation requires a minimum three years of annual earnings history.

Loss: The relative frequency of losses in the previous three years (number of loss years divided by three). A loss year is one in which net income before extraordinary items (Compustat data item 18) is negative.

FOG: The index of Li (2008), which is a measure of the readability of *qualitative* information in annual reports.

SI: Special items (Compustat data item 17), divided by lagged total assets (data item 6).

Other Variables:

Accruals: The change in working capital, minus depreciation, scaled by total assets. Specifically, the [change in (current assets – cash – current liabilities + debt in current liabilities) – depreciation] / total assets. In terms of Compustat data items this is [Δ(data4 – data1 – data5 + data34) – data14] / data6.

Adv: The logarithm of (1+ advertising expense). Advertising expense is reported in Compustat (data item 45). Adv is set to zero when advertising expense is missing.

Analyst: The logarithm of (1 + the number of analysts who issue annual EPS forecasts reported in IBES in calendar year t). If the number of analyst following is 0, Analyst is zero.

Beta: The CAPM beta at the end of June each year, estimated using rolling 60-month firm-specific regressions of excess stock returns on an intercept and the market excess return.

B/M: The logarithm of book value divided by market value of equity, log(data60/(data25*data199)).

BSM: The probability of default, measured using the option pricing model of Merton (1974).

CAcc: Current accruals, defined as total accruals plus depreciation, or Accruals + (data14/data6).

CBreadth: Annual percentage change in breadth, where breadth is the number of mutual funds with long positions in the stock divided by the total number of mutual funds.

CFO: Operating cash flows, defined as net income before extraordinary items, scaled by total assets, minus accruals. Specifically, (data18/data6) – Accruals.

CFVol: Volatility of operating cash flows, defined as the standard deviation over years t-5 to t-1 of the ratio of operating cash flows to average total assets.

Empl: The logarithm of (1+ number of employees). Number of employees is reported in Compustat (data item 29).

InstOwn: The logarithm of (1+ annual institutional ownership). Annual institutional ownership is average quarterly institutional ownership in year t. Quarterly institutional ownership is defined as the number of shares held by institutional investors at quarter end, as reported in 13F filings in the Thomson Financial database, divided by the number of shares outstanding.

Illiquidity: Annual average daily absolute stock return per dollar trading volume (Amihud 2002).

NASDAQ = 1 if the firm is listed on Nasdaq, and 0 otherwise.

NWords: The number of words in the annual report, as measured by Li (2008).

PPE: Property, plant and equipment scaled by total assets, or data7/data6.

$Ret_{[-36,-13]}$: Total returns from month -36 to month -13, where month 0 is the regression month.

$Ret_{[12,-2]}$: Total returns from month -12 to month -2, where month 0 is the regression month.

$Ret_{[-1]}$: Returns at month -1, where month 0 is the regression month.

Ret: Average monthly returns over months +1 to +12.

Rev: Revenues scaled by total assets, or data12/data6.

Size: The logarithm of market value of equity (Compustat data25 x data199) at the end of each month.

Traday: The number of days a stock is traded in year t, defined as the number of days with non-zero trading volume.

Turn: The logarithm of turnover. Turnover is the average monthly number of shares traded divided by shares outstanding in year t.

Turn-NASD: the interaction term between the NASDAQ dummy and Turn.

Turn-NYAM: Turnover for NYSE and AMEX firms, defined as the interaction term between (1-NASDAQ) and Turn.

References

Aboody, David, John Hughes and Jing Liu. 2005. Earnings quality, insider trading and cost of capital. *Journal of Accounting Research*, 43 (5): 651-673.

Amihud, Yakov. 2002. Illiquidity and stock returns: cross-section and time series effects. *Journal of Financial Markets,* 5: 31-56.

Amihud, Yakov and Haim Mendelson. 1988. Liquidity and asset prices: Financial management implications. *Financial Management,* 17 (1): 5-15.

Ashbaugh-Skaife, Hollis, Daniel Collins, William Kinney and Ryan LaFond. 2008. The effect of SOX internal control deficiencies and their remediation on accrual quality. *The Accounting Review,* 83 (1): 217-250.

Barry, Christopher B. and Stephen J. Brown. 1984. Differential information and the small firm effect. *Journal of Financial Economics*, 13(2): 283-294.

Beatty, Anne, Scott Liao and Joseph Weber. 2008. Financial reporting quality, private information, monitoring and the lease-versus-buy decision. Working paper, MIT.

Bharath, Sreedhar, Jayanthi Sunder and Shyam Sunder. 2008. Accounting quality and debt contracting. *The Accounting Review*, 83: 1-28.

Bhattacharya, Neil, Hemang desai and Kumar Venkataraman. 2008. Earnings quality and information asymmetry. Working paper, Southern Methodist University.

Biddle, Gary, Gilles Hilary and Rodrigo Verdi. 2009. How does financial reporting quality relate to investment efficiency? Forthcoming, *Journal of Accounting and Economics*.

Black, Fischer and Myron Scholes. 1973. The pricing of options and corporate liabilities. *Journal of Political Economy,* 81: 637-654.

Bloomfield, Robert. 2002. The "incomplete revelation hypothesis" and financial reporting. *Accounting Horizons*, 16: 233-243.

Callen, Jeffrey, Suresh Govindaraj and Lin Xu. 2000. Large time and small noise asymptotic results for mean reverting diffusion processes with applications. *Economic Theory*, 16: 401-419.

Chen, Joseph, Harrison Hong and Jeremy Stein. 2002. Breadth of ownership and stock returns. *Journal of Financial Economics* 66: 171-205.

Chen, Linda, Dan Dhaliwal and Mark Trombley. 2008. The effect of fundamental risk on the market pricing of accruals quality. *Journal of Accounting, Auditing and Finance*, 23: 471-491.

Chen, Shuping, Terry Shevlin and Yen Tong. 2007. Does the pricing of financial reporting quality change around dividend changes? *Journal of Accounting Research,* 45 (1): 1-40.

Core, John, Wayne Guay and Rodrigo Verdi. 2008. Is accruals quality a priced risk factor? *Journal of Accounting and Economics*, 46 (1): 2-22.

Dechow, Patricia, and Ilia Dichev. 2002. The quality of accruals and earnings. *The Accounting Review*, 77: 35-59.

Dechow, Patricia, Weili Ge, Chad Larson and Richard Sloan. 2009. Predicting material accounting misstatements. Working paper, UC Berkeley.

Diamond, D.W., Verrecchia, R.E., 1987. Constraints on short-selling and asset price adjustment to private information. *Journal of Financial Economics* 18: 277-311.

Diamond, Douglas W. and Robert E. Verrecchia. 1991. Disclosure, liquidity, and the cost of capital. *Journal of Finance* 46 (4): 1325-1359.

Doyle, Jeffrey, Weili Ge and Sarah McVay. 2007. Accruals quality and internal control over financial reporting. *The Accounting Review*, 82 (5): 1141-1170.

Easley, David, Soeren Hvidkjaer and Maureen O'Hara. 2002. Is information risk a determinant of asset returns? *Journal of Finance*, 57 (5): 2185-2221.

Easley, David and Maureen O'Hara. 2004. Information and the cost of capital. *Journal of Finance* 59 (4): 1553-83.

Fama, Eugene F. and Kenneth R. French. 1992. The cross-section of expected stock returns. *Journal of Finance*, 47(2), 427-466.

Fama, Eugene F. and Kenneth R. French. 1993. Common risk factors in the returns on stocks and bonds. *Journal of Financial Economics*, 33: 3-56.

Fama, Eugene F. and Kenneth R. French. 1997. Industry costs of equity. *Journal of Financial Economics*, 43: 153-193.

Fama, Eugene F. and James MacBeth. 1973. Risk, return and equilibrium: empirical tests. *Journal of Political Economy*, 81: 607-636.

Francis, Jennifer, Ryan LaFond, Per Olsson and Katherine Schipper. 2004. Costs of equity and earnings attributes. *The Accounting Review*, 79: 967-1010.

Francis, Jennifer, Ryan LaFond, Per Olsson and Katherine Schipper. 2005. The market pricing of accruals quality. *Journal of Accounting and Economics*, 39: 295-327.

Grossman, Sanford and Joseph Stiglitz. 1980. On the impossibility of informationally efficient markets. *American Economic Review*, 70: 393-408.

Hillegeist, Stephen, Elizabeth Keating, Donald Cram and Kyle Lundstedt. 2004. Assessing the probability of bankruptcy. *Review of Accounting Studies*, 9: 5 – 34.

Hou, Kewei and Tobias Moskowitz. 2005. Market frictions, price delay and the cross-section of expected returns. *Review of Financial Studies*, 18 (3): 981-1020.

Hughes, John, Jing Liu, and Jun Liu. 2007. Information asymmetry, diversification, and cost of capital. *The Accounting Review* 82 (3): 705-29.

Hutton, Amy, Alan Marcus and Hassan Tehranian. 2009. Opaque financial reports and the distribution of stock returns. *Journal of Financial Economics,* 94: 67-86.

Jayaraman, Sudarshan. 2008. Earnings volatility, cash flow volatility and informed trading. *Journal of Accounting Research*, 46: 809-851.

Jegadeesh, Narasimhan. 1990. Evidence of predictable behavior of security returns. *Journal of Finance*, 45: 881-898.

Jegadeesh, Narasimhan and Sheridan Titman. 1993. Returns to buying winners and selling losers: implications for stock market efficiency. *Journal of Finance*, 48: 65-91.

Jiang, Guohua, Charles Lee and Yi Zhang. 2005. Information uncertainty and expected returns. *Review of Accounting Studies*, 10: 185-221.

Lambert, Richard A., Christian Leuz, and Robert E. Verrecchia. 2007. Accounting information, disclosure, and the cost of capital. *Journal of Accounting Research* 45 (2): 385-420.

Li, Feng. 2008. Annual report readability, current earnings and earnings persistence. *Journal of Accounting and Economics,* 45: 221-247.

McNichols, Maureen. 2002. Discussion of "The quality of accruals and earnings: the role of accrual estimation errors." *The Accounting Review*, 77 (supplement), 61-69.

Merton, Robert C. 1974. On the pricing of corporate debt: The risks structure of interest rates. *Journal of Finance*, 29: 449 – 470.

Merton, Robert C. 1987. Presidential address: A simple model of capital market equilibrium with incomplete information. *Journal of Finance*, 42 (3): 483-510.

Mohanram, Partha, and Shivaram Rajgopal. 2009. Is PIN priced risk? Forthcoming, *Journal of Accounting and Economics*.

Ng, Jeffrey. 2008. The effect of information quality on liquidity risk. Working paper, MIT.

Ogneva, Maria. 2008. A Re-examination of the Cost-of-Capital Effects of Accrual Quality: Evidence from the Future Realized Returns. Working paper, Stanford University.

Petersen, Mitchell. 2009. Estimating standard errors in finance panel data sets: comparing approaches. *Review of Financial Studies*, 22: 435-480.

Rajgopal, Shivaram and Mohan Venkatachalam. 2008. Financial reporting quality and idiosyncratic return volatility over the last four decades. Working paper, U. of Washington and Duke.

Sloan, Richard. 1996. Do stock prices fully reflect information in accruals and cash flows about future earnings? *The Accounting Review*, 3: 289-316.

Verrecchia, Robert. 1980. The rapidity of price adjustments to information. *Journal of Accounting and Economics*, 2: 63-92.

White, Halbert. 1984. A heteroskedasticity-consistent covariance matrix estimator and a direct test of heteroskedasticity. *Econometrica*, 48: 817-838.

Zhang, X. Frank. 2006. Information uncertainty and stock returns. *Journal of Finance*, 61: 105-137.

Table 1. Descriptive Statistics

The table reports descriptive statistics for 29,345 firm-years from 1981 to 2006. D is the average delay with which information is impounded into stock price, and its estimation is described in section 3.3 in the text. ES is the absolute value of annual earnings surprise scaled by the standard deviation of annual earnings surprises over the last five years. AQ is accrual quality, measured as the standard deviation of the residuals from the Dechow-Dichev model over the last five years. SI is special items. Loss is the relative frequency of annual losses in past three years (number of loss years divided by three). Analyst is log of 1+the number of analysts. InstOwn is log of 1+annual institutional ownership, where ownership is number of shares held scaled by shares outstanding. Empl is log of 1+the number of employees. Adv is log of 1+advertising expense. NASDAQ=1 if the firm trades on NASDAQ, and 0 otherwise. Turn is log of share turnover, where turnover is average monthly shares traded scaled by shares outstanding. Traday is the number of days the stock is traded in a given year. BSM is the probability of default from the Merton (1974) option pricing model. CBreadth is the change of breadth from year t-1 to year t scaled by breadth in year t-1. Breadth is the annual average of quarterly breadth which is the ratio of the number of mutual funds that hold a long position in the stock to the total number of mutual funds in the quarter.

	Mean	Q1	Median	Q3	StdDev
D	0.093	0.016	0.042	0.119	0.124
ES	1.942	0.201	0.645	1.697	8.426
AQ	0.039	0.020	0.033	0.050	0.026
SI	-0.013	-0.009	0	0	0.066
Loss	0.199	0	0	0.333	0.323
Analyst	1.826	1.099	1.792	2.485	0.831
InstOwn	0.379	0.251	0.399	0.518	0.172
Empl	1.589	0.588	1.324	2.303	1.228
Adv	1.027	0	0	1.645	1.722
NASDAQ	0.430	0	0	1	0.495
Turn	0.130	0.045	0.086	0.162	0.145
Traday	248	251	252	252	17
BSM	0.036	0	0	0.007	0.113
CBreadth	0.080	-0.203	-0.004	0.216	0.585

Table 2. Correlations

The table reports means of annual cross-sectional Pearson (upper diagonal) and Spearman (lower diagonal) correlations. D is the average delay with which information is impounded into stock price, and its estimation is described in section 3.3 in the text. ES is the absolute value of annual earnings surprise scaled by the standard deviation of annual earnings surprises over the last five years. AQ is accrual quality, measured as the standard deviation of the residuals from the Dechow-Dichev model over the last five years. SI is special items. Loss is the relative frequency of annual losses in past three years (number of loss years divided by three). Analyst is log of 1+the number of analysts. InstOwn is log of 1+annual institutional ownership, where ownership is number of shares held scaled by shares outstanding. Empl is log of 1+the number of employees. Adv is log of 1+advertising expense. NASDAQ=1 if the firm trades on NASDAQ, and 0 otherwise. Turn is log of share turnover, where turnover is average monthly shares traded scaled by shares outstanding. Traday is the number of days the stock is traded in a given year. BSM is the probability of default from the Merton (1974) option pricing model. CBreadth is the change of breadth from year t-1 to year t scaled by breadth in year t-1. Breadth is the annual average of quarterly breadth which is the ratio of the number of mutual funds that hold a long position in the stock to the total number of mutual funds in the quarter. Numbers in bold are statistically significant at 1%, where significance is calculated using the time series of annual correlations in order to control for time effects.

	D	ES	AQ	SI	Loss	Analyst	InstOwn	Empl	Adv	NASDAQ	Turn	Traday	BSM	CBreadth
D		**-0.06**	**0.16**	**-0.04**	**0.25**	**-0.53**	**-0.43**	**-0.41**	**-0.22**	**0.28**	**-0.10**	**-0.36**	**0.14**	**-0.08**
ES	**-0.12**		**-0.06**	**0.14**	**-0.09**	**0.05**	**0.05**	**0.04**	**0.03**	**-0.04**	-0.01	**0.04**	**-0.08**	**0.04**
AQ	**0.19**	**-0.05**		**-0.11**	**0.25**	**-0.16**	**-0.07**	**-0.24**	**-0.09**	**0.20**	**0.15**	-0.01	**0.08**	**0.04**
SI	-0.02	**0.12**	**-0.08**		**-0.21**	**-0.01**	-0.01	**0.02**	0.00	**-0.05**	**-0.08**	**-0.02**	**-0.08**	**0.04**
Loss	**0.27**	**-0.16**	**0.24**	**-0.20**		**-0.20**	**-0.20**	**-0.23**	**-0.11**	**0.19**	**0.10**	-0.01	**0.30**	**-0.06**
Analyst	**-0.64**	**0.12**	**-0.17**	**-0.03**	**-0.20**		**0.51**	**0.54**	**0.33**	**-0.25**	**0.18**	**0.29**	**-0.08**	**-0.05**
InstOwn	**-0.46**	**0.10**	**-0.04**	**-0.03**	**-0.19**	**0.52**		**0.30**	**0.19**	**-0.18**	**0.17**	**0.23**	**-0.11**	0.03
Empl	**-0.55**	**0.09**	**-0.23**	-0.01	**-0.25**	**0.55**	**0.37**		**0.50**	**-0.42**	-0.03	**0.17**	**-0.05**	**-0.06**
Adv	**-0.21**	**0.04**	-0.03	**-0.02**	**-0.06**	**0.24**	**0.16**	**0.35**		**-0.18**	**0.07**	**0.10**	**-0.04**	**-0.03**
NASDAQ	**0.33**	**-0.04**	**0.21**	**-0.03**	**0.18**	**-0.26**	**-0.19**	**-0.45**	**-0.09**		**0.23**	**-0.16**	**0.02**	0.03
Turn	**-0.14**	**0.04**	**0.20**	**-0.08**	**0.15**	**0.29**	**0.31**	0.01	**0.11**	**0.23**		**0.15**	**0.08**	**0.15**
Traday	**-0.48**	**0.07**	**-0.06**	**-0.02**	**-0.05**	**0.48**	**0.33**	**0.33**	**0.14**	**-0.21**	**0.376**		0.00	**0.04**
BSM	**0.20**	**-0.14**	**0.08**	**-0.12**	**0.33**	**-0.11**	**-0.12**	**-0.02**	**-0.04**	0.02	**0.119**	**-0.03**		**-0.11**
CBreadth	**-0.14**	**0.10**	-0.02	**0.09**	**-0.15**	0.02	**0.11**	0.02	0.00	**-0.03**	**0.097**	**0.08**	**-0.22**	

Table 3. Univariate Analysis of Information Delay

The table reports means by quintiles of price delay, D. D is the average delay with which information is impounded into stock price, and its estimation is described in section 3.3 in the text. ES is the absolute value of annual earnings surprise scaled by the standard deviation of annual earnings surprises over the last five years. AQ is accrual quality, measured as the standard deviation of the residuals from the Dechow-Dichev model over the last five years. SI is special items. Loss is the relative frequency of annual losses in past three years (number of loss years divided by three). Analyst is log of 1+the number of analysts. InstOwn is log of 1+annual institutional ownership, where ownership is number of shares held scaled by shares outstanding. Empl is log of 1+the number of employees. Adv is log of 1+advertising expense. NASDAQ=1 if the firm trades on NASDAQ, and 0 otherwise. Turn is log of share turnover, where turnover is average monthly shares traded scaled by shares outstanding. Traday is the number of days the stock is traded in a given year. BSM is the probability of default from the Merton (1974) option pricing model. CBreadth is the change of breadth from year t-1 to year t scaled by breadth in year t-1. Breadth is the annual average of quarterly breadth which is the ratio of the number of mutual funds that hold a long position in the stock to the total number of mutual funds in the quarter. * and *** denote one-tailed statistical significance at 10% and 1%, respectively, where significance is calculated using the time series of annual High-Low differences in order to control for cross-sectional correlation.

	Low	2	3	4	High	High-Low	
D	0.009	0.026	0.056	0.108	0.265	0.256	***
ES	1.592	1.705	1.735	2.294	2.383	0.791	***
AQ	0.032	0.036	0.038	0.041	0.047	0.015	***
SI	-0.011	-0.011	-0.013	-0.013	-0.017	-0.006	***
Loss	0.094	0.143	0.180	0.231	0.347	0.252	***
Analyst	2.564	2.111	1.827	1.507	1.126	-1.437	***
InstOwn	0.456	0.430	0.399	0.353	0.257	-0.199	***
Empl	2.643	1.837	1.493	1.148	0.828	-1.814	***
Adv	1.827	1.168	0.869	0.738	0.539	-1.288	***
NASDAQ	0.208	0.324	0.399	0.539	0.679	0.470	***
Turn	0.144	0.145	0.139	0.129	0.094	-0.050	***
Traday	252	251	251	248	240	-12	***
BSM	0.018	0.028	0.034	0.042	0.059	0.041	***
CBreadth	0.083	0.111	0.114	0.094	-0.005	-0.088	*

Table 4. Determinants of Information Delay

The table presents coefficients from pooled (cross-sectional and time-series) regressions of price delay, D, on the variables shown. D is the average delay with which information is impounded into stock price, and its estimation is described in section 3.3 in the text. ES is the absolute value of annual earnings surprise scaled by the standard deviation of annual earnings surprises over the last five years. AQ is accrual quality, measured as the standard deviation of the residuals from the Dechow-Dichev model over the last five years. SI is special items. Loss is the relative frequency of annual losses in past three years (number of loss years divided by three). Analyst is log of 1+the number of analysts. InstOwn is log of 1+annual institutional ownership, where ownership is number of shares held scaled by shares outstanding. Empl is log of 1+the number of employees. Adv is log of 1+advertising expense. NASDAQ=1 if the firm trades on NASDAQ, and 0 otherwise. Turn is log of share turnover, where turnover is average monthly shares traded scaled by shares outstanding. Traday is the number of days the stock is traded in a given year. BSM is the probability of default from the Merton (1974) option pricing model. CBreadth is the change of breadth from year t-1 to year t scaled by breadth in year t-1. Breadth is the annual average of quarterly breadth which is the ratio of the number of mutual funds that hold a long position in the stock to the total number of mutual funds in the quarter. The t-statistics are based on standard errors clustered by firm and time (double clustering). ** and *** denote one-tailed statistical significance at 5%, and 1%, respectively.

	Coeff	t-stat		Coeff	t-stat	
Intercept	0.056	8.89	***	0.460	3.07	***
ES	0.0004	2.25	**	0.0001	0.72	
AQ	0.614	8.21	***	0.309	6.10	***
SI	0.014	0.88		-0.037	-2.44	***
Loss	0.069	4.92	***	0.017	1.77	**
Analyst				-0.032	-6.66	***
InstOwn				-0.142	-8.87	***
Empl				-0.011	-7.06	***
Adv				-0.0004	-0.55	
NASDAQ				0.045	5.22	***
Turn-NYAM				-0.010	-0.41	
Turn-NASD				-0.157	-5.27	***
Traday				-0.001	-1.77	**
BSM				0.119	7.38	***
CBreadth				-0.010	-1.98	**
R-Sq		6.28%			35.42%	

Table 5. Univariate Analysis of Return Predictability

The table reports means by quintile of the accounting component, D_{Acct}, of price delay. D_{Acct}, described in Section 5 in the text, is the fitted portion of D associated with accounting quality. D is the average delay with which information is impounded into stock price, and its estimation is described in section 3.3 in the text. $D_{NonAcct}$ is the non-accounting component of delay and is defined as the difference between D and D_{Acct}. Ret is the average monthly return from months t+1 to t+12. Beta is the CAPM beta at the end of June each year, estimated using rolling 60-month time series firm-specific regressions. B/M is the log book-to-market ratio. Size is the log market value of equity. $Ret_{[-1]}$ is the return in month t-1. $Ret_{[-12,-2]}$ is the total return from months t-12 to t-2. $Ret_{[-36,-13]}$ is the total return from months t-36 to t-13. Accruals is the change in working capital, minus depreciation, scaled by average total assets. *** denotes one-tailed statistical significance at 1%, where significance is calculated using the time series of annual High-Low differences in order to control for cross-sectional correlation.

	Low	2	3	4	High	High-Low	
D_{Acct}	0.002	0.006	0.009	0.016	0.035	0.033	***
$D_{NonAcct}$	0.063	0.068	0.077	0.090	0.109	0.046	***
D	0.065	0.074	0.086	0.106	0.144	0.079	***
Ret	0.013	0.014	0.014	0.014	0.015	0.002	
Beta	0.877	0.991	1.103	1.284	1.571	0.694	***
B/M	-0.771	-0.832	-0.813	-0.777	-0.715	0.057	
Size	6.853	6.582	6.262	5.910	5.209	-1.644	***
$Ret_{[-1]}$	0.014	0.014	0.015	0.014	0.016	0.003	
$Ret_{[-12,-2]}$	0.153	0.163	0.161	0.187	0.196	0.043	
$Ret_{[-36,-13]}$	0.414	0.462	0.477	0.493	0.204	-0.210	
Accruals	-0.043	-0.039	-0.031	-0.027	-0.055	-0.012	***

Table 6. Return Prediction Regressions

The table presents mean coefficients from Fama and MacBeth (1973) cross-sectional regressions of one-year-ahead monthly excess stock returns on the variables shown. D is the average delay with which market information is impounded into stock price, and its estimation is described in section 3.3 in the text. The accounting component of delay, D_{Acct}, is the fitted portion of D associated with accounting quality and is described in Section 5 in the text. The non-accounting component of delay, $D_{NonAcct}$, is defined as the difference between D and D_{Acct}. Beta is the CAPM beta at the end of June each year, estimated using rolling 60-month time series firm-specific regressions. B/M is the log book-to-market ratio. Size is the log market value of equity. $Ret_{[-1]}$ is the return in month t-1. $Ret_{[-12,-2]}$ is the total return from months t-12 to t-2. $Ret_{[-36,-13]}$ is the total return from months t-36 to t-13. Accruals is the change in working capital, minus depreciation, scaled by average total assets. The t-statistics are calculated from Fama-MacBeth standard errors. *, **, and *** denote one-tailed statistical significance at 10%, 5%, and 1%, respectively.

	Coeff	t-stat		Coeff	t-stat	
Intercept	-0.046	-8.12	***	-0.058	-10.06	***
Beta	0.004	1.92	**	0.003	1.64	**
B/M	0.007	7.73	***	0.007	8.29	***
Size	0.008	12.48	***	0.010	14.49	***
$Ret_{[-1]}$	-0.053	-9.89	***	-0.054	-10.26	***
$Ret_{[-12,-2]}$	-0.001	-0.44		-0.002	-1.02	
$Ret_{[-36,-13]}$	-0.001	-2.01	**	-0.001	-1.70	**
Accruals	-0.009	-2.18	**	-0.006	-1.60	*
D	0.081	9.64	***			
$D_{NonAcct}$				0.110	12.03	***
D_{Acct}				0.333	5.67	***
R-Sq	21.79%			22.59%		

Table 7. Calendar Time Fama-French Regressions

The table reports alphas and t-statistics from calendar-time Fama-French three-factor regressions. The dependent variable is the monthly excess return, over the risk-free rate, on test portfolios. The independent variables are an intercept (or alpha) and the three Fama and French (1993) risk factors. In Panel A, firms are sorted annually into quintiles of price delay, D, to yield 5 test portfolios. D is the average delay with which market information is impounded into stock price, and its estimation is described in section 3.3 in the text. In Panel B firms are sorted into quintiles of D_{Acct} and $D_{NonAcct}$ independently each year to yield 25 test portfolios. D_{Acct} is the accounting component of D, measured as the fitted portion of D associated with accounting quality, and $D_{NonAcct}$ is the difference between D and D_{Acct}. D_{Acct}, is described in Section 5 in the text. ** and *** denote one-tailed statistical significance at 5% and 1%, respectively.

Panel A. Quintiles of D

	alpha	t-stat
Low	0.0009	0.85
2	0.0013	1.14
3	0.0018	1.77
4	0.0026	2.55
High	0.0052	3.67
High-Low	0.0042	2.55***

Panel B. Quintiles of D_{Acct} x Quintiles of $D_{NonAcct}$

	Alpha					t-stat					
	Low $D_{NonAcct}$	2	3	4	High $D_{NonAcct}$	Low	2	3	4	High	High-Low
Low D_{Acct}	0.0010	0.0029	0.0023	0.0013	0.0040	0.63	2.68	1.94	1.05	2.78	0.85
2	0.0020	0.0020	0.0021	0.0021	0.0025	1.36	1.51	1.47	1.59	1.56	0.34
3	0.0018	0.0016	0.0026	0.0027	0.0041	1.33	1.04	1.76	1.65	2.33	1.11
4	-0.0006	-0.0028	0.0014	0.0005	0.0037	-0.37	-1.41	0.77	0.29	2.16	2.02**
High D_{Acct}	-0.0021	0.0022	0.0051	0.0024	0.0090	-1.04	0.79	2.25	1.05	3.53	3.90***
High-Low	-0.0031	-0.0006	0.0028	0.0011	0.0050	-1.37	-0.22	1.08	0.42	1.80**	

Table 8. Accrual Quality (AQ) as the Sole Measure of Accounting Quality

The table reports coefficients and t-statistics from a delay regression (Panel A) and a return prediction regression (Panel B) when accounting quality is measured by accrual quality (AQ) only. Panel A (Panel B) follows Table 4 (Table 6). See Tables 4 and 6 for the relevant regression description and variable definitions. In Panel B, D_{AQ} is the fitted portion of D associated with AQ, while D_{NonAQ} is the difference between D and D_{AQ}. D is the average delay with which information is impounded into stock price, and its estimation is described in section 3.3 in the text. ** and *** denote one-tailed statistical significance at 5% and 1%, respectively.

Panel A. Delay Regression

	Coeff	t-stat	
Intercept	0.458	3.06	***
AQ	0.347	6.32	***
Analyst	-0.033	-6.60	***
InstOwn	-0.145	-9.06	***
Empl	-0.012	-7.18	***
Adv	-0.0004	-0.61	
NASDAQ	0.047	5.02	***
Turn-NYAM	-0.002	-0.06	
Turn-NASD	-0.151	-5.26	***
Traday	-0.001	-1.74	**
BSM	0.131	7.60	***
CBreadth	-0.011	-2.11	**
R-Sq	35.20%		

Panel B: Return Prediction Regression

	Coeff	t-stat	
Intercept	-0.059	-10.03	***
Beta	0.003	1.68	**
B/M	0.008	8.38	***
Size	0.010	14.34	***
$Ret_{[-1]}$	-0.054	-10.18	***
$Ret_{[-12,-2]}$	-0.002	-1.05	
$Ret_{[-36,-13]}$	-0.001	-2.17	**
Accruals	-0.009	-2.25	***
D_{NonAQ}	0.111	11.89	***
D_{AQ}	0.403	6.34	***
R-Sq	22.58%		

Table 9. Annual Reports' Lexical Properties as Measure of Accounting Quality

The table reports coefficients and t-statistics from a delay regression (Panel A) and a return prediction regression (Panel B) when accounting quality is measured by the readability (FOG) and the length (NWords) of annual reports. The Fog Index and NWords are obtained from Feng Li for the period 1994-2004. Panel A (Panel B) follows Table 4 (Table 6). See Tables 4 and 6 for the relevant regression description and variable definitions. In Panel B, D_{Lex} is the fitted portion of D associated with FOG and NWords, while D_{NonLex} is the difference between D and D_{Lex}. D is the average delay with which information is impounded into stock price, and its estimation is described in section 3.3 in the text. ** and *** denote one-tailed statistical significance at 5% and 1%, respectively.

Panel A. Delay Regression

	Coeff	t-stat	
Intercept	0.791	10.33	***
Analyst	-0.033	-10.24	***
InstOwn	-0.182	-8.45	***
Empl	-0.014	-5.52	***
Adv	0.002	2.16	**
NASDAQ	0.051	5.40	***
Turn-NYAM	0.041	2.05	**
Turn-NASD	-0.138	-4.18	***
Traday	-0.002	-8.07	***
BSM	0.121	6.24	***
CBreadth	-0.019	-2.72	***
Fog	0.001	1.94	**
NWords	-0.0001	-2.60	***
R-Sq	44.27%		

Panel B: Return Prediction Regression

	Coeff	t-stat	
Intercept	-0.099	-6.92	***
Beta	0.005	1.89	**
B/M	0.008	5.45	***
Size	0.012	9.46	***
$Ret_{[-1]}$	-0.045	-4.61	***
$Ret_{[-12,-2]}$	-0.008	-2.66	***
$Ret_{[-36,-13]}$	-0.003	-3.00	***
Accruals	-0.012	-2.07	**
D_{NonLex}	0.132	8.46	***
D_{Lex}	1.095	5.33	***
R-Sq	15.22%		

Table 10. Alternative Price Delay Measure

The table reports coefficients and t-statistics from a delay regression (Panel A) and return prediction regression (Panel B) when price delay is measured by D_fs. D_fs, described in Section 6.3 in the text, is the average delay with which firm-specific (as opposed to market-wide) information is fully impounded into stock price. Panel A follows Table 4 using D_fs as the dependent variable. Panel B follows Table 6. See Tables 4 and 6 for the relevant regression description and variable definitions. In Panel B, D_fs_{Acct} is the fitted portion of D_fs associated with accounting quality, where accounting quality is measured by ES, AQ, SI and Loss. $D\_fs_{NonAcct}$ is the difference between D_fs and D_fs_{Acct}. *, **, and *** denote one-tailed statistical significance at 10%, 5%, and 1%, respectively.

Panel A. Delay Regression

	Coeff	t-stat	
Intercept	0.433	3.09	***
Analyst	-0.033	-6.70	***
InstOwn	-0.129	-9.25	***
Empl	-0.010	-6.67	***
Adv	-0.001	-0.98	
NASDAQ	0.047	5.62	***
Turn-NYAM	-0.011	-0.45	
Turn-NASD	-0.159	-5.81	***
Traday	-0.001	-1.81	**
BSM	0.113	6.00	***
CBreadth	-0.013	-2.94	***
ES	0.0002	2.20	**
AQ	0.302	6.85	***
SI	-0.033	-3.00	***
Loss	0.014	1.68	**
R-Sq	35.06%		

Panel B: Return Prediction Regression

	Coeff	t-stat	
Intercept	-0.055	-10.07	***
Beta	0.003	1.62	*
B/M	0.008	8.48	***
Size	0.009	14.64	***
$Ret_{[-1]}$	-0.054	-10.19	***
$Ret_{[-12,-2]}$	-0.002	-0.82	
$Ret_{[-36,-13]}$	-0.001	-1.85	**
Accruals	-0.007	-1.74	**
$D\_fs_{NonAcct}$	0.106	11.80	***
D_fs_{Acct}	0.363	5.67	***
R-Sq	22.48%		

Table 11. Controlling for Amihud Illiquidity, Innate AQ Determinants and the Firm's Growth Options

The table reports coefficients and t-statistics from a delay regression (Panel A) and return prediction regression (Panel B) controlling separately for the Amihud (2002) illiquidity measure (Illiquidity), innate determinants of AQ (Dechow and Dichev, 2002; Francis et al., 2005), and proxies for the firm's growth options (Cao, Simin, and Zhao, 2007). Illiquidity is the annual average daily absolute stock return per dollar trading volume. Size is logarithm of total assets. CFVol (SALEVol) is the standard deviation over years t-5 to t-1 of the ratio of operating cash flows (sales revenue) to average total assets. Opercyc is operating cycle, defined as the logarithm of the sum of days accounts receivable and days inventory. The growth option proxies include R&D expenses scaled by sales (in log, and assume zero if missing value), Tobin's Q, the debt to equity ratio (DTE), the ratio of capital expenditures to fixed assets (CAPFIX), and a direct measure of the present value of growth options (PVGO). The definitions of the growth options except R&D are discussed in Cao et al (2007). Panel A follows Table 4 but adds Illiquidity, innate accounting factors, and proxies for growth options sequentially. Panel B follows Table 6. See Tables 4 and 6 for the relevant regression description and the definitions of other variables. *, **, and *** denote one-tailed statistical significance at 10%, 5%, and 1%, respectively.

Panel A. Delay Regression

	Control for Amihud illiquidity			Control for innate factors			Control for growth options		
	Coeff	t-stat		Coeff	t-stat		Coeff	t-stat	
Intercept	0.551	8.40	***	0.622	8.43	***	0.674	8.98	***
Analyst	-0.029	-6.52	***	-0.021	-4.56	***	-0.012	-2.99	***
InstOwn	-0.146	-9.68	***	-0.131	-8.55	***	-0.130	-8.00	***
Empl	-0.011	-7.03	***	0.008	3.07	***	0.006	3.07	***
Adv	-0.0002	-0.30		-0.001	-1.54	*	-0.001	-0.71	
NASDAQ	0.036	4.89	***	0.026	3.50	***	0.028	3.22	***
Turn-NYAM	-0.016	-0.61		0.015	0.58		0.026	0.94	
Turn-NASD	-0.128	-4.82	***	-0.092	-3.60	***	-0.079	-2.94	***
Traday	-0.001	-5.75	***	-0.001	-5.94	***	-0.002	-6.88	***
BSM	0.108	6.52	***	0.114	6.78	***	0.065	4.18	***
CBreadth	-0.009	-1.66	**	-0.009	-1.65	**	-0.003	-0.67	
ES	0.0001	0.40		-0.0001	-0.62		-0.0001	-0.97	
AQ	0.287	6.17	***	0.102	2.58	***	0.226	3.77	***
SI	-0.033	-2.34	***	-0.035	-2.16	**	-0.040	-1.90	**
Loss	0.012	1.37	*	0.017	2.06	**	0.013	1.78	**
Illiqudity	0.006	4.10	***	0.005	3.47	***	0.003	2.56	***
Size				-0.021	-5.69	***	-0.021	-6.31	***
CFVol				0.013	0.77		0.010	0.76	
SALEVol				0.003	0.51		-0.004	-0.62	
OperCye				0.003	1.31	*	0.002	1.01	
R&D							0.000	-0.17	
Q							-0.008	-3.89	***
DTE							0.010	5.55	***
CAPFIX							-0.018	-1.36	*
PVGO							-0.001	-1.41	*
R-Sq	39.30%			41.84%			43.55%		

Table 11 (… continued)

Panel B: Return Prediction Regression

	Coeff	t-stat		Coeff	t-stat		Coeff	t-stat	
Intercept	-0.054	-9.52	***	-0.056	-9.72	***	-0.045	-8.50	***
Beta	0.004	2.11	**	0.004	1.90	**	0.002	1.21	
B/M	0.007	7.74	***	0.007	8.04	***	0.007	7.52	***
Size	0.009	13.86	***	0.010	14.05	***	0.008	13.37	***
$Ret_{[-1]}$	-0.053	-10.12	***	-0.053	-10.07	***	-0.048	-8.71	***
$Ret_{[-12,-2]}$	-0.002	-0.92		-0.002	-1.13		-0.001	-0.43	
$Ret_{[-36,-13]}$	-0.001	-2.16	**	-0.001	-2.21	**	-0.001	-1.36	*
Accruals	-0.008	-1.89	**	-0.008	-1.99	**	-0.005	-0.91	
$D\_{NonAcct}$	0.112	11.93	***	0.110	14.05	***	0.086	8.78	***
D_{Acct}	0.113	12.04	***	0.619	3.89	***	0.505	5.03	***