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Two Essays on Earnings Quality and Corporate Decisions

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TWO ESSAYS ON EARNINGS QUALITY AND CORPORATE DECISIONS

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ABSTRACT

TWO ESSAYS ON EARNINGS QUALITY AND CORPORATE DECISIONS

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This dissertation investigates how earnings quality as an information risk may facilitate our understanding of the choice of payment method in Mergers and acquisitions and the value and the level of corporate cash holdings. In a world of asymmetric information and agency problem, Poor earnings quality implies the inadequate supply of relevant and reliable information for investors to monitor and discipline the behavior of firm managers to act in shareholder and stakeholder's best interest.

This study contributes to the literature in three folds. First, I add to the literature by postulating that earnings quality has a significant impact on the choice of payment method in mergers and acquisitions. I hypothesize that M&A payment methods represent a desire by the acquiring firm's manager to strike a balance between protecting personal pecuniary benefits based on the firm's earnings quality (incentive alignment effects), not losing control of the company (entrenchment effects) and reserving cash for the firm's

future growth (growth opportunity consideration). Second, by focusing on earnings quality as an information risk, I am able to explain simultaneously that the value of cash holdings could decline and yet firms have incentives to hold more cash. I offer explanations that the two phenomena are not inconsistent with each other and that they could exist at the same time. Third, my study adds to the literature on the determinants of the level of corporate cash holdings. The earnings quality augmented model has significantly smaller prediction errors relative to existing models in predicting the level of corporate cash holdings.

In Essay I, with earnings quality measured in a way to reflect a firm's information risk, I show that acquisition financing is also affected by the acquirer's earnings quality. I find that acquiring firms with poor earnings quality prefer a lower cash payment in acquisitions, but those with low insider ownership stakes prefer cash over stock even if the earnings quality is poor. Unlike previous studies, I find that high insider ownerships of acquiring firms do not have a significant impact on the amount of cash paid in corporate acquisitions.

In Essay II, Using a sample period between 1980 and 2005 for U.S. publicly traded firms, I find that poor earnings quality has a negative impact on the value of corporate cash holdings. I also find that poor earnings quality is positively related to the level of corporate cash holdings. Moreover, the earnings quality augmented model has significantly smaller prediction errors relative to existing models in predicting the level of corporate cash holdings.

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Chapter 1

Introduction

Researchers have related the choice of payment method in acquisitions to factors such as growth opportunities, stock price performance, corporate control, managerial equity ownership, and target size. In this study, we show that acquisition financing is also affected by the acquirer's earnings quality. Mergers and acquisitions, being significant events in the history of a firm, represent excellent opportunities for researchers to investigate the earnings quality information impounded by acquiring managers. Managerial decisions are likely to contain information about earnings quality because managers make decisions based on current and future earnings. Thus, to the extent that the acquiring manager is more informative than investors about the earnings quality of the acquiring firm, the acquiring manager is likely to choose a payment method that enables him to take advantage of his superior information. We add to the literature by showing that the choice of payment method in mergers and acquisitions is also significantly affected by the earnings quality of the acquiring firm.

In Chapter 2, we document that acquiring firms with poor earnings quality prefer a lower cash payment in acquisitions. In addition, acquirers with low insider ownership stakes prefer cash over stock financing even if the earnings quality is poor. Unlike previous studies, we find that high insider ownerships of acquiring firms do not have a significant impact on the amount of cash paid in corporate acquisitions.

In general, it is likely that the acquiring manager tends to prefer cash (stock) financing when the earnings quality of the acquiring firm is high (low). However, with the value of managerial ownership at stake, the acquiring manager's chosen acquisition payment method reflects a trade-off between personal wealth and control benefits. Entrenched managers prefer cash over stock as the acquisition payment method even if the acquiring firm's earnings quality is poor. In situations where the acquiring manager wants to strike a balance between protecting the value of his stock ownership as well as control benefits, the chosen payment method would be a combination that has more (less) cash and less (more) stock if the earnings quality is high (low).

It has been found in recent research (Faulkender and Wang (2005) and Pinkowitz, Stulz, and Williamson (2006)) that the market value of corporate cash holdings could be less than the actual dollar value when investors expect private benefits to be extracted by firm managers from the cash holdings. At the same time, there is evidence showing that the cash reserves held by U.S. firms have increased substantially in the last two decades. According to Bates, Kahle, and Stulz (2006), the median cash-to-assets ratio for 13,237 U.S. industrial firms has increased from 5.5% to 14.73% between 1980 and 2004. The question of why firms choose to hold more and more cash reserves at the amounts well exceed those predicted by conventional models while holding excess cash may destroy firm value motivates Chapter 3 of the study.

There are two strands of recent research related to the above two phenomena. The first strand of studies examines how the value of corporate cash holdings is affected by firm-

specific factors (Pinkowitz, Stulz, and Williamson, 2006; Dittmar and Mahrt-Smith, 2006; Faulkender and Wang, 2006). The second strand of studies explains why firms hold so much cash (Pinkowitz, Stulz, and Williamson, 2003; Bates, Kahle, Stulz, 2006; Foley, Hartzell, Titman, and Twite, 2007). While the two phenomena are not necessarily inconsistent, researchers in general treat the two as separate issues. In considering earnings quality as an information risk, I am able to explain that poor earnings quality has a negative impact on the value of corporate cash holdings and a positive impact on the level of cash reserves. That is, the two phenomena could exist simultaneously and that they are not necessarily inconsistent with each other. I offer explanations that are related to the predictions of agency theories and asymmetric information arguments. In relating earnings quality to corporate cash holdings, I highlight investors' concerns about the discretionary use of corporate cash holdings when firm managers decide to present less reliable earnings information to the market.

The remainder of the dissertation is organized as follows. Chapter 2 investigates the effects of earnings quality as an information risk on the choice of payment method in mergers and acquisitions. Chapter 3 discusses the effects of earnings quality on the value and level of corporate cash holdings.

Chapter 2

Earnings Quality and the Choice of Payment Method in Mergers and Acquisitions

2.1 Introduction

The choice of payment method in corporate mergers and acquisitions (M&As) has been extensively studied in the literature. Some researchers indicate the choice is driven by the desire of the acquiring manager to maintain control of the acquiring firm (see, e.g., Shleifer and Vishny (1986), Stulz (1988), Amihud, Lev, and Travlos (1990), Ghosh and Ruland (1998)). Faccio and Masulis (2005) extend the argument and suggest that the payment method in M&As is largely a tradeoff between the threats of corporate control and financing constraints. Other researchers have related the choice of payment method in M&As to the asymmetric information between the acquiring firm and outsiders (see, e.g., Travlos (1987), Hansen (1987), Shleifer and Vishny (2003), Rhodes-Kropf; Robinson, and Viswanathan (2005), and Dong, Hirshleifer, Richardson, and Teoh (2006)). It is generally argued that the acquiring firm will prefer stock financing when the acquiring manager believes his firm's stock is overvalued. Martin (1996) suggests that the choice of payment method in acquisitions is also affected by the acquiring firm's growth opportunities. Acquiring firms with high growth opportunities are more likely to use stock exchange as the payment method due to the desire to preserve cash for their investment needs.

In this study, we add to the literature by showing that the choice of payment method in mergers and acquisitions is also significantly affected by the earnings quality of the acquiring firm. M&As are important managerial decisions. Managerial decisions

are likely to contain information about earnings quality because managers make decisions based on current and future earnings. Supporters of the efficient market hypothesis would argue that earnings quality is reflected in share value and thus its impact on the choice of financing in M&As is irrelevant. Indeed Francis et al. (2005), Aboody et al. (2005), and Chan et al. (2006) find that earnings (accruals) quality is priced in stock value. However, there is also significant empirical evidence that the market is surprised by earnings news quite frequently (see, e.g., Bartov, Givoly, and Hayn (2002), Kasznik and McNichols (2002), and Doyle, Russell, Lundholm, and Soliman (2006)). Researchers of behavioral finance often suggest that investors are unable to correctly evaluate earnings information and that they react incorrectly to earnings news (see, e.g., Bernard and Thomas (1990), Barberis et al. (1998), and Daniel et al. (1998)). In addition, there is ample evidence that firms can influence reported earnings and that investors fail to respond instantaneously (see, e.g., Sloan (1996), Teoh et al. (1998a, 1998b), and Xie (2001)). Thus, to the extent that the acquiring manager is more informative than investors about the earnings quality of the acquiring firm, the acquiring manager is likely to choose a payment method that enables him to take advantage of his superior information. In general it is likely that the acquiring manager tends to prefer cash (stock) financing when the earnings quality of the acquiring firm is high (low). Financing decisions made by the acquiring manager are also possibly influenced by the size of his ownership stake in the acquiring firm. The effect of managerial ownership on the choice of payment method in M&As, however, could be non-linear (see, e.g., Morck, Shleifer, and Vishny (1988) and Lins (2003)). If the acquiring manager is more concerned about the value of his ownership stake than control benefits, the manager is likely to prefer cash (stock) as the medium of payment when the

earnings quality of the acquiring firm is high (low). If the acquiring manager is concerned about protecting both the value of his ownership stake and control benefits, we expect the acquiring manager to choose a payment method that is a combination of cash and stock in order to strike a balance between protecting personal wealth and not losing control of the company. In this scenario, more cash (stock) and less stock (cash) would be used when earnings quality is high (low). In the extreme case, if the acquiring manager does not want to give up any control benefits, it is possible that 100 percent cash financing is used even if the earnings quality of the acquiring firm is low.

Our study is motivated by two strands of literature. First, a number of researchers have shown that earnings quality (accruals quality) plays a significant role in a multitude of corporate events (e.g., management buyouts (DeAngelo (1986) and Perry and Williams (1994)); initial public offerings of equity securities (Teoh, Welch, and Wong (1998a), Teoh and Wong (2002), DuCharme, Malatesta, and Sefick (2004), and Lee and Masulis (2006)); seasoned equity offerings (Teoh, Welch, and Wong (1998b), Rangan (1998), Shivakumar (2000), and Jo, Kim, and Park (2007)); stock splits (Louis and Robinson (2005)); employee stock option reissues (Coles, Hertzel, and Kalpathy (2006)). Since control benefits and ownership stake are involved in M&As, it is conceivable that the acquiring manager has incentives to select a payment method that allows him to take advantage of his superior information about the earnings quality of the acquiring firm.

The second strand of literature shows that there could be a direct link between corporate takeovers and earnings management (see, e.g., Erickson and Wang (1999) and Louis (2004)). The general conclusion in the literature on earnings management is that managers have strong incentives to influence the outcome of an event by altering accruals

in order to obtain better personal benefits. The findings of Erickson and Wang (1999) and Louis (2004) indicate acquiring firms pursue income increasing accruals manipulations in the quarter preceding a merger announcement. That is, earnings quality of acquiring firms could be subject to deliberate manipulations. Given the empirical evidence that investors are sometimes unable to understand earnings information correctly, we believe the acquiring manager has incentives to pick a payment method that reflects his knowledge of the firm's earnings quality.

We have found three important results in this study. The first is that there is a significant negative relation between the earnings quality of the acquiring firm and the amount of cash paid in acquisitions. Firms with high (low) earnings quality use more cash (stock) in acquisition financing. The second important finding is that acquiring firms that have low insider ownership stakes use more cash in acquisition financing even if the earnings quality is poor. The observation implies that managers with low ownership stakes tend to avoid diluting their control of the acquiring firm when acquisitions take place. Unlike previous research, the third major finding of our study shows that high insider ownerships of acquiring firms do not have a significant impact on the amount of cash paid in acquisitions. Our third result suggests that for acquiring firms with high insider ownerships, the choice of payment method in acquisitions is likely affected by the effect of earnings quality on the personal wealth of the insiders. Our results are robust to different measures of earnings quality. In addition, using different econometric methodologies produce consistent results.

The paper proceeds as follows. In Section II, we review the literature that specifically links together earnings quality and mergers and acquisitions. In Section III,

we develop our hypotheses. Empirical methods are presented in Sections IV and V. The sample construction is presented in Section VI. In Section VII, we present the results. A short summary is given in Section VIII.

2.2 The Link between Earnings Quality and Mergers and Acquisitions

Corporate decisions are generally made based on evaluations of current and future earnings. Thus it is likely that managerial decisions contain information about earnings quality. Recently, Li (2007) find empirical evidence that corporate investment decisions are positively related to earnings persistence. His results indicate that there is information contained in corporate investment decisions about earnings quality and that the information is uncorrelated with other conventional measures of earnings quality. Based on the results of Li (2007), it is reasonable to extrapolate that corporate M&As contain information about the earnings quality of the acquiring firm. To the extent that the acquiring manager is better informed than outsiders in determining the sustainability of the earnings growth following the acquisition, the acquiring manager is likely to choose the payment method he desires.

Common accounting practices also suggest that earnings quality and managerial decisions are related. Managers exercise some discretion in computing earnings without violating generally accepted accounting principles. For example, firms can shift earnings to the current period from a subsequent period by accelerating revenue recognition and deferring expense recognition. Alternatively, firms can affect earnings by changing methods of inventory accounting, revising estimated numbers such as bad debt expense, or a variety of other techniques. The belief that firms manage accounting earnings by

altering accruals is widely accepted by users of financial statements and is supported by a growing body of academic research.

Several published papers motivate our proposition that earnings quality is important in determining the choice of payment method in mergers and acquisitions. These papers show that management of earnings may be a common occurrence when the control of a company changes hands. Perry and Williams (1994) examine a sample of 175 management buyouts (MBOs) during the period between 1981 and 1988 and find negative discretionary accruals in the year preceding the MBO. Despite corporate managers have a legal duty to seek the best possible price for their firms; the authors argue that personal economic stakes may motivate managers to depress pre-buyout accounting earnings so that they could get a more favorable purchase price for the buyout. Wu (1997) uses the sample of management buyouts in DeAngelo (1986) and finds evidence that managers understate accounting earnings in the period immediately before the buyout so as to underpay the public shareholders for the transaction. He estimated that the average gain for managers is about $50 million for the sample firms. Direct evidence of earnings management involving third-party takeovers are reported by Erickson and Wang (1999) and Louis (2004). Erickson and Wang report results that are consistent with income increasing accruals manipulation by acquiring firms in the period prior to the announcement of the merger agreement, and that the degree of accruals manipulation is an increasing function of the economic benefits at stake in the merger. In addition, they find no such evidence for cash mergers. Louis (2004) also report evidence that acquiring firms overstate their earnings in the quarter preceding a merger announcement.

In sum, there is ample evidence that corporate investment decisions may contain information about earnings quality. Mergers and acquisitions, being significant events in the history of a firm, represent excellent opportunities for researchers to investigate the earnings quality information impounded by acquiring managers.

2.3 Hypotheses Development

Following Faccio and Masulis (2005), we focus on the acquiring firm's financing choices though the target firm can also exert its influences. It is argued by Faccio and Masulis that for a deal to succeed, the financial structure of the deal must be acceptable to the bidding firm. In addition, the bidder is likely to have strong preferences toward one financial structure over another because control threats are involved. If the bidder is not satisfied with the target firm's financing choice, the deal may be aborted or else the acquiring firm can make a hostile takeover on its own terms.

Next, we explain how earnings quality is relevant to the existing hypotheses in the literature regarding the choice of payment method in acquisitions. We then develop our own hypotheses.

2.3.1 Earnings Quality and Asymmetric Information

The asymmetric information theory has been used in explaining the choice of payment method in acquisitions. It is generally argued that if the acquiring manager is better informed than outside investors about the value of the acquiring firm, the manager will prefer stock financing of an acquisition when he believes the acquiring firm's stock is overvalued. Some recent studies have found evidence that firms engage in waves of acquisitions when their common equities are over-valued, and such acquirers typically

use stock as the medium of payment in acquisitions (see, e.g., Shleifer and Vishny (2003), Rhodes-Kropf; Robinson, and Viswanathan (2005), and Dong, Hirshleifer, Richardson, and Teoh, (2006)).

To the extent that the acquiring manager is better informed than other stakeholders about the earnings quality of the acquiring firm, poorer (better) earnings quality makes the private information of firm managers more valuable and the information asymmetry between acquirers and other stakeholders more pertinent. The acquiring manager is conceivably in a better position to determine if the earnings quality is going to be poorer (better) after the acquisition. The acquiring manager is also likely to have more information than others in determining the sustainability of earnings growth after the acquisition. Despite some researchers (see, e.g., Francis et al. (2005), Aboody et al. (2005), and Chan et al. (2006)) indicate that earnings quality is reflected in share value, the empirical evidence that investors are unable to understand earnings information and react correctly suggests that the acquiring manager's insights regarding earnings quality is relevant in his choice of payment method in M&As. In general, we expect the acquiring manager to prefer cash (stock) as the medium of payment when the earnings quality of the acquiring firm is high (low). Paying cash for acquisitions when earnings quality is high helps the manager retain the gain under his control. On the other hand, using stock financing in M&As when earnings quality is low transfers potential losses to other parties. An implicit assumption underlying our argument is that the acquiring manager is better informed and is thus capable of assessing more correctly the effect of earnings quality on the share value before and after the acquisition. This implicit assumption, however, is not inconsistent with the implication of the abundant empirical

evidence presented by researchers that show acquiring managers are able to recognize temporary market misvaluations and use overvalued equities to finance acquisitions (see, e.g., Shleifer and Vishny (2003) and Rhodes-Kropf, Robinson, and Viswanathan (2005)).

Hypothesis 1: The acquiring manager prefers cash (stock) as the acquisition payment method when the acquiring firm's earnings quality is high (low).

2.3.2 Earnings Quality and Managerial Ownership

A typical characteristic of the publicly traded firms in the United States is the separation of ownership from control, which gives rise to agency conflicts between managers and shareholders (e.g., Jensen and Meckling (1976)). Managers with a significant ownership in their firm who wish to retain control will tend to finance acquisitions with cash (or debt) rather than with stock in order to avoid diluting their control and risk losing it (see, e.g., Stulz (1988) and Jung, Kim, and Stulz (1995)). Amihud et al. (1990) and Ghosh and Ruland (1998) find empirical evidence supporting this hypothesis. However, there is evidence that the effect of managerial ownership on the likelihood of stock financing is non-linear (Morck, Shleifer, and Vishny (1988)). Denis et al. (1997) and Lins (2003) find evidence that the interests of the managers are not sufficiently aligned with those of the shareholders when managerial holdings are small (less than 5%) or relatively large (more than 20%). It is suggested that managerial entrenchment effects dominate incentive alignment effects in both cases.

With the presence of agency problems, earnings quality of the acquiring firm could affect the manager's choice of payment method through its effect on the value of

the manager's stockholding. We hypothesize that in cases where managerial entrenchment dominate, the acquiring manager prefers cash over stock as the payment method even if the acquiring firm's earnings quality is poor. This happens because control benefits are more important than other considerations. In contrast, in situations in which the manager is concerned about the value of his ownership stake rather than the benefits of control, the manager would prefer cash (stock) in acquisition financing when the acquiring firm's earnings quality is high (low). Finally, in situations where the acquiring manager is concerned about protecting the value of his ownership stake as well as the benefits of control, the choice of payment method is a combination of stock and cash that depends on the acquiring firm's earnings quality. When the earnings quality is low, we expect the manager to use a payment method that has more stock and less cash. When the earnings quality is high, we expect the manager to use more cash and less stock to pay for the target. These payment choices allow the acquiring manager to strike a balance between protecting personal wealth and not losing control of the firm.

Hypothesis 2: With the value of managerial ownership at stake, the acquiring manager's chosen acquisition payment method reflects a trade-off between personal wealth and control benefits. Entrenched managers prefer cash over stock as the acquisition payment method even if the acquiring firm's earnings quality is poor. In situations where the acquiring manager wants to strike a balance between protecting the value of his stock ownership as well as control benefits, the chosen payment method would be a combination that has more (less) cash and less (more) stock if the earnings quality is high (low).

2.4 Measures of Earnings Quality

There is no agreed-upon metric for the earnings quality construct. Two general approaches are used in existing research for measuring earnings quality. The first approach measures earnings quality by examining properties of observed accounting numbers. The measures based on this approach are typically related to the level of accruals (Sloan (1996)); the estimation error in accruals (Dechow and Dichev (2002)); and earnings variability (Francis et al. (2004, 2005)). The second approach focuses on the association between earnings and stock returns (see, e.g., Francis and Schipper (1999) and Ecker, Francis, Kim, Olsson, and Schipper (2006)). This approach extracts information about earnings from stock prices by assuming the market is efficient. In this study, we follow the first approach in using accounting measures to describe the earnings quality of a firm because these measures have been used extensively in the literature and have been shown to have significant market effects (Francis et al. 2004, 2005).

2.4.1 Accruals Quality (AQ)

Our first measure of earnings quality is accruals quality. Accruals quality, AQ, is measured by the standard deviation of residuals from regressions relating accruals to cash flows over a multi-year period before the merger. A high (low) standard deviation implies a low (high) accruals quality. Our method, following Francis et al. (2005), is based on the cross-sectional Dechow-Dichev (2002) model and augmented with the fundamental variables from the modified Jones model, namely, PPE and change in revenues (all variables are scaled by lagged assets):

$$TCA_{j,t} = \phi_{0,j} + \phi_{1,j} CFO_{j,t-1} + \phi_{2,j} CFO_{j,t} + \phi_{3,j} CFO_{j,t+1} + \phi_{4,j} \Delta \mathrm{Re}v_{j,t} + \phi_{5,j} PPE_{j,t} + v_{j,t}$$

(Eq.1)

Where $TCA_{j,t}$= ($\triangle CA_{j,t}$-$\triangle CL_{j,t}$-$\triangle Cash_{j,t}$+$\triangle STDEBT_{j,t}$)= total current accruals in year t, $CFO_{j,t}$ = $NIBE_{j,t}$,- $TA_{j,t}$ = firm j's cash flow from operations in year t, $NIBE_{j,t}$ = firm j's net income before extraordinary items (Compustat #18) in year t, $TA_{j,t}$= ($\triangle CA_{j,t}$-$\triangle CL_{j,t}$-$\triangle Cash_{j,t}$+$\triangle STDEBT_{j,t}$ –$DEPN_{j,t}$) = firm j's total accruals in year t, $\triangle CA_{j,t}$ = firm j's change in current assets (Compustat #4) between year t-1 and year t, $\triangle CL_{j,t}$ = firm j's change in current liabilities (Compustat #5) between year t-1 and year t, firm j's change $\triangle Cash_{j,t}$ in cash (Compustat #1) between year t-1 and year t, $\triangle STDEBT_{j,t}$ = firm j's change in debt in current liabilities (Compustat #34) between year t-1 and year t, $DEPN_{j,t}$ = firm j's depreciation and amortization expense (Compustat #14) in year t, $\triangle Rev_{j,t}$ = firm j's change in revenues (Compustat #12) between year t-1 and year t, $PPE_{j,t}$ = firm j's gross value of PPE (Compustat #7) in year t.

We first estimate Equation (1) for each industry in year t. Annual cross-sectional estimations of (1) are then performed to yield firm- and year-specific residuals, which form our accruals quality metric: $AQ_{j,t} = \sigma(v_j)_t$ is the standard deviation of firm j's residuals $(v_j)_t$ calculated over years t - 4 through t. Larger standard deviations of residuals indicate poorer accruals quality. Unlike abnormal accruals generated by the modified Jones (1991) model, the AQ proxy employed by Francis et al. has an advantage of taking uncertainty into consideration so that a firm that has consistently large residuals may still has a good accruals quality because there is no uncertainty about its accruals. We calculate values of $AQ_{j,t} = \sigma(v_j)_t$ for all firms with available data on Compustat for the period from 1991 to 2004 and then merge with our initial sample obtained from Thomson One Banker. Because $\sigma(v_j)_t$ is based on five annual residuals, our sample has to restrict to firms with at least 7 years of data. For our sample, the mean and median values of AQ are

0.051 and 0.038, respectively. These values are consistent with the ones (mean and median values of 0.044 and 0.031) reported by Francis et al. (2005).

2.4.2 Innate and Discretionary Accruals Quality

The second measure of earnings quality is related to the components of accruals quality. Accruals quality could be driven by a firm's innate features such as the business strategy and operating environment. Accruals quality could also be affected by managerial discretion. According to the Dechow-Dichev model there are five innate factors affecting accruals quality: firm size (Size, measured as the log of total assets), standard deviation of cash flow from operations (σ(CFO)), standard deviation of sales revenues (σ(Sales)), length of operating cycle (OperCycle, measured as the sum of days accounts receivable and days inventory) and incidence of negative earnings realizations (NegEarn). We expect smaller firms and firms with higher cash flow volatility, higher sales revenue volatility, longer length of operating cycle, or higher frequency of losses to have poorer accruals quality.

To find the innate component of accruals quality, we regress AQ on the five innate indicators by year (Equation 2). The residual from Equation 2 form the discretionary component of accruals quality. The predicted values from Equation 2 yield the innate AQ (Equation 3).

$$AQ_{j,t} = \lambda_{0,} + \lambda_1 Size_{j,t} + \lambda_2 \sigma(CFO)_{j,t} + \lambda_{3,j} \sigma(Sales)_{j,t} + \lambda_{4,} Log(OperCycle)_{j,t} + \lambda_{5,j} NegEarn_{j,t} + \mu_{j,t} \quad \text{(Eq.2)}$$

$$InnateAQ_{j,t} = \hat{\lambda}_{0,} + \hat{\lambda}_1 Size_{j,t} + \hat{\lambda}_2 \sigma(CFO)_{j,t} + \hat{\lambda}_{3,j} \sigma(Sales)_{j,t} + \hat{\lambda}_{4,} Log(OperCycle)_{j,t} + \hat{\lambda}_{5,j} NegEarn_{j,t} \quad \text{(Eq.3)}$$

where Size is measured as the log of total assets, σ(CFO) is the standard deviation of cash flow from operations over the past 5 years, σ(Sales) is the standard deviation of sales revenues over the past 5 years, Log (OperCycle) is measured as the log of sum of days accounts receivable and days inventory, and NegEarn is the number of years out of the past 5 that shows a negative earnings. We measure each of the five innate indicators on a firm-specific basis, using rolling 5-year windows.[1] The mean coefficient estimates from the annual regression of Eq.2 (13 annual) are similar to those reported by Francis (2005) with 32 annual coefficient estimates. All five innate factors have the expected signs (i.e., Size is negatively related to accruals quality, and all the other 4 indicators are positively related to accruals quality).

2.4.3 Absolute Abnormal Accruals

The third measure of earnings quality is the absolute value of abnormal accruals (AQ2) based on the modified Jones (1991) model. First, we estimate the following cross-sectional regression for each of the Fama-French (1997) 48 industry groups with at least 20 firms in year *t*:

$$TA_{j,t} / Asset_{j,t-1} = \beta_1 * 1/ Asset_{j,t-1} + \beta_2 * \Delta \mathrm{Rev}_{j,t} / Asset_{j,t-1} + \beta_3 * PPE_{j,t} / Asset_{j,t-1} + \varepsilon_{j,t} \quad \text{(Eq. 4)}$$

The industry- and year-specific parameter estimates obtained are then used to estimate firm-specific normal accruals (*NA*) as a percentage of lagged total assets:

$$NA_{j,t} = \hat{\beta}_1 * 1/ Asset_{j,t-1} + \hat{\beta}_2 * \Delta \mathrm{Rev}_{j,t} / Asset_{j,t-1} + \hat{\beta}_3 * PPE_{j,t} / Asset_{j,t-1} + \varepsilon_{j,t} \quad \text{(Eq. 5)}$$

[1] Francis et al. (2005) use a 10-year rolling window for their 32-year analysis, and conclude that their results are not sensitive to the length of the window used to measure the innate factors. We choose a 5-year rolling window given the length of our sample period from 1991 to 2004.

Absolute abnormal accruals in year t is equal to the absolute value of the difference between the firm-specific actual accruals and the estimated normal accruals.

2.4.4 Earnings Variability

The fourth measure of earnings quality, earnings variability (EARNVAR), is the standard deviation of the firm's earnings over the seven years before the acquisition. Earnings is defined as earnings before extraordinary items divided by total assets. Similar to the interpretation of the standard deviation of accruals quality, higher earnings variability is equivalent to lower earnings quality.

2.5 The Endogeneity between Earnings Quality and Payment Method

It is likely that earnings quality and the choice of payment method in acquisitions are endogenously determined. The choice of payment method is affected by earnings quality because of the effect of earnings quality on stock value. But researchers have also shown that acquiring firms manage their earnings to inflate the share price before making stock-financed acquisitions (e.g., Erickson and Wang (1999) and Louis (2003)). That is, earnings quality is affected by the acquiring firm's choice of payment method. Given the endogeneity between earnings quality and the choice of payment method in acquisitions, we use the following simultaneous equations in this study.

%Cash = EARN_QUAL + FINLEVER + ASSETS + RUN_UP + RELSIZE + MTB + INDR + UNLISTED_TGT + SUBSID + BLOCK + INSIDER<5+ INSIDER>20 + INSIDER<5*EARN_QUAL + INSIDER>20*EARN_QUAL ------ Equation (6.1)

EARN_QUAL = %Cash + FINLEVER + ASSETS + RELSIZE + MTB + INSIDER_OWN + DIVDEND ------ Equation (6.2)

Eight different versions of the model are made in order to facilitate testing the hypotheses developed. The %Cash variable is the percentage of cash used in the chosen payment method. EARN_QUAL is earnings quality and is measured by the four proxies described earlier (accruals quality, discretionary accruals quality, earnings variability, and absolute abnormal accruals). FINLEVER is financial leverage of the acquiring firm. It is the acquirer's total debt before the acquisition divided by total assets. A higher leverage lowers the likelihood of using cash financing (Faccio and Masulis (2005)). ASSETS is measured as the log of total assets. Larger bidders are more likely to choose cash financing in acquisitions because their higher debt capacity makes it easier to raise cash. RUN_UP is measured as the one-year buy and hold stock return of the bidder before the acquisition. Acquirers prefer to pay with stock when the stock is believed to be overvalued (e.g., Myers and Majluf (1984) and Martin (1996)). RELSIZE is measured as the deal size relative to the sum of the acquirer's pre-acquisition market capitalization plus the deal size. Acquirers prefer stock financing for large acquisitions because of the related information asymmetry (Hansen (1987)). MTB is the market-to-book ratio of equity prior to the acquisition. Martin (1996) finds that bidders with high growth opportunities (high market-to-book) prefer stock financing in acquisitions. INDR is a (0,1) dummy variable to measure the industry relatedness of the merging firms. It has a value of 1 if the firms are in the same 2-digit SIC code, and equals 0 otherwise. The target firm is more likely to accept stock financing as the payment method in a same-industry merger because of the relatively lower level of information asymmetry. UNLISTED_TGT is a (0,1) dummy variable that has a value of 1 if the target is a stand-

alone unlisted firm, and is 0 otherwise. An unlisted target is likely to prefer cash payment in acquisitions (Faccio and Masulis (2005)). SUBSID is a (01) dummy variable that has a value of 1 if the unlisted target is a subsidiary of another firm, and is 0 otherwise. A target firm that is an unlisted subsidiary would prefer cash financing in an acquisition because of the concern about liquidity needs. INSIDER_OWN is the percentage ownership of the company stock owned by insiders. Managerial ownership is related to the probability of stock financing in acquisitions (Martin (1996)). BLOCK is a (01) dummy variable that has a value of 1 if outside blockholders owning more than 5% of the stock are reported in Compact Disclosure or SEC filings on Lexis-Nexis, and is 0 otherwise. INSIDER<5 is a (01) dummy variable that has a value of 1 if the insider ownership of the company stock is less than 5%, and is 0 otherwise. INSIDER>20 is a (01) dummy variable that has a value of 1 if the insider ownership of the company stock is greater than 20%, and is 0 otherwise. DIVIDEND is measured as total dividends divided by net income. Firms with high dividend payouts are less likely to use cash financing in acquisitions.

In equation (6.2) of the simultaneous estimation model, earnings quality is affected by a number of variables in addition to the payment method (%Cash). Financial leverage is a control variable because firms might increase earnings management when they are close to violating debt covenants (Jo et al. (2007)). ASSETS and MTB are control variables because Watts and Zimmerman (1978) and Zmijewski and Hagerman (1981) find that large and/or high-growth firms have greater incentives to engage in earnings management. We include RELSIZE as an independent variable given Erickson and Wang (1999) find that the degree of accruals manipulation is an increasing function

of the economic benefits at stake in the merger. Earnings quality is affected by insider ownership (INSIDER_OWN) of the firm due to the personal benefits at stake (see, e.g., Bergstresser and Philippon (2006) and Coles et al. (2006)). Finally, DIVDIENDS is included because some firms have the incentive to manage earnings given their desire to maintain a smooth dividend payout (Kasanen et al. (1996).

2.6 Sample Construction

The sample consists of mergers and acquisitions announced by publicly traded U.S. companies between January 1993 and December 2004, inclusively. We select the sample period depending upon the data availability of certain variables. For example, the earliest availability of insider ownership data can be only traced back to 1992 when Compact Disclosure started to release insider ownership data through proxy statements. Since we need to use insider ownership data before the merger announcement, we have to restrict our sample period starting from January 1993.

Our sample is obtained from the Security Data Company (SDC) Merger and Acquisition database. Because our sample only includes publicly traded firms, this excludes transactions such as leveraged buyouts and management buyouts. To be included in our sample, an eligible transaction must satisfy the following criteria:

1) The merger was successfully completed.
2) The acquirer must be a publicly traded firm.
3) The acquiring firm is a non-financial and non-utility firm. We follow Louis (2004) to exclude firms with SIC codes between 4400 and 5000(regulated) and between 6000 and 6500 (Financial).

4) Information of the deal value and method of payment information is available. The acquirer has the necessary annual data on Compustat to compute AQ, innate AQ, discretionary AQ, Earning Variability and other control variables.
5) Ownership information of the acquiring firm is available either from proxy statements of Compact Disclosure or SEC fillings through LexisNexis Academic.
6) The acquiring firm has the necessary data on CRSP to compute the one-year buy-and-hold return (RUN_UP) prior to announcement.

Given the data required to construct the various measures of earnings quality and the availability of ownership data, only 786 M&As meet the requirements. Our sample size is comparable to the 373 observations of either pure stock swaps or pure cash purchases between 1992 and 2000 in Louis (2004). For our sample, the number of observations in each year ranges from 19 to 122. In Panel A of Table 1, we report the distribution of the sample per industry, and in Panel B of Table 1, we present the distribution of the sample by year.

[Table 1 about here]

2.7 Results

2.7.1 Descriptive Statistics

Descriptive statistics for the variables in the simultaneous estimation model are reported in Table 2. Our sample contains 391 (49.7%) pure stock deals, 194 (24.7%) pure cash deals, and 201 (25.6%) mixed payment deals. For the sake of comparison, we focus

on the descriptive statistics by payment method in panel B. Accruals quality (AQ), measured as the standard deviation of residuals, is the lowest for pure stock-financed deals (that is, the highest standard deviation) among the three financing types with a mean (median) of 0.059(0.046). The mean (median) accruals quality is 0.038 (0.026) for cash-financed deals; and 0.049 (0.031) for mixed-financed deals. Earnings variability (EARNVAR) exhibits similar characteristics that it has a higher mean (median) of 0.078(0.055) for pure stock offers than the mean (median) of 0.052(0.032) for pure cash offers. Regarding the size of absolute abnormal accruals (AQ2), pure stock offers also have a higher mean (median) of 0.062 (0.054) than the mean (median) of 0.047 (0.037) for pure cash offers. Innate accruals quality for stock-financed acquirers has a mean (median) standard deviation of 0.028 (0.025), the quality is lower than those for cash-financed and mixed-financed acquisitions. Discretionary accruals quality is also the lowest in stock-financed acquisitions with a mean (median) standard deviation of 0.031 (0.021). In sum, all the various measures of earnings quality show that pure stock offers are related to lower earnings quality and pure cash offers are related to higher earnings quality, and mixed offers on average have an earnings quality that is in between. These numbers lend initial support to our hypothesis that earnings quality has a significant impact on acquisition payment method. On average, the acquirers in stock-financed deals are smaller than the acquirers in cash-financed deals. The mean (median) total assets for the two groups are $5977 ($1840) million and $8727 ($4000) million respectively. Acquirers making mixed-financing acquisitions have mean (median) total assets of $5463 ($2765) million. We control for the effect of firm size of the acquirer in our model. Financial leverage (FINLEVER) of cash-financed acquirers is higher than that for stock-

acquirers. The mean (median) FINLEVER is 15.0% (12.7%) for stock-acquirers, and 19.0% (19.7%) for cash-acquirers. The average financial leverage is reasonably low that it may not have imposed a constraint on the choice of payment method for our sample of mergers and acquisitions. Average DEAL VALUE for stock-financed acquisitions is much larger than that for cash-financed deals. The mean (median) deal value for the two groups are $1065 ($714) million and $370 ($112) million respectively. The one-year buy-and-hold stock return (RUN_UP) prior to the acquisition is the highest for stock-financed acquisitions with a mean (median) of 103.9% (34.8%). The cash-financed acquirers have a significantly smaller RUN_UP with a mean (median) of only 28.9% (18.0%). Growth opportunities (market-to-book ratio) are the highest for stock-financed acquirers among the three financing types with a mean (median) of 5.69 (3.89); cash-financed acquirers have the lowest market-to-book ratio with a mean (median) of 0.29 (0.18). Regarding insider equity ownership, INSIDER_OWN, the mean (median) value is 0.377 (0.075) for stock-payers and 0.332 (0.052) for cash-payers. Block ownership has a mean (median) of 0.185 (0.098) for pure stock offers, pure cash and mixed offers have comparable levels of block ownership. For our sample, stock-financed deals involve more often than cash-financed deals targets that are stand-alone unlisted firms or subsidiaries of other companies.

[Table 2 about here]

In Table 3, we divide the sample firms into five quintiles by earnings quality and report the mean value of cash paid (%Cash) by acquiring firms in each quintile.

Acquiring firms with the highest AQ quality (quintile 1) have a mean %Cash paid that is about two times higher than those of acquiring firms with the lowest AQ quality (quintile 5). The difference is 22.32% and is significant at 1%. Similar statistics are observed for other measures of earnings quality. The results in Table 3 show that acquiring firms with higher earnings quality pay significantly more cash for their targets than acquirers with lowest earnings quality. This is consistent with the prediction of hypothesis 1.

[Tables 3 about here]

2.7.2 Full Model Regressions Results

Table 4 presents the results of the simultaneous equations models. Results for equation 6.1 are presented in columns 1 to 8, and results for equation 6.2 are presented in the last two columns. All the eight models are significant at $p < 0.001$. The adjusted R^2 values are 0.15 or higher. In columns 1 to 8, we find that AQ is significantly negatively related to %Cash, that is, low accruals quality (high standard deviation) significantly reduces the amount of cash paid. The coefficient on AQ is significant at the 5% level in all the eight models. The finding supports our hypothesis 1 that acquiring firms with poor earnings quality prefer stock over cash as the payment method in acquisitions. In column 1, the coefficients on FINLEVER, ASSETS, RUN_UP, RELSIZE, MTB, INDR, and SUBSID have the expected signs. Unlike Faccio and Masulis (2005), the coefficient on UNLISTED_TGT is negative for our sample. INSIDER_OWN, as an aggregate measure, is insignificant in column 1. Given that stock-financed acquisitions typically reduce the wealth of the acquiring firm's shareholders, the likelihood of choosing stock as the payment method in acquisitions should be lower when block ownership is higher. The

positive coefficient on BLOCK supports this argument. In column 2, INSIDER_OWN is replaced by INSIDER<5 and INSIDER>20. The coefficient on INSIDER<5 is positive but insignificant. Researchers generally find that firms with a low or high insider ownership are likely to suffer from agency problems. Firms with higher insider ownerships are likely to make cash-financed acquisitions in order to avoid dilution of ownership (see, e.g., Amihud, Lev, and Travlos (1990) and Chang and Mais (2000)). In Table 4, the coefficient on Insider>20 is insignificant. It suggests that managers with significant insider holdings do not necessarily prefer cash-financed acquisitions if the values of their stock holdings are affected by the earnings quality of the acquiring firm. For acquiring managers with high ownership stakes, it is likely that the choice of payment method is a balance between protecting the personal wealth and not losing control of the firm. This finding supports the prediction of our second hypothesis.

In columns 3 and 4 of Table 4, we examine how accruals quality interacts with insider ownership in affecting the choice of payment method in acquisitions. When the effect of insider ownership is only channeled through the interaction with AQ, as in column 4, the coefficient on INSIDER<5*AQ is significantly positive at the 10% level. That is, there is some evidence that managers with low ownerships prefer cash over stock in financing acquisitions even though the acquiring firm's accruals quality is bad. This finding supports the prediction of hypothesis 2. The entrenchment by acquiring managers with low insider ownership stakes, INSIDER<5, is more clear in columns 5 and 6. The coefficient on INSIDER<5*MTB is positive and significant at 10% and 5% in column 5 and 6, respectively. That is, for acquiring firms that have high growth opportunities, the entrenched managers still prefer pay cash over stock as the payment method even when

cash should be preserved for investment activities. In columns 5 and 6, the coefficient on INSIDER>20*MTB is insignificant. It confirms our earlier observation that acquiring firms with high insider ownership stakes do not always prefer higher levels of cash financing with the intention to retain control. In columns 7 and 8, we consider the interactions among insider ownership, growth opportunities, and accruals quality. Consistent with the earlier results, the coefficient on INSIDER<5*MTB*AQ is significantly positive at the 10% level in column 8. Also consistent with the other columns, the coefficient on the interaction variable INSIDER>20 *MTB*AQ is insignificant.

[Table 4 about here]

2.7.3 Reduced-form Regressions Results

In Table 4, although most of the coefficients have the expected signs, some are insignificant in all the eight models. Hahn and Hausman (2002) show that if the degree of endogeneity is not strong enough, statistical inference based on simultaneous equation systems will pose a significant bias. Donald and Newey (2001) and Stock et al. (2002) recommend using only the strong variables in a reduced-form regression model. Thus, we re-estimate our model using only the significant variables and report the results in Table 5. Consistent with the results in Table 4, the coefficient on AQ is negative and significant at 5% in each of the eight models. That is, acquiring firms with poor accruals quality (high standard deviations) prefer stock over cash for financing acquisitions. The evidence of managerial entrenchment among acquiring firms with lower insider ownership stakes,

INSIDER<5, has become stronger in Table 5. INSIDER<5 in column 2 is significant at 10%; INSIDER<5*AQ in column 4 is significant at 10%; INSIDER<5*MTB is significant at 5% in column 6; and INSIDER<5*MTB*AQ is significant at 5% in column 8. The observation in column 8 clearly shows that entrenched insiders opt for cash-financed acquisitions despite earnings quality and growth opportunities suggest the opposite. Also similar to the findings in Table 4, the reduced form regressions in Table 5 show that acquiring firms with high ownership stakes, INSIDER>20, do not necessary prefer higher levels of cash payment for acquisitions when the impact of earnings quality on personal wealth is taken into consideration. In sum, the results reported in Tables 4 and 5 confirm that earnings quality has a significant impact on the choice of payment method in acquisitions. Therefore, the potential weak endogeneity problem does not change our inferences concerning the simultaneous relation between earnings quality and the choice of payment method in acquisitions.

[Table 5 about here]

2.7.4 Robustness Tests

The first robustness test that we perform is to substitute AQ with discretionary AQ (DISC_AQ) which is estimated from discretionary accruals alone. Due to the weak endogeneity concern, we conduct our robustness tests using reduced form equations only. The results presented in Table 6 are consistent and similar to those reported in Tables 4 and 5. The coefficient on DISC_AQ is negative and significant in all the 8 models. Evidence of managerial entrenchment continues to exist among managers

with low insider ownership stakes (INSIDER<5), as shown by the various interaction variables with AQ. In unreported results, we considered two other proxies for accruals quality. The first is the standard deviation of residuals (AQ1) using the unmodified Dechow-Dichev model. This unmodified regression excludes the change in revenues and PPE as independent variables. The second additional proxy is the absolute value of abnormal accruals (AQ2) estimated according to the modified Jones (1991) model. The results obtained by using the AQ proxy from the unmodified Dechow-Dichev model are consistent and similar to those reported in Tables 4, 5, and 6. Surprisingly, the coefficient on AQ2 is not significant in all the eight models. A possible explanation is that in a standard asymmetric information framework, the size of abnormal accruals before the merger has limited impact on the choice of the payment method. The typical situation for accruals management to occur is when the user of accounting information is uninformed or unsophisticated. In corporate takeovers, the user of accounting information is not uninformed. On the contrary, managers of the target firm are informed users of accounting information, and are likely familiar with the techniques of accruals management. Because managers of the target firm are subject to potential legal liabilities if they do not perform fiduciary duties on behalf of the target shareholders, they have strong incentives to make sure that the financial information of the acquiring firm is not subject to manipulations. In such a situation, short-term accruals management before the merger may not have taken place at all. Even if they do happen, their magnitudes may be relatively restrained and their effects on the choice of payment method reduced because the information asymmetries between acquirers and targets are not effective. Thus, the

size of short-term abnormal accruals may have less impact on the choice of payment method in M&As.

[Table 6 about here]

In Table 7, we report robustness test results where earnings quality is measured by earnings variability (EARNVAR). Unlike the results using AQ, the coefficient on EARNVAR itself is only marginally significant in column 8. However, previous conclusions regarding the interactive variables involving insider ownership and earnings quality persist in Table 7. That is, acquiring firms with low insider ownership stakes (INSIDER<5) show some evidence of preferring higher levels of cash payment in M&As (in columns 4, 5, 6, and 8) whereas those with high insider ownership stakes (INSIDER>20) do not necessary prefer cash over stock when earnings quality is considered (in columns 3, 4, 5, 6, 7, and 8).

[Table 7 about here]

The other major robustness test is the use of Tobit models instead of simultaneous equations. The dependent variable in a Tobit model is both left and right censored. In our case, the percentage of cash paid (%Cash) is bounded in the interval (0,100) and suits Tobit models very well. The Tobit regression model is appropriate when the dependent variable is censored at some upper or/and lower bound as an artifact of how the data are measured. Tobit models are estimated with maximum likelihood estimation, a general

method for obtaining parameter estimates and performing statistical inference on the estimates. The results are reported in Tables 8 and 9.

In these Tobit regressions, the effect of earnings quality is much stronger than those reported using simultaneous regressions. In Table 8, the coefficient on AQ alone is negative and significant at the 1% level in all the eight columns. The interaction variable INSIDER<5*AQ, is significant at the 1% level in columns 3 and 4, and INSIDER<5*MTB*AQ in column 8 is significant at 10%. These findings provide stronger evidence supporting our hypotheses that earnings quality affects the choice of payment method in acquisitions. In the Tobit models of Table 9, earnings quality is measured by EARNVAR. The coefficient on EARNVAR itself is significant at the 5% level in 7 out of 8 columns. The interaction variables involving insider ownership and EARNVAR have coefficients similar to those reported in earlier tables. That is, acquiring firms with low insider ownership stakes (INSIDER<5) prefer higher levels of cash payment in M&As (in columns 4, 5, 6, 7, and 8) whereas those with higher insider ownership stakes (INSIDER>20) do not necessary prefer cash over stock when earnings quality is considered (in columns 3, 4, 5, 6, 7, and 8). In sum, the results of the Tobit models give a stronger support to the predictions of our two hypotheses.

[Tables 8 and 9 about here]

2.8 Summary

The intention of accounting standard regulators in allowing some degree of reporting flexibility is to provide enough latitude so that financial statements can be more

informative. Nevertheless, in a world of asymmetric information and agency problems, the discretionary nature of accrual accounting can lead to earnings manipulation. Firms have been found to use discretionary accounting choices to manage earnings information around the time of mergers and acquisitions. In this study, we show that the choice of payment method in acquisitions is significantly affected by the acquiring firm's earnings quality. We find that acquiring firms with poor earnings quality prefer a lower cash payment in acquisitions, but acquiring managers with low insider ownership stakes prefer cash over stock even if the earnings quality is poor. We also find that acquiring firms with high insider ownership stakes do not always prefer paying more cash for acquisitions. For them, it is likely that the choice of payment method in acquisitions is to maintain a balance between protecting personal wealth and not losing control of the acquiring firm. The existing literature has related the choice of payment method in acquisitions to factors such as growth opportunities, stock price performance, corporate control, managerial equity ownership, and target size. We contribute to the literature by showing that the earnings quality of the acquiring firm is also an important factor.

Chapter3

Earnings Quality and Corporate Cash Holdings

3.1 Introduction

Poor earnings quality, regardless of its definition, displeases investors. Despite there is argument whether earnings quality, when measured as accruals quality, is systematically priced in the stock market (Francis et al., 2004 and 2005; Core, Guay, and Verdi, 2008), researchers have linked earnings quality to a multitude of corporate events (see Dechow and Schrand, 2004 for a summary). A recurrent theme in extant literature is that poor earnings quality is associated with agency problems and earnings management (Teoh, Welch, and Wong, 1998a and 1998b; Teoh and Wong 2002; DuCharme, Malatesta, and Sefick, 2004; Louis, 2004; Jo, Kim, and Park, 2007). In this study, we add to the literature by studying the effect of poor earnings quality on corporate cash holdings. We argue that poor earnings quality implies a lack of reliable information for investors to monitor firm managers, and it may also imply a higher likelihood that earnings are managed. Thus, we postulate that poor earnings quality has a negative effect on the value of corporate cash holdings. We argue that the negative effect arises because in a world of asymmetric information and agency problems, investors discount the value of corporate cash holdings based on their expectations of how the cash would be used. We also postulate that poor earnings quality aggravates the information asymmetry between insiders and outsiders of the firm. As information asymmetry makes raising external equity funds more expensive, firms have incentives to hold more cash. We examine cash due to several reasons. First, there is evidence that the cash reserves held by U.S. firms have increased substantially in the last two decades. According to Bates,

Kahle, and Stulz (2006), the median cash-to-assets ratio for 13237 U.S. industrial firms has increased from 5.5% to 14.73% between 1980 and 2004. Second, as Myers and Rajan (1998) suggest, liquid assets can be turned into private benefits for firm managers at lower cost than other assets. More liquid assets can lead to increased agency problems. Thus, cash holdings represent a good target for examining the implications of the agency problems associated with poor earnings quality on firm value.

Our study is motivated by two strands of recent research related to corporate cash holdings. The first strand of studies examines how the value of corporate cash holdings is affected by firm-specific factors (Pinkowitz, Stulz, and Williamson, 2006; Dittmar and Mahrt-Smith, 2006; Faulkender and Wang, 2006). The second strand of studies explains why firms hold so much cash (Pinkowitz, Stulz, and Williamson, 2003; Bates, Kahle, Stulz, 2006; Foley, Hartzell, Titman, and Twite, 2007; Harford, Mansi, and Maxwell, 2008). The value of cash and the level of corporate cash holdings are largely treated as separate issues in existing literature. Our study makes two contributions. First, by evaluating the impact of earnings quality in an asymmetric information framework, we are able to explain that the value of cash holdings could decline and yet firms have incentives to hold more cash simultaneously. Second, our study adds to the literature on the determinants of the level of corporate cash holdings. Opler, Pinkowitz, Stulz, and Williamson (1999) and Kim, Mauer, and Sherman (1998) have identified a set of variables that can lead to an estimation of the optimal level of cash holdings. Our results show that earnings quality is a significant factor among the determinants of cash holdings identified in extant studies. Our accruals quality augmented prediction model has lower prediction errors than existing models.

The remainder of the paper is organized as follows. Section 2 explains why poor earnings quality constitutes is a risk concern. Section 3 discusses the effects of earnings quality on the value and level of corporate cash holdings. Sections 4 and 5 describe the methodologies and sample characteristics. Section 6 reports the results. Section 7 concludes.

3.2 Poor earnings quality as a firm-specific risk

The separation of ownership and control in publicly traded firms has led to the rise of agency conflicts between firm managers and outside shareholders (Jensen and Meckling, 1976; Demsetz and Lehn, 1985). Despite accounting earnings are used to alleviate the agency conflicts between firm managers and shareholders, managers have been found to protect and promote private benefits by manipulating reported accounting information (Christie and Zimmerman, 1994; Warfield, Wild, and Wild, 1995; Bergstresser and Philippon, 2006; Coles, Hertzel, and Kalpathy, 2006). Thus, the demand for high-quality earnings information is strong from shareholders and stakeholders. Investors demand high-quality earnings information in order to better monitor mangers and promote contracting efficiencies (Ball, Robin, and Wu, 2003). Poor earnings quality, as a result, implies inadequate information for shareholders and stakeholders to monitor and discipline managers to act in the investors' interest. According to Ball and Shivakumar (2005), lower earnings quality does not imply sub-optimality because it can arise when the demand for quality is low. For example, investor protection is low in East Asian countries; firms in these countries have lower incentives to supply high-quality earning information (Fan and Wong, 2002). However, given that

the demand for high-quality accounting information from publicly traded firms is relatively high in the United States, it is prudent to view that poor earnings quality is undesirable and that it constitutes a risk concern.

Merton (1987) posits that firm-specific risk factors become relevant when investors do not have complete information for achieving a fully diversified portfolio. Easley and O'Hara (2004) suggest that the risk faced by uninformed investors increases when private information is more relative to public information. According to Easley and O'Hara, the risk faced by uninformed investors is affected by both the amount of private information and by the precision of private information. Poor earnings quality implies an increase of private information as well as the supply of imprecise information. Therefore, poor earnings quality constitutes a relevant firm-specific risk concern in the spirit of Merton and Easley and O'Hara.

Luez and Verrecchia (2004) take a more direct approach in linking information risk and the quality of earnings reports. According to Leuz and Verrecchia, earnings reports serve the function of monitoring and aligning the interests of different groups of claimholders of the firm. When performance reports are of poor quality, an information risk is created. The interests of the claimholders are misaligned because the information risk makes coordination difficult, and firm investment decisions could be jeopardized. Shareholders, expecting the undesirable effects of poor-quality earnings reports, thus demand a risk premium to compensate for the information risk. According to Leuz and Verrecchia, the information risk associated with poor earnings quality is a significant firm-specific risk. Li (2005) also examines directly the effect of information quality on stock performance. He finds that less precise information can increase the risk premium

and stock return volatility. He argues that firms should disclose more precise information to investors in order to reduce the cost of equity capital. Similarly, Esptein and Schnedier (2005) find that investors, particularly those who are ambiguity averse, dislike assets that have poor information quality. In the presence of poor-quality information, investors demand a premium to compensate for the ambiguity involved.

In sum, the literature has ample theoretical and empirical supports that poor earnings quality is an important firm-specific risk. Poor earnings quality displeases investors as it presents incomplete information for making investment decisions.

3.3 How does poor earnings quality affect corporate cash holdings?

3.3.1 Effects on the value of cash

Poor earnings quality implies the inadequate supply of relevant and reliable information for investors to monitor and discipline the behavior of firm managers (Ball, Robin, and Wu, 2000 and 2003; Ball, 2005). The discretionary use of a firm's cash flow by undisciplined firm manager has been well discussed in the literature (Jensen, 1986; Stulz, 1990). Difficulties in monitoring firm managers create the potential for management to spend internally generated funds on investment projects that are beneficial only from a management perspective. For example, Harford (1999) and Bates (2005) find evidence that cash-rich firms spend more on acquisitions that perform poorly subsequently. Blanchard, Lopez-di-Silanes, and Vishny (1994) report that eleven firms with windfall legal settlements appear to engage in wasteful investment and acquisition activities. Amihud and Lev (1981) suggest that corporate diversification is likely intended

for promoting the private benefits of firm managers. In short, firm managers spend to pursue their own objectives at shareholder expense. According to Opler, Pinkowtiz, Stulz, and Williamson (1999, henceforth OPSW), cash is like free cash flow. Cash allows firm managers to engage in projects that the capital markets would not be willing to finance. Thus, entrenched managers have incentives to hold excess cash because it gives them more flexibility in pursuing their own objectives while avoiding the effect of market discipline. Poor earnings quality weakens investors' ability to mitigate the agency cost of managerial discretion. Thus, poor earnings quality has the impact of lowering the value of corporate cash holdings when investors expect private benefits to be extracted by entrenched managers.

There is a second route through which poor earnings quality lowers the value of corporate cash. Earnings equal cash flow plus accruals. Earnings and cash flow can be different because accounting conventions regarding the timing and magnitude of revenues and expenses are not necessarily based on cash inflows and outflows. Some revenues can be counted towards earnings in the current period even though they have not yet been collected in cash. Likewise, non-cash expense items are routinely deducted from revenues even though they do not impose cash outlays. As such, the accrual component of earnings is subject to a higher degree of uncertainty than is the cash flow component; because managers can discretionary manipulate accruals to inflate earnings. There is extensive evidence supporting the existence of managerial earnings (accruals) management (Teoh, Welch, and Wong, 1998a and 1998b; Teoh and Wong 2002; DuCharme, Malatesta, and Sefick, 2004; Louis, 2004; Jo, Kim, and Park, 2007). Some researchers find specific evidence that managers manage earnings for private benefits

(Perry and Williams, 1994; Bergstresser and Philippon, 2006; Coles et al., 2006). In addition, firm managers have incentives to manage earnings because firms meeting earnings targets are less likely subject to the scrutiny of outside blockholders (Shleifer and Vishny, 1986; Denis and Serrano, 1996). Poor earnings quality therefore suggests the likelihood of earnings management by firm managers for enhancing private benefits, among other implications. As a consequence, in the presence of poor earnings quality, increasing a firm's holdings of cash by one dollar may increase firm value by less than one dollar.

Hypothesis 1: Poor earnings quality has a negative impact on the value of corporate cash holdings.

3.3.2 Effects on the level of cash holdings

Earnings supply information of cash flows because cash flow equals earnings less accruals. Dechow (1994) shows that current earnings predict future cash flow very well. Poor earnings quality therefore implies riskier and less predictable future cash flow. OPSW find evidence that firms are likely to hold more cash if their cash flow volatility is higher than average. Bates, Kahle, and Stulz (2006) find that the average cash to assets ratio for U.S. industrial firms has increased by 129% from 1980 to 2004. They attribute the increase to the riskier cash flows facing U.S. corporations. The results presented by Mikkelson and Partch (2004) also imply that firms persistently hold large cash reserves to hedge against future cash flow uncertainty. Poor earnings quality, implying riskier future cash flow, thus increases the need for firms to hold more cash for precautionary motives.

On the other hand, poor earnings quality implies a lower supply of information to outsiders and aggravates the information asymmetry between insiders and outsiders. Nanda and Narayanan (1997) argue that the information asymmetry between firm managers and the market can lead to misvaluation of the firm's securities. They develop a model in which the market can observe the aggregate cash flows of the firm but not the individual divisional cash flows, which leads to misvaluation of the firm's securities. Myers and Majluf (1984) argue that raising external capital is more costly than using internal funds in the presence of asymmetry information and that it may be optimal for firms to hold cash to meet the need for investment expenditures. Consistent with Myers and Majluf, OPSW argue that information asymmetries make it harder for firms to raise outside funds because outsiders want to be certain that the securities they buy are not overvalued. Given that poor earnings quality presents outsiders with lesser information, outsiders may require a discount to compensate for the uncertainty involved. Thus, poor earnings quality has the potential effect of making outside funds more expensive. Firms may need to hold more cash when poor earnings quality results in more expensive external funds.

Hypothesis 2: Firms with poor earnings quality tend to hold more cash.

3.4 Methodology

3.4.1 Measuring earnings quality

There is no consensus among researchers regarding the measuring of earnings quality. A common approach measures earnings quality by examining properties of

observed accounting numbers. The measures based on this approach are typically related to the level of accruals (Sloan, 1996); the estimation error in accruals (Dechow and Dichev, 2002); and earnings variability (Francis et al., 2004 and 2005). Another general approach for measuring earnings quality focuses on the association between earnings and stock returns (Francis and Schipper, 1999; Ecker et al., 2006). The approach extracts information about earnings from stock prices by assuming the market is efficient. In this study, we follow the first approach in using accounting measures to describe the earnings quality of a firm because these measures have been used extensively in the literature and have been shown to have significant market effects (Francis et al., 2004 and 2005). The chosen accounting measures include accruals quality, absolute abnormal accruals, and earnings variability. Francis et al. (2004) report that accruals quality has larger effects on cost of capital than other measures such as earnings persistence, predictability, smoothness, timeliness, and conservatism; and that earnings variability has about the same effect as accruals quality. Francis et al. (2005) also show that the absolute abnormal accruals from a Jones (1991) model have about the same capital market effect as accruals quality.

A. Accruals Quality (AQ)

Our first measure of earnings quality is accruals quality. Accruals quality, AQ, is the standard deviation of residuals from regressions relating accruals to cash flows over a multi-year period before the merger. A high (low) standard deviation implies a low (high) accruals quality. Our method, following Francis et al. (2005), is based on the cross-sectional Dechow-Dichev (2002) model (all variables are scaled by lagged assets):

$$TCA_{j,t} = \phi_{0,j} + \phi_{1,j} CFO_{j,t-1} + \phi_{2,j} CFO_{j,t} + \phi_{3,j} CFO_{j,t+1} + v_{j,t} \quad \text{(Eq.1)}$$

Where $TCA_{j,t}$= ($\triangle CA_{j,t}$-$\triangle CL_{j,t}$-$\triangle Cash_{j,t}$+$\triangle STDEBT_{j,t}$)= total current accruals in year t, $CFO_{j,t}$ = $NIBE_{j,t}$,- $TA_{j,t}$ = firm j's cash flow from operations in year t, $NIBE_{j,t}$ = firm j's net income before extraordinary items (Compustat #18) in year t, $TA_{j,t}$= ($\triangle CA_{j,t}$-$\triangle CL_{j,t}$-$\triangle Cash_{j,t}$+$\triangle STDEBT_{j,t}$ –$DEPN_{j,t}$) = firm j's total accruals in year t, $\triangle CA_{j,t}$ = firm j's change in current assets (Compustat #4) between year t-1 and year t, $\triangle CL_{j,t}$ = firm j's change in current liabilities (Compustat #5) between year t-1 and year t, firm j's change $\triangle Cash_{j,t}$ in cash (Compustat #1) between year t-1 and year t, $\triangle STDEBT_{j,t}$ = firm j's change in debt in current liabilities (Compustat #34) between year t-1 and year t, $DEPN_{j,t}$ = firm j's depreciation and amortization expense (Compustat #14) in year t, $\triangle Rev_{j,t}$ = firm j's change in revenues (Compustat #12) between year t-1 and year t.

We first estimate Equation (1) for each industry in year t. Annual cross-sectional estimations of (1) are then performed to yield firm- and year-specific residuals, which form our accruals quality metric: $AQ_{j,t} = \sigma(v_j)_t$ is the standard deviation of firm j's residuals $(v_j)_t$ calculated over years t - 4 through t. Larger standard deviations of residuals indicate poorer accruals quality. Unlike abnormal accruals generated by the modified Jones (1991) model, the AQ proxy employed by Francis et al. has an advantage of taking uncertainty into consideration so that a firm that has consistently large residuals may still has a good accruals quality because there is no uncertainty about its accruals. We calculate values of $AQ_{j,t} = \sigma(v_j)_t$ for all firms with available data on Compustat for the period from 1980 to 2004. Because $\sigma(v_j)_t$ is based on five annual residuals, our sample has to restrict to firms with at least 7 years of data. For our sample, the mean and median

values of AQ are 0.064 and 0.042, respectively. These values are consistent with the ones reported by Francis et al. (2005).

B. Absolute Abnormal Accruals (ABS_ABN_ACC)

The second measure of earnings quality is the absolute value of abnormal accruals (ABS_ABN_ACC) based on the modified Jones (1991) model. First, we estimate the following cross-sectional regression for each of the Fama-French (1997) 48 industry groups with at least 20 firms in year *t*:

$$TA_{j,t} / Asset_{j,t-1} = \beta_1 * 1/ Asset_{j,t-1} + \beta_2 * \Delta \mathrm{Rev}_{j,t} / Asset_{j,t-1} + \beta_3 * PPE_{j,t} / Asset_{j,t-1} + \varepsilon_{j,t} \quad \text{(Eq. 2)}$$

The industry- and year-specific parameter estimates obtained are then used to estimate firm-specific normal accruals (*NA*) as a percentage of lagged total assets:

$$NA_{j,t} = \hat{\beta}_1 * 1/ Asset_{j,t-1} + \hat{\beta}_2 * \Delta \mathrm{Rev}_{j,t} / Asset_{j,t-1} + \hat{\beta}_3 * PPE_{j,t} / Asset_{j,t-1} + \varepsilon_{j,t} \quad \text{(Eq. 3)}$$

Absolute abnormal accruals in year t is equal to the absolute value of the difference between the firm-specific actual accruals and the estimated normal accruals.

C. Earnings Variability (EARNVAR)

The third measure of earnings quality, earnings variability (EARNVAR), is the standard deviation of the firm's earnings over the seven years before the acquisition. Earnings is defined as earnings before extraordinary items divided by total assets. Similar to the interpretation of the standard deviation of accruals quality, higher earnings variability is equivalent to lower earnings quality.

3.4.2 Measuring the effect of earnings quality on the value of cash

To estimate the effect of earnings quality on the value of corporate cash holdings, we need a model that relates firm value to firm characteristics. We use the Fama and French (1998) regression model for our investigation, similar to other "value of cash" papers (Pinkowitz and Williamson, 2004; Pinkowitz, Stulz, and Williamson, 2006; Dittmar and Mahrt-Smith, 2007). This valuation approach has been shown to give robust results under different conditions. In the model of Fama-French, the dependent variable is the firm's market-to-book ratio. The independent variables include factors that are likely to affect investors' expectations' of future net cash flows, which determine the value of the firm. The determinants of future cash flows that Fama and French use as controls are past changes, future changes, and current levels of Earnings, R&D Expenses, Dividends, Interest Expenses, as well as past and future changes in Assets and Market Value, all normalized by the Book Value of Assets of the firm. Included in our model are year dummies for capturing macroeconomic and time trend effects, as well as firm dummies (fixed effects) for unobserved heterogeneity and industry effects. Specifically, the following regression model is used:

$$MV/_{NA} = \alpha + \beta_1\, EARN\_QUAL + \beta_2\, Xcash + \beta_3\,(Xcash*EARN\_QUAL) + \beta_4$$

$$Govindex + \beta_5\,(Xcash*EARN\_QUAL*Govindex) + \beta_6\,(MV/_{NA})_{(t-1)} +$$

$$\beta_7\, Earnings/_{assets} + \beta_8\, D2Earnings/_{assets} + \beta_9\, DL2Earnings/_{assets} +$$

$$\beta_{10}\, R\,\&\,D/_{sales} + \beta_{11}\, D2R\,\&\,D/_{assets} + \beta_{12}\, DL2R\,\&\,D/_{assets} + \beta_{13}\, Interests/_{assets} +$$

$$\beta_{14}\, D2Interests/_{assets} + \beta_{15}\, DL2Interests/_{assets} + \beta_{16}\, D2assets/_{assets} +$$

$$\beta_{17}\ DL2assets/_{assets} + \beta_{18}\ Dividends/_{assets} + \beta_{19}\ D2Dividends/_{assets} +$$

$$\beta_{20}\ DL2Dividends/_{assets} + \beta_{21}\ D2MV/_{assets} + Year\ Dummy + Firm\ fixed\ effects + \varepsilon$$

(Eq. 4a)

The dependent variable is the firm's market-to-book ratio. The independent variables include: Xcash (calculated as the ratio of the difference between the actual cash holdings and the optimal cash holdings to assets), Govindex (the Gompers, Ishii, and Metrick governance index), the two-year lagged change (DL2), and the 2-year future change (D2), and the current realizations of the ratios of the following variables over assets: Earnings, Assets, R&D, Interest Expenses, Dividends, and Market Value (only future change). In all variables, assets are computed net of cash.

Firm value and earnings quality may be endogenously determined. Similarly, firm value and governance may also exhibit endogenous feedback in their relationship. Thus, the above OLS regressions may not fully account for the endogeneity problem in the data. Two-stage least squares regressions are commonly used for controlling endogeneity problems. However, using 2SLS requires the ability to identify exogenous variables in the first stage that are not related to the second-stage dependent variable. Existing studies on relationships among firm value, earnings, and governance have frequently used similar exogenous variables in the first-stage and second-stage regressions, making it difficult for us to identify reasonable instrumental variables. Thus, we follow the alternative approach used by Harford et al. (2008) by adding lagged measures of earnings quality and governance to our model in order to control for endogeneity problems. The following is the alternative model:

$$MV/_{NA} = \alpha + \beta_1 EARN\_QUAL_{(t-1)} + \beta_2 Xcash + \beta_3 (Xcash*EARN\_QUAL)_{(t-1)} + \beta_4 Govindex_{(t-1)} + \beta_5 (Xcash*EARN\_QUAL*Govindex)_{(t-1)} + \beta_6 (MV/_{NA})_{(t-1)} + \beta_7 Earnings/_{assets} + \beta_8 D2Earnings/_{assets} + \beta_9 DL2Earnings/_{assets} + \beta_{10} R\&D/_{sales} + \beta_{11} D2R\&D/_{assets} + \beta_{12} DL2R\&D/_{assets} + \beta_{13} Interests/_{assets} + \beta_{14} D2Interests/_{assets} + \beta_{15} DL2Interests/_{assets} + \beta_{16} D2assets/_{assets} + \beta_{17} DL2assets/_{assets} + \beta_{18} Dividends/_{assets} + \beta_{19} D2Dividends/_{assets} + \beta_{20} DL2Dividends/_{assets} + \beta_{21} D2MV/_{assets} + Year\ Dummy + Firm\ fixed\ effects + \varepsilon$$

(Eq. 4b)

3.4.3 Measuring the effect of earnings quality on the level of cash holdings

Our model follows closely those of OPSW (1999) and Bates, Kahle, and Stulz (2006, henceforth BKS) in measuring the effect of earnings quality on the level of corporate cash holdings. The OPSW and BKS models basically are models designed to evaluate the determinants of corporate cash holdings. We add earnings quality to the estimation model to evaluate its effect on the level of corporate cash holdings. Specifically, our model has the following specification:

$$Cash/_{assets} = \alpha + \beta_1 EARN\_QUAL + \beta_2 Industry\ Sigma + \beta_3 MTB + \beta_4 Real\ Size + \beta_5 Cashflow/_{assets} + \beta_6 NWC/_{assets} + \beta_7 Capex + \beta_8 Leverage$$

$$+ \beta_9 \frac{R\&D}{sales} + \beta_{10} Dividummy + \beta_{11} Acquisition + \varepsilon \qquad \text{(Eq. 5)}$$

where the ratio of cash and marketable securities to the book value of assets is the dependent variable. AQ is the accruals quality measure discussed above. Industry sigma is the mean of standard deviations of cash flow/assets over the previous 10 years for firms in the same industry as defined by two-digit SIC code. Market to book is measured as (book value of total assets - book value of equity + market value of equity)/book value of total assets. Real size is the natural log of the book value of total assets in 2005 dollars. Cash flow is defined as (EBITDA - interest - taxes - common dividends). NWC is defined as net working capital minus cash and marketable securities. Capex is the ratio of capital expenditures to the book value of total assets. Leverage is defined as the ratio of total debt to the book value of total assets. R&D is the spending and capital expenditures on research and development. Dividummy is a dummy variable set to one if the firm paid a common dividend in that year, and 0 if it did not. Acquisition activity is measured as the ratio of expenditures on acquisitions (Compustat data item #129) relative to the book value of total assets.

3.5 Sample and descriptive statistics of selected variables

Our sample consists of all US publicly traded firms from 1980 to 2005 for which the required data items are available. The requirement that each firm-year observation must have at least 7 years of data for estimating the accruals quality (AQ) makes our sample bias towards surviving firms that are likely larger and more successful than average. This reduces the variation in AQ and makes it more difficult to detect effects, thus making our results stronger. The sample includes all Compustat firm-year

observations with positive data for the book value of total assets and sales revenue and non-missing data for the accruals quality (AQ) variable. Financial firms (SIC code 6000-6999), utilities (SIC codes 4900-4999) and ADRs are excluded, yielding a panel of 83,287 observations for 9,417 unique firms. Missing explanatory values reduce the final sample to 8,621 unique firms with 71,544 firm-year observations.

We measure cash ratio as the ratio of cash and marketable securities to the book value of total assets. Industry sigma is the mean of standard deviations of cash flow/assets over the previous 10 years for firms in the same industry as defined by two-digit SIC code. Market to book is measured as (book value of total assets - book value of equity + market value of equity)/book value of total assets. Real size is the natural log of the book value of total assets in 2005 dollars. Cash flow is defined as (EBITDA - interest - taxes - common dividends). NWC is defined as net working capital minus cash and marketable securities. Leverage is defined as the ratio of total debt to the book value of total assets. Other variables are included to control for R&D spending, dividend, acquisitions, and capital expenditures. Dividend is the common dividend payments over a particular year. Acquisition activity is measured as the ratio of expenditures on acquisitions (Compustat data item #129) relative to the book value of total assets.

Table 10 provides summary statistics of the sample firms. The earnings quality measure in this table is AQ (accruals quality). Characteristics of firms in the lowest and highest earnings quality quartiles are remarkably different. The mean (median) cash ratio of firms in the lowest earnings quality quartile (0.191) is more than twice that of firms in the highest earnings quality quartile (0.088), and the difference is significant at the 1% level. The mean values of AQ for firms in the lowest and highest earnings quality

quartiles are 0.133 and 0.005, respectively, and the difference is significant at 1%. Besides being smaller, firms in the lowest earnings quality quartile also exhibit characteristics that suggest these firms are more risky. The average MTB for firms in the lowest earnings quality quartile is significantly higher, which implies a higher systematic risk (Fama and French, 1992). In addition to their negative average cash flow and NWC, low earnings quality firms also have higher cash flow volatilities (industry sigma), more intangible assets (R&D), and more debt. Descriptive statistics based on other measures of earnings quality are similar and consistent, and therefore not reported for brevity reasons.

[Table 10 about here]

3.6 Results

3.6.1 The effect of earnings quality on the value of corporate cash holdings

In Panel A of Table 11, we report estimation results of Equation (4a) regarding the effect of earnings quality on the value of corporate cash holdings. We follow Dittmar and Mahrt-Smith in using excess cash (Xcash) instead of total cash because total cash may not reveal the effect of earnings quality clearly if firm managers do not have sufficient discretion in using the cash. Excess cash is the difference between actual cash holdings and the optimal (or necessary) cash holdings implied by the OPSW model. Note that the sample period in this table is between 1990 and 2003 because of the need to predict the optimal cash holdings and control for the effect of corporate governance on the value of corporate cash holdings (Dittmar and Mahrt-Smith, 2007; Pinkowitz, Stulz, and Williamson, 2006). Data for corporate governance (the Gompers, Ishii, and Metrick

(2003) corporate governance index) is only available after 1990. Thus, the sample size in Table 11 is reduced to 4,310 observations.[2] The three measures of earnings quality reported in columns 1, 2, and 3 are AQ (accruals quality), ABS_ABN_ACC (absolute abnormal accruals), and EARNVAR (earnings variability), respectively. In columns 1 and 3, we find that poor earnings quality significantly reduces firm value. The coefficient on AQ in column 1 is significantly negative at 1% and the coefficient on EARNVAR in column 3 is significantly negative at 5%. The coefficient on ABS_ABN_ACC in column 2 is insignificant. In the three regressions, Xcash is positively related to firm value. However, all the interaction variables between excess cash and earnings quality have negative coefficients. The interaction variables in column 1 (Xcash*AQ) and column 3 (Xcash*EARNVAR) are negative and significant at the 1% level. That is, for a firm with one dollar of excess cash, the value of the dollar is statistically and economically significantly lower if the firm has poorer earnings quality. The result implies that investors assign a lower market value to the excess cash held by firms with poor earnings quality. The finding is consistent with implications that investors are concerned about the misuse of excess cash by firms that are more difficult to monitor. The result is consistent with the prediction of our first hypothesis. The interaction variable among excess cash, earnings quality, and corporate governance has a positive and significant coefficient in the three columns. That is, firms with good corporate governance appear able to alleviate investors' concerns about the misuse of excess cash. Similar to the result of Dittmar and

[2] The firm-year observations reduce from 71,544 (26 years) to 39,881 (16 years, we need 1980-89 to estimate the optimal cash level), and the sample size is consistent with BKS model. The missing value for governance index reduces our sample to 4,310 firm-year observations (990 firms). The value regression is run from 1990-2003 because 2-year future values are needed for the value equation. Our sample size (4,310) is very close to Dittmar's paper in which they reported 4,044 observations from 1990 to 2003 in a value regression.

Mahr-Smith (2006), we also find a negative coefficient on governance (Govindex). Dittmar and Mahr-Smith suggest that this might have been caused by endogeneity problems.

In Panel B of Table 11, we use lagged values of earnings quality measures and governance index in the regressions in order to account for potential endogeneity problems in the data. The results in Panel B are very similar and consistent with those in Panel A of Table 11. That is, poor earnings quality reduces firm value; excess cash alone has a positive impact on firm value but the interaction between excess cash and earnings quality lowers firm value.

[Table 11 about here]

3.6.2 The effect of earnings quality on the level of cash holdings

In Table 12, we divide the sample firms into four quartiles by earnings quality and report the mean (median) value of cash holdings held by firms in each quartile. Firms with the lowest AQ quality (quartile 4) have a mean cash holdings that is more than two times higher than that of firms with the highest AQ quality (quartile 1). The difference is 0.103 and is significant at 1%. Similar statistics are observed for the other two measures of earnings quality. Firms with the lowest EARNVAR quality (quartile 4) hold a mean (median) cash level that is 3 (4) times more than firms with the highest EARNVAR quality (quartile 1). The results in Table 12 show that firms with higher earnings quality hold significantly less cash than firms with lower earnings quality. This is consistent with the prediction of hypothesis 2.

[Table 12 about here]

Table 13 presents results of regression equation 5. The sample period is between 1980 and 2005, and the sample includes 71,544 firm-year observations with 8,631 unique firms. In Panel A, the earnings quality measure is AQ. The first column of Panel A reports results using the Fama-Macbeth (1973) method. This method eliminates serial correlation in the residuals of a time-series cross-sectional regression. Newey-West adjusted t-values are reported. Similar to OPSW, we find corporate cash holdings decrease significantly with firm size, net working capital, capital expenditure, leverage, whether a firm pays dividends, and the ratio of expenditures on acquisitions to assets. On the other hand, corporate cash holdings increase significantly with poor earnings quality (AQ), industry cash flow volatility, the market-to-book ratio, the cash flow-to-assets ratio, and the R&D-to-sales ratio. The positive coefficient on earnings quality supports our hypothesis 2 that firms with poorer earnings quality tend to hold more cash. In Table 13, we also present a time-series cross-sectional regression estimation with year dummies, and a time-series cross-sectional regression estimation with year and industry dummies. The results of these two regressions are consistent and similar to those using the Fama-Macbeth method. The coefficient on AQ is positive in columns 2 and 3 and significant at the 1% level with a much larger t-statistic than in column 1. The last column in Panel A of Table 13 shows the result of a cross-sectional regression approach of equation 5. This approach, using the average of the variables over the sample period for the firms, reduces the number of observations to 8631. The results are consistent with

those of the other three regressions. That is, poor earnings quality increases corporate cash holdings.

In Panel B of Table 13 the measure of earnings quality is EARNVAR. The coefficient on EARNVAR is insignificant in column 1, but is highly significant in the other three columns. Overall, the results are similar to Panel A. That is, firms with lower earnings quality hold more excess cash.

[Table 13 about here]

There may be some inconsistencies in the regression results in Table 13 because some variables, such as leverage, cash holdings, capital expenditures, and dividends are simultaneously determined. Therefore, we use a reduced-from regression approach to re-estimate equation 5 in which we exclude the capital expenditures, leverage, and dividend variables. The results of these reduced-form regressions are reported in Table 14. The results are similar and consistent with those reported in Table 13.

[Table 14 about here]

3.6.3 Robustness Test

In Table 15, we present results showing the contribution of earnings quality as a determinant of the level of corporate cash holdings. First of all, we predict the optimal cash level of each year from 1990 to 2005 using the Bates, Kahle, and Stulz (2006) model (which is basically a modified OPSW model), and then compare the predicted amount of each year with the actual cash holdings. The difference is the prediction error. The cash ratio is computed as the ratio of cash and marketable securities to the book value of total assets. Estimates from the BKS model regression are as follows: Cash ratio = 0.2192 + 0.0532 Industry cash flow volatility + 0.0119 Market-to-book - 0.0108 Real size + 0.0705

Cash-flow/Assets - 0.1495 Net working capital/Assets - 0.3247 Capital expenditures/Assets - 0.2066 Leverage + 0.1597 R&D/Sales +0.4000 Dividends/Assets - 0.1579 Acquisitions/Assets + 0.0523 Net equity/Assets + 0.1168 Net debt/Assets.

Next, we add the earnings quality measure (AQ) to the model and repeat the process. Estimates from AQ model regression are as follows: Cash ratio = 0.2148 + 0.1233 AQ + 0.0430 Industry cash flow volatility + 0.0114 Market-to-book - 0.0104 Real size + 0.0745 Cash-flow/Assets - 0.1493 Net working capital/Assets - 0.3275 Capital expenditures/Assets - 0.2068 Leverage + 0.1561 R&D/Sales +0.4147 Dividends/Assets - 0.1582 Acquisitions/Assets + 0.0508 Net equity/Assets + 0.1166 Net debt/Assets. Then we compare the prediction errors of the BKS model and our AQ-augmented model. In Table 15, the results show that the AQ-augmented model has smaller prediction errors in 13 of the 16 years between 1990 and 2005. In seven years, the difference is statistically significant, particularly in the period after 2000. The results validate that earnings quality has a significant impact on corporate cash holdings. However, results in Panel B of 15show that EARNVAR is not as successful as AQ in helping to predict the optimal cash ratio.

[Table 15 about here]

3.7 Conclusions

It has been found in recent research that the market value of corporate cash holdings could be less than the actual dollar value when investors expect private benefits to be extracted by firm managers from the cash holdings. Poor corporate governance has been identified as a major reason accounting for the phenomenon, both domestically and

internationally. At the same time, researchers find that US firms are holding more and more cash reserves, and the amounts well exceed those predicted by conventional models. While the two phenomena are not necessarily inconsistent, researchers in general treat the two as separate issues. In considering earnings quality as an information risk, we are able to explain that poor earnings quality has a negative impact on the value of corporate cash holdings and a positive impact on the level of cash reserves. That is, the two phenomena could exist simultaneously and that they are not necessarily inconsistent with each other. We offer explanations that are related to the predictions of agency theories and asymmetric information arguments. In relating earnings quality to corporate cash holdings, we highlight investors' concerns about the discretionary use of corporate cash holdings when firm managers decide to present less reliable earnings information to the market.

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Table 1 Industry and event-year distribution of 786 eligible mergers and acquisitions that took place between 1993 and 2004.

Panel A. Sample Distribution by industry

SIC Code	Industry	Frequency
07	Agriculture, Forestry, and Fishing	1
10	Metal Mining	6
13	Oil and Gas; Petroleum Refining	21
14	Mining & Quarrying of Nonmetallic Minerals (No Fuels)	1
16	Heavy Construction	1
17	Construction - Special Trade Contractors	1
20	Food and Kindred Products	32
22	Textile Mill Products	3
23	Apparels	7
24	Lumber, and Wood Products	2
25	Furniture, and Fixtures	2
26	Paper and Allied Products	10
27	Printing, Publishing, and Allied Services	14
28	Chemicals and Allied Products	90
29	Oil and Gas; Petroleum Refining	4
30	Rubber and Miscellaneous Plastic Products	2
32	Stone, Clay, Glass, and Concrete Products	1
33	Primary Metals	16
34	Fabricated Metal Products	19
35	Machinery	101
36	Electronic and Electrical Equipment	100
37	Transportation Equipment	20
38	Measuring, Medical, Photo Equipment; Clocks	91
39	Miscellaneous Manufacturing	12
40	Transportation and Shipping (except air)	3
42	Motor Freight Transportation	4
50	Wholesale Trade-Durable Goods	14
51	Wholesale Trade-Nondurable Goods	11
52	Miscellaneous Retail Trade	2
53	Retail Trade-General Merchandise	10
54	Retail Trade-Food Stores	6
56	Retail Trade- Apparel and Accessory	5
58	Retail Trade-Eating and Drinking Places	4
59	Miscellaneous Retail Trade	13
70	Hotels and Casinos	3
72	Personal Services	5
73	Advertising Services	125
78	Motion Picture Production and Distribution	6
79	Amusement and Recreation Services	4

80	Health Services	5
87	Business Services	9
Total		786

Panel B. Sample distribution by year

1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	Total
19	37	70	86	70	92	122	100	66	49	39	36	786

Notes: The sample includes Mergers and Acquisitions with pure cash, stock, or mixed payment methods during 1993-2004 as reported by Securities Data Corporation.

Table 2 Sample Descriptive Statistics for 786 eligible mergers and acquisitions that took place between 1993 and 2004.

Panel A (Full sample)

AQ and AQ1 are measured by the standard deviation of firm j's residuals from cross-sectional regressions over year t-4 to year t based on the modified and unmodified Dechow-Dichev (2002) models respectively. EARNVAR is the standard deviation of the firm's earnings over 7 years before the M&A event. AQ2 is the absolute value of abnormal accruals generated by the modified Jones (1991) approach. Innate AQ is an estimate of the innate portion of firm j's accrual quality from Dechow-Dichev (DD) model while DiscAQ is the estimate of the discretionary component of firm j's accrual quality. FINLEVER is the total interest bearing debt to total assets, prior to deal announcement. RUN_UP is the cumulative stock buy and hold return of the bidder over the year preceding the announcement month. MTB is the ratio of the market value of equity over the book value of equity prior to deal announcement. INSIDEROWN is the shares owned by corporate insiders divided by total shares outstanding. BLOCK is a (01) dummy variable that has a value of 1 if outside blockholders owning more than 5% of the stock, and is 0 otherwise. CASH and STOCK are the percentage of cash and stock financed in deals respectively. INDR equals 1 if the bidder's and the target's primary 4-digit SIC code coincides, and equals 0 otherwise. UNLISTEDTGT equals 1 if the target is an unlisted stand-alone company, and equals 0 otherwise. SUBSID equals 1 if the target is an unlisted subsidiary of another firm and equals 0 otherwise. σ(CFO) is the standard deviation of cash flow from operations. σ(Sales) is the standard deviation of sales. OperCycle is the firm j's Operation Cycle). Negative Earnings is the incidence of negative earnings over the sample period.

Variables	Mean	25%	Median	75%
Accruals Quality (AQ)	0.051	0.019	0.038	0.070
Earning Variability (EARNVAR)	0.069	0.022	0.042	0.087
Accruals Quality1 (AQ1)	0.058	0.023	0.043	0.074
Accruals Quality2 (AQ2)	0.058	0.016	0.036	0.076
Innate AQ	0.026	0.016	0.023	0.033
DiscAQ	0.025	-0.005	0.012	0.039
Asset ($mils)	6524.61	785.17	2700.54	8404.11
Financial Leverage (FINLEVER)	0.182	0.043	0.173	0.286
Deal Value ($mils)	1114.12	56.633	197.45	677.96
Run-up (RUN_UP)	0.676	-0.012	0.255	0.606
Market-To-Book ratio (MTB)	4.765	1.968	3.230	5.507
Insider ownership (INSIDEROWN)	0.327	0.022	0.061	0.261
Block Ownership (BLOCK)	0.174	0	0.114	0.235
Intra-industry Target (INDR)	0.344	0	0	1
Unlisted Target (UNLISTEDTGT)	0.290	0	0	1
Subsidary (SUBSID)	0.004	0	0	0
SIZE (Log of total assets)	4.995	3.314	4.925	6.593
Innate factors explaining accruals quality				
σ(CFO)	0.205	0.046	0.081	0.146
σ(Sales)	0.396	0.118	0.216	0.392
OperCycle	173	79	124	182
Log (Operation Cycle)	4.743	4.387	4.827	5.207
Negative Earnings	0.317	0	0.20	0.60

Panel B (Sample Descriptive Statistics By Payment Method)

	Pure Stock (N=391)		Pure Cash (N=194)		Mixed Payment (N=201)	
Variables	**Mean**	**Median**	**Mean**	**Median**	**Mean**	**Median**
Accruals Quality (AQ)	0.059	0.046	0.038	0.026	0.049	0.031
Earning Variability (EARNVAR)	0.078	0.055	0.052	0.032	0.069	0.037
Accruals Quality1 (AQ1)	0.065	0.054	0.045	0.032	0.053	0.033
Accruals Quality2 (AQ2)	0.062	0.043	0.047	0.034	0.060	0.029
Innate AQ	0.028	0.025	0.022	0.020	0.028	0.024
DiscAQ	0.031	0.021	0.016	0.006	0.021	0.007
Asset ($mils)	5977.17	1839.78	8727.31	4000.26	5463.55	2765.60
Financial Leverage (FINLEVER)	0.150	0.127	0.190	0.197	0.234	0.235
Deal Value ($mils)	1065.46	174.75	370.14	112.09	1926.86	498.74
Run-up (RUN_UP)	1.039	0.348	0.289	0.180	0.344	0.163
Market-To-Book ratio (MTB)	5.694	3.893	0.289	0.180	3.860	2.478
Insider ownership (INSIDEROWN)	0.377	0.075	0.332	0.052	0.224	0.046
Block Ownership (BLOCK)	0.185	0.098	0.150	0.083	0.178	0.145
% of Cash payment (CASH)	0	0	100	100	26.331	16.190
Intra-industry Target (INDR)	0.361	0	0.268	0	0.388	0
Unlisted Target (UNLISTEDTGT)	0.440	0	0.082	0	0.199	0
Subsidary (SUBSID)	0.003	0	0	0	0.010	0

Table 3 Mean Values of Cash Paid (%Cash) by Acquirers in Acquisitions by Earnings Quality Quintile

Five measures of earnings quality are reported in this table. AQ and AQ1 are measured by the standard deviation of firm j's residuals from cross-sectional regressions over year t-4 to year t based on the modified and unmodified Dechow-Dichev (2002) models respectively. EARNVAR is the standard deviation of the firm's earnings over 7 years before the M&A event. AQ2 is the absolute value of abnormal accruals generated by the modified Jones (1991) approach.. The columns labeled "Q5-Q1" show the difference in the mean values between the worst (Q5) and best (Q1) earnings quality quintiles, along with t-statistic of whether the difference is significantly from zero.

Variable	Earnings Quality Quintile (1=high earnings quality; 5=low earnings quality)					Q5-Q1	
	Q1	Q2	Q3	Q4	Q5	Diff.	t-stat.
AQ	44.13%	39.03%	26.01%	26.10%	21.81%	22.32% ***	4.68
EARNVAR	40.27%	34.90%	30.92%	28.41%	22.38%	17.89%***	3.69
AQ1	43.68%	39.15%	30.68%	16.81%	27.18%	16.50%***	3.37
AQ2	34.72%	31.08%	32.66%	28.07%	23.11%	11.61% **	2.31
AQ (Innate)	46.15%	31.31%	30.70%	27.81%	21.20%	24.95% ***	5.27
AQ (Discretionary)	41.51%	34.53%	29.71%	29.27%	22.07%	19.43% ***	4.11

*** and **** denote significance at the 5% and 1% level, respectively.*

Table 4 Simultaneous Equations Explaining the Choice of Acquisition Financing in Mergers and Acquisitions (Earnings Quality is measured by AQ and the Complete System Model is Used)

AQ is measured by the standard deviation of firm j's residuals, from year t-4 to t from annual cross-sectional estimations of the modified Dechow-Dichev (2002) model. FINLEVER is the total interest bearing debt to total assets, prior to deal announcement. RUN_UP is the cumulative stock buy and hold return of the bidder over the year preceding the announcement month. MTB is the ratio of the market value of equity over the book value of equity prior to deal announcement. INSIDEROWN is the shares owned by corporate insiders divided by total shares outstanding. BLOCK is a (01) dummy variable that has a value of 1 if outside blockholders owning more than 5% of the stock, and is 0 otherwise. CASH and STOCK are the percentage of cash and stock financed in deals respectively. INDR equals 1 if the bidder's and the target's primary 4-digit SIC code coincides, and equals 0 otherwise. UNLISTEDTGT equals 1 if the target is an unlisted stand-alone company, and equals 0 otherwise. SUBSID equals 1 if the target is an unlisted subsidiary of another firm and equals 0 otherwise. RELSIZE is the ratio of the deal value over the sum of the deal value plus the bidder's market capitalization as of the year-end prior to deal announcement. Insider5 equals 1 when insider ownership is less than 5%, and equals 0 otherwise. Insider20 equals 1 when insider ownership is greater than 20% and equals 0 otherwise.

%Cash = AQ + FINLEVER + ASSETS + RUN_UP + RELSIZE + MTB + INDR + UNLISTED_TGT + SUBSID + BLOCK + INSIDER<5+ INSIDER>20 + INSIDER<5*AQ + INSIDER>20*AQ ------ Equation (6.1)

AQ = %Cash + FINLEVER + ASSETS + RELSIZE + MTB + INSIDER_OWN + DIVDEND ------- Equation (6.2)

	Simultaneous Equation 1								Simultaneous Equation 2	
Variables	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**1**	**2-8**
Intercept	48.546*** (10.11)	45.167*** (8.67)	47.052*** (8.39)	47.932*** (10.31)	50.783*** (8.20)	49.847*** (10.56)	53.263*** (8.51)	48.482*** (10.42)	0.071*** (17.69)	0.070*** (15.38)
CASH	_	_	_	_	_	_	_	_	-0.0001*** (-3.30)	-0.0001*** (-3.19)
AQ	-67.747** (-2.24)	-60.864** (-2.08)	-101.912* (-1.84)	-110.79** (-2.50)	-58.701** (-2.33)	-59.345** (-2.12)	-73.263** (-2.13)	-79.287** (-2.32)	_	_

FINLEVER	-2.978 (-0.28)	-3.083 (-0.30)	-2.383 (-0.23)	-2.425 (-0.23)	-5.126 (-0.49)	-4.638 (-0.44)	-2.295 (-0.22)	-2.486 (-0.24)	-0.072*** (-5.86)	-0.076*** (-6.19)
ASSET	0.0004** (2.26)	0.0004** (2.12)	0.0004** (2.17)	0.0003* (1.70)	0.0003** (2.06)	0.0003* (1.94)	0.0003** (2.10)	0.0004** (2.15)	-6.60E-7*** (3.71)	-6.49E-7*** (3.71)
RUN_UP	-0.032 (-0.07)	0.040 (0.09)	-0.020 (-0.04)	-0.028 (-0.06)	-0.014 (-0.03)	-0.007 (-0.02)	-0.001 (-0.01)	-0.037 (-0.08)	–	–
RELSIZE	-204.7*** (-5.91)	-178.6*** (-4.95)	-180.0*** (-4.98)	-179.7*** (-4.98)	-177.8*** (-4.93)	-178.5*** (-4.96)	-179.8*** (-4.98)	-177.7*** (-4.92)	-9.012* (-1.87)	-4.407 (-1.00)
MTB	-0.811*** (-3.18)	-0.803*** (-3.14)	-0.812*** (-3.17)	-0.816*** (-3.19)	-2.055*** (-2.60)	-1.917*** (-3.26)	-0.976*** (-2.63)	-0.909*** (-3.05)	0.0007** (2.47)	0.0008** (2.63)
INDR	-6.687** (-2.19)	-6.849** (-2.25)	-6.673** (-2.18)	-6.755** (-2.22)	-6.853** (-2.25)	-6.886** (-2.26)	-6.774** (-2.22)	-6.982** (-2.29)	–	–
UNLISTED TGT	-32.68*** (-9.75)	-32.12*** (-9.53)	-32.03*** (-9.47)	-31.86*** (-9.49)	-32.16*** (-9.55)	-31.92*** (-9.53)	-32.04*** (-9.46)	-32.00*** (-9.52)	–	–
SUBSID	6.936 (0.28)	5.372 (0.21)	6.255 (0.25)	5.971 (0.24)	-1.632 (-0.06)	-0.234 (-0.01)	8.866 (0.35)	9.730 (0.38)	–	–
INSIDER OWN	1.061 (0.48)	–	–	–	–	–	–	–	0.005* (1.73)	–
BLOCK	5.908* (1.71)	5.873* (1.70)	5.887* (1.70)	5.902* (1.70)	5.425 (1.56)	5.445 (1.58)	6.042* (1.74)	6.125* (1.76)	–	–
INSIDER5	–	3.799 (1.07)	0.101 (0.02)	–	2.273 (0.46)	–	2.916 (0.74)	–	–	0.0003 (0.06)
INSIDER20	–	4.424 (1.13)	2.670 (0.48)	–	0.922 (0.16)	–	3.444 (0.80)	–	–	0.004 (0.92)

INSIDER5* AQ	–	–	74.610 (1.06)	76.487* (1.72)	–	–	–	–	–	–
INSIDER20 *AQ	–	–	36.230 (0.50)	59.700 (1.16)	–	–	–	–	–	–
INSIDER5* MTB	–	–	–	–	1.465* (1.76)	1.261** (2.14)	–	–	–	–
INSIDER20 * MTB	–	–	–	–	0.885 (0.88)	0.957 (1.38)	–	–	–	–
INSIDER5* MTB*AQ	–	–	–	–	–	–	3.740 (1.56)	3.006* (1.73)	–	–
INSIDER20 * MTB*AQ	–	–	–	–	–	–	3.760 (0.62)	8.097 (1.21)	–	–
DIV	–	–	–	–	–	–	–	–	-0.001 (-0.93)	-0.001 (-0.97)
Adjusted R^2	0.161	0.157	0.156	0.158	0.160	0.162	0.163	0.163	0.103	0.097
Obs	786	786	786	786	786	786	786	786	786	786

, **, and * denote significance at the 10%, 5%, and 1% levels, respectively*
t-values are in parentheses

Table 5 Simultaneous Equations Explaining the Choice of Acquisition Financing in Mergers and Acquisitions (Earnings Quality is measured by AQ and Reduced-Form Equations are Used)

AQ is measured by standard deviation of firm j's residuals, from year t-4 to t from annual cross-sectional estimations of the modified Dechow-Dichev (2002) model. FINLEVER is the total interest bearing debt to total assets, prior to deal announcement. RUN_UP is the cumulative stock buy and hold return of the bidder over the year preceding the announcement month. MTB is the ratio of the market value of equity over the book value of equity prior to deal announcement. INSIDEROWN is the shares owned by corporate insiders divided by total shares outstanding. BLOCK is a (01) dummy variable that has a value of 1 if outside blockholders owning more than 5% of the stock, and is 0 otherwise. CASH and STOCK are the percentage of cash and stock financed in deals respectively. INDR equals 1 if the bidder's and the target's primary 4-digit SIC code coincides, and equals 0 otherwise. UNLISTEDTGT equals 1 if the target is an unlisted stand-alone company, and equals 0 otherwise. SUBSID equals 1 if the target is an unlisted subsidiary of another firm and equals 0 otherwise. RELSIZE is the ratio of the deal value over the sum of the deal value plus the bidder's market capitalization as of the year-end prior to deal announcement. INSIDER5 equals 1 when insider ownership is less than 5%, and equals 0 otherwise. INSIDER20 equals 1 when insider ownership is greater than 20% and equals 0 otherwise. T statistics are reported in the parenthesis.

%Cash = AQ + RELSIZE + MTB + INDR + UNLISTED_TGT + BLOCK + INSIDER<5+ INSIDER>20 + INSIDER<5*AQ + INSIDER>20*AQ ------ Equation (6.1)-Reduced Form

AQ = %Cash + FINLEVER + ASSETS + RELSIZE + MTB + INSIDER_OWN + DIVDEND --- Equation (6.2)-Reduced Form

	Simultaneous Equation 1								Simultaneous Equation 2	
Variables	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**1**	**2-8**
Intercept	53.240*** (14.73)	48.552*** (11.16)	50.563*** (10.33)	52.102*** (14.65)	53.939*** (10.13)	56.903*** (19.05)	49.556*** (10.66)	52.895*** (14.85)	0.070*** (17.69)	0.070*** (15.38)
CASH	_	_	_	_	_	_	_	_	-0.0001*** (-3.30)	-0.0001*** (-3.19)
AQ	-73.360** (-2.57)	-67.486** (-2.37)	-107.59** (-1.98)	-122.52*** (-2.79)	-63.906** (-2.24)	-62.971** (-2.20)	-80.480** (-2.38)	-91.56*** (-2.74)	_	_

FINLEVER	–	–	–	–	–	–	–	–	-0.072*** (-5.86)	-0.076*** (-6.19)
ASSET	–	–	–	–	–	–	–	–	-6.60E-7*** (3.61)	-6.49E-7*** (3.71)
RELSIZE	-216.7*** (-5.58)	-188.10*** (-5.29)	-189.3*** (-5.32)	-189.4*** (-5.33)	-188.3*** (-5.30)	-181.1*** (-5.17)	-188.9*** (-5.31)	-187.6*** (-5.28)	-9.012* (-1.87)	-4.407 (-1.00)
MTB	-0.780*** (-3.41)	-0.757*** (-3.24)	-0.764*** (-3.27)	-0.760*** (-3.26)	-2.077*** (-2.65)	-2.044*** (-3.51)	-0.901*** (-2.65)	-0.867*** (-3.19)	0.0007** (2.47)	0.0008** (2.63)
INDR	-7.216** (-2.37)	-7.335** (-2.41)	-7.204** (-2.37)	-7.207** (-2.37)	-7.323** (-2.41)	-7.292** (-2.41)	-7.281** (-2.39)	-7.448** (-2.45)	–	–
UNLISTED TGT	-33.24*** (-10.13)	-32.38*** (-9.81)	-32.36*** (-9.74)	-32.41*** (-9.88)	-32.30*** (-9.79)	-32.24*** (-9.84)	-32.34*** (-9.72)	-32.70*** (-9.95)	–	–
INSIDER OWN	0140 (0.06)	–	–	–	–	–	–	–	0.0046* (1.73)	–
BLOCK	3.283 (1.01)	3.549 (1.09)	3.578 (1.09)	3.489 (1.07)	-3.057 (0.94)	-7.133 (-1.02)	3.809 (1.16)	3.783 (1.14)	–	–
INSIDER5	–	5.529* (1.69)	2.211 (0.45)	–	0.726 (0.15)	–	4.841 (1.27)	–	–	0.0003 (0.06)
INSIDER20	–	3.703 (0.95)	1.741 (0.32)	–	0.335 (0.46)	–	2.571 (0.60)	–	–	0.004 (0.92)
INSIDER5 *AQ	–	–	2.211 (1.35)	90.191* (1.82)	–	–	–	–	–	–
INSIDER20 *AQ	–	–	39.038 (0.54)	56.076 (1.09)	–	–	–	–	–	–

INSIDER5 *MTB	–	–	–	–	1.500* (1.83)	1.398** (2.42)	–	–	–	–
INSIDER20 * MTB	–	–	–	–	1.027 (1.03)	0.939 (1.36)	–	–	–	–
INSIDER5 *MTB*AQ	–	–	–	–	–	–	2.970* (1.64)	4.911* (1.76)	–	–
INSIDER20 * MTB*AQ	–	–	–	–	–	–	4.187 (0.70)	8.597 (1.31)	–	–
DIV	–	–	–	–	–	–	–	–	-0.001 (-0.93)	-0.001 (-0.97)
Adjusted R^2	0.159	0.157	0.155	0.157	0.158	0.161	0.164	0.164	0.103	0.097
Obs	786	786	786	786	786	786	786	786	786	786

, **, and * denote significance at the 10%, 5%, and 1% levels, respectively*

Table 6. Simultaneous Equations Explaining the Choice of Acquisition Financing in Mergers and Acquisitions (Earnings Quality is measured by Discretionary AQ and Reduced-form Equations are Used)

DiscAQ is the estimate of the discretionary component of firm j's accrual quality. FINLEVER is the total interest bearing debt to total assets, prior to deal announcement. RUN_UP is the cumulative stock buy and hold return of the bidder over the year preceding the announcement month. MTB is the ratio of the market value of equity over the book value of equity prior to deal announcement. INSIDEROWN is the shares owned by corporate insiders divided by total shares outstanding. BLOCK is a (01) dummy variable that has a value of 1 if outside blockholders owning more than 5% of the stock, and is 0 otherwise. CASH and STOCK are the percentage of cash and stock financed in deals respectively. INDR equals 1 if the bidder's and the target's primary 4-digit SIC code coincides, and equals 0 otherwise. UNLISTEDTGT equals 1 if the target is an unlisted stand-alone company, and equals 0 otherwise. SUBSID equals 1 if the target is an unlisted subsidiary of another firm and equals 0 otherwise. RELSIZE is the ratio of the deal value over the sum of the deal value plus the bidder's market capitalization as of the year-end prior to deal announcement. INSIDER5 equals 1 when insider ownership is less than 5%, and equals 0 otherwise. INSIDER20 equals 1 when insider ownership is greater than 20% and equals 0 otherwise. T statistics are reported in the parenthesis.

%Cash = Disc_AQ + RELSIZE + MTB + INDR + UNLISTED_TGT + BLOCK + INSIDER<5+ INSIDER>20 + INSIDER<5*Disc_AQ + INSIDER>20*Disc_AQ ------ Equation (6.1)-Reduced Form

Disc_AQ = %Cash + FINLEVER + ASSETS + RELSIZE + MTB + INSIDER_OWN + DIVDEND--- Equation (6.2)-Reduced Form

	Simultaneous Equation 1								Simultaneous Equation 2	
Variables	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**1**	**2-8**
Intercept	51.711*** (14.74)	46.894*** (11.06)	48.173*** (11.05)	50.537*** (14.70)	52.445*** (9.98)	52.017*** (15.08)	47.186*** (10.97)	50.998*** (14.84)	0.035*** (9.85)	0.034*** (8.19)
CASH	_	_	_	_	_	_	_	_	-0.0001*** (-2.81)	-0.0001*** (-2.71)

DISCAQ	-65.361** (-2.04)	-59.210* (-1.87)	-130.48** (-2.01)	-150.46** (-2.50)	-55.114* (-1.73)	-55.233* (-1.78)	-77.900** (-1.96)	-84.420** (-2.14)	–	–
FINLEVER	–	–	–	–	–	–	–	–	-0.063*** (-5.60)	-0.066*** (-5.91)
ASSET	–	–	–	–	–	–	–	–	2.579E-8 (0.09)	-1.25E-9 (-0.01)
RELSIZE	-218.2*** (-5.60)	-189.6*** (-5.32)	-190.9*** (-5.35)	-190.9*** (-5.36)	-189.6*** (-5.33)	-189.7*** (-5.34)	-190.40*** (-5.32)	-189.9*** (-5.33)	-9.540** (-2.18)	-5.088 (-1.27)
MTB	-0.734*** (-3.14)	-0.754*** (-3.21)	-0.765*** (-3.25)	-0.749*** (-3.20)	-2.098*** (-2.67)	-2.041*** (-3.51)	-0.822*** (-3.01)	-0.846*** (-3.11)	0.0009*** (3.66)	0.0010*** (3.79)
INDR	-7.503** (-2.47)	-7.589** (-2.50)	-7.531** (-2.47)	-7.584** (-2.49)	-7.570** (-2.49)	-7.560** (-2.50)	-7.649** (-2.51)	-7.741** (-2.54)	–	–
UNLISTED TGT	-33.79*** (-10.34)	-32.86*** (-9.99)	-32.76*** (-9.90)	-33.10*** (-10.15)	-33.21*** (-10.10)	-32.74*** (-10.04)	-32.59*** (-9.70)	-33.39*** (-10.20)	–	–
INSIDER OWN	-0.050 (-0.02)	–	–	–	–	–	–	–	0.005* (1.93)	–
BLOCK	2.873 (0.88)	3.230 (0.99)	3.533 (1.08)	3.281 (1.00)	2.754 (0.84)	2.797 (0.86)	3.618 (1.09)	3.206 (-2.22)	–	–
INSIDER5	–	5.878* (1.70)	3.724 (0.96)	–	0.505 (0.10)	–	5.915* (1.68)	–	–	0.003 (0.79)
INSIDER20	–	3.609 (0.92)	1.786 (0.41)	–	0.484 (0.09)	–	2.347 (0.57)	–	–	0.005 (1.27)
INSIDER5* DISCAQ	–	–	100.274 (1.25)	135.251* (1.89)	–	–	–	–	–	–

INSIDER20 * DISCAQ	–	–	83.894 (0.80)	101.083 (1.37)	–	–	–	–	–	–
INSIDER5* MTB	–	–	–	–	1.526* (1.87)	1.463** (2.53)	–	–	–	–
INSIDER20 *MTB	–	–	–	–	1.041 (1.04)	0.975 (1.41)	–	–	–	–
INSIDER5* MTB* DISCAQ	–	–	–	–	–	–	0.979 (1.31)	4.929* (1.72)	–	–
INSIDER20 *MTB* DISCAQ	–	–	–	–	–	–	7.467 (1.05)	7.634 (1.12)	–	–
DIV	–	–	–	–	–	–	–	–	-0.001 (-1.16)	-0.001 (-1.28)
Adjusted R^2	0.157	0.154	0.154	0.155	0.156	0.158	0.159	0.160	0.095	0.087
Obs	786	786	786	786	786	786	786	786	786	786

, **, and * denote significance at the 10%, 5%, and 1% levels, respectively*

Table 7 Simultaneous Equations Explaining the Choice of Acquisition Financing in Mergers and Acquisitions (Earnings Quality is measured by Earnings Variability and Reduced-Form Equations are Used)

EARNVAR, earnings variability is the standard deviation of the firm's earnings over 7 years before the M&A event. FINLEVER is the total interest bearing debt to total assets, prior to deal announcement. RUN_UP is the cumulative stock buy and hold return of the bidder over the year preceding the announcement month. MTB is the ratio of the market value of equity over the book value of equity prior to deal announcement. INSIDEROWN is the shares owned by corporate insiders divided by total shares outstanding. BLOCK is a (01) dummy variable that has a value of 1 if outside blockholders owning more than 5% of the stock, and is 0 otherwise. CASH and STOCK are the percentage of cash and stock financed in deals respectively. INDR equals 1 if the bidder's and the target's primary 4-digit SIC code coincides, and equals 0 otherwise. UNLISTEDTGT equals 1 if the target is an unlisted stand-alone company, and equals 0 otherwise. SUBSID equals 1 if the target is an unlisted subsidiary of another firm and equals 0 otherwise. RELSIZE is the ratio of the deal value over the sum of the deal value plus the bidder's market capitalization as of the year-end prior to deal announcement. INSIDER5 equals 1 when insider ownership is less than 5%, and equals 0 otherwise. INSIDER20 equals 1 when insider ownership is greater than 20% and equals 0 otherwise. T statistics are reported in the parenthesis.

%Cash = EARNVAR + RELSIZE + MTB + INDR + UNLISTED_TGT + BLOCK + INSIDER<5+ INSIDER>20 + INSIDER<5*EARNVAR + INSIDER>20*EARNVAR ------ Equation (6.1)-Reduced Form

EARNVAR = %Cash + FINLEVER + ASSETS + RELSIZE + MTB + INSIDER_OWN + DIVDEND- Equation (6.2)-Reduced Form

	Simultaneous Equation 1								Simultaneous Equation 2	
Variables	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**1**	**2-8**
Intercept	51.530***	46.523***	46.055***	51.054***	52.127***	55.460***	47.661***	51.468***	0.102***	0.088***
	(14.46)	(10.91)	(11.05)	(14.63)	(9.90)	(18.99)	(10.42)	(14.57)	(12.64)	(9.41)
CASH	_	_	_	_	_	_	_	_	-0.0002*	-0.0002*
									(-1.85)	(-1.70)
EARNVAR	-17.742	-13.901	-0.630	-30.169	-12.790	-13.357	-22.24	-26.98*	_	_
	(-1.42)	(-0.99)	(-0.98)	(-1.46)	(-0.92)	(-0.96)	(-1.21)	(-1.69)		

FINLEVER	–	–	–	–	–	–	–	–	-0.106*** (-4.25)	-0.116*** (-4.60)
ASSET	–	–	–	–	–	–	–	–	-8.98E-7** (-2.42)	-8.96E-7** (-2.26)
RELSIZE	-210.8*** (-5.42)	-182.9*** (-5.11)	-184.07*** (-5.13)	-183.1*** (-5.11)	-183.4*** (-5.13)	-175.7*** (-4.98)	-188.8*** (-5.16)	-190.8*** (-5.23)	-9.540** (-2.18)	-20.11** (-2.24)
MTB	-0.804*** (-3.48)	-0.819*** (-3.53)	-0.820*** (-3.53)	-0.798*** (-3.45)	-2.163*** (-2.75)	-2.141*** (-3.68)	-0.964*** (-2.92)	-1.050*** (-3.24)	0.0001 (0.10)	0.0001 (0.17)
INDR	-7.876*** (-2.59)	-7.961*** (-2.62)	-7.880** (-2.58)	-7.810** (-2.55)	-7.910** (-2.61)	-7.873** (-2.60)	-7.727** (-2.54)	-7.799** (-2.56)	–	–
UNLISTED TGT	-34.03*** (-10.38)	-33.17*** (-10.05)	-33.54*** (-10.13)	-33.38*** (-10.17)	-33.05*** (-10.03)	-32.96*** (-10.08)	-33.57*** (-10.09)	-33.99*** (-10.90)	–	–
INSIDER OWN	-0.501 (-0.23)	–	–	–	–	–	–	–	-0.009 (1.58)	–
BLOCK	3.315 (1.02)	3.673 (1.12)	3.359 (1.53)	3.053 (0.94)	3.144 (0.96)	8.030 (1.14)	3.837 (1.17)	3.522 (1.08)	–	–
INSIDER5	–	5.883* (1.70)	6.226 (1.49)	–	0.634 (0.13)	–	4.662 (1.25)	–	–	0.015* (1.66)
INSIDER20	–	3.376 (0.86)	8.952* (1.68)	–	0.223 (0.04)	–	4.070 (0.93)	–	–	0.004 (0.42)
INSIDER5* EARNVAR	–	–	7.459 (0.80)	26.034* (1.58)	–	–	–	–	–	–
INSIDER20* EARNVAR	–	–	79.484 (1.43)	19.324 (0.49)	–	–	–	–	–	–

INSIDER5* MTB	–	–	–	–	1.550* (1.88)	1.458** (2.52)	–	–	–	–
INSIDER20 *MTB	–	–	–	–	0.927 (0.92)	0.851 (1.23)	–	–	–	–
INSIDER5* MTB* EARNVAR	–	–	–	–	–	–	3.694 (0.82)	5.651* (1.63)	–	–
INSIDER20 *MTB* EARNVAR	–	–	–	–	–	–	1.717 (1.26)	0.193 (1.38)	–	–
DIV	–	–	–	–	–	–	–	–	-0.001 (-0.56)	-0.002 (-0.77)
Adjusted R^2	0.154	0.151	0.154	0.155	0.153	0.156	0.155	0.160	0.031	0.038
Obs	786	786	786	786	786	786	786	786	786	786

, **, and * denote significance at the 10%, 5%, and 1% levels, respectively*

Table 8 Tobit Regressions Explaining the Choice of Acquisition Financing in Mergers and Acquisitions (Earnings Quality is measured by AQ)

The dependent variable in all the regression models is the percent cash paid (%cash) in M&A deals. AQ is measured by standard deviation of firm j's residuals, from year t-4 to t from annual cross-sectional estimations of the modified Dechow-Dichev (2002) model. FINLEVER is the total interest bearing debt to total assets, prior to deal announcement. RUN_UP is the cumulative stock buy and hold return of the bidder over the year preceding the announcement month. MTB is the ratio of the market value of equity over the book value of equity prior to deal announcement. INSIDEROWN is the shares owned by corporate insiders divided by total shares outstanding. BLOCK is a (01) dummy variable that has a value of 1 if outside blockholders owning more than 5% of the stock, and is 0 otherwise. CASH and STOCK are the percentage of cash and stock financed in deals respectively. INDR equals 1 if the bidder's and the target's primary 4-digit SIC code coincides, and equals 0 otherwise. UNLISTEDTGT equals 1 if the target is an unlisted stand-alone company, and equals 0 otherwise. SUBSID equals 1 if the target is an unlisted subsidiary of another firm and equals 0 otherwise. RELSIZE is the ratio of the deal value over the sum of the deal value plus the bidder's market capitalization as of the year-end prior to deal announcement. INSIDER5 equals 1 when insider ownership is less than 5%, and equals 0 otherwise. INSIDER20 equals 1 when insider ownership is greater than 20% and equals 0 otherwise. Z-statistic is reported in the parenthesis.

%Cash = AQ + RELSIZE + MTB + INDR + UNLISTED_TGT + BLOCK + INSIDER<5+ INSIDER>20 + INSIDER<5*AQ + INSIDER>20*AQ + INSIDER<5*MTB + INSIDER>20*MTB + INSIDER<5*MTB*AQ + INSIDER>20*MTB*AQ

Variables	1	2	3	4	5	6	7	8
Intercept	50.547***	46.692***	53.093***	55.678***	64.305***	79.059***	71.181***	62.232***
	(15.18)	(11.17)	(4.11)	(4.94)	(4.18)	(21.32)	(17.71)	(5.34)
AQ	-74.680***	-73.212***	-333.03***	-362.53***	-114.72**	-73.22***	-75.297***	-228.56***
	(-2.81)	(-2.74)	(-2.89)	(-3.54)	(-1.98)	(-3.98)	(-2.78)	(-2.85)
RELSIZE	-237.44***	-237.85***	-584.51***	-584.35***	-571.69***	-192.44***	-193.89***	-581.63***
	(-6.21)	(-6.30)	(-5.30)	(-5.32)	(-5.23)	(-7.45)	(-6.86)	(-5.32)
MTB	-0.721***	-0.761***	-5.704***	-5.647***	-12.171***	-2.546***	-0.788***	-7.197***

	(-3.13)	(- 3.36)	(- 4.07)	(- 4.07)	(-3.76)	(-4.19)	(-2.79)	(-4.33)
INDR	-8.882*** (-2.81)	-8.647*** (-2.75)	-14.825* (-1.91)	-14.849* (-1.92)	-15.039** (-1.95)	-6.431** (-2.13)	-6.566** (-2.17)	-14.764* (-1.92)
UNLISTED TGT	-33.634*** (-6.49)	-33.031*** (-6.44)	-96.116*** (-6.37)	-96.602*** (-6.40)	-96.653*** (-6.39)	-39.022*** (-7.29)	-39.075*** (-6.59)	-97.682*** (-6.44)
INSIDEROWN	0.604 (0.27)	–	–	–	–	–	–	–
BLOCK	3.694 (0.25)	4.229 (1.31)	4.902 (0.60)	4.578 (0.57)	5.172 (0.64)	-0.230 (-0.08)	1.452 (0.47)	4.421 (0.55)
INSIDER5	–	5.366* (1.76)	4.791 (0.45)	–	-7.95 (-0.60)	–	9.085** (2.20)	–
INSIDER20	–	3.278 (0.63)	1.750 (0.12)	–	-14.07 (-0.87)	–	3.522 (0.73)	–
INSIDER5*AQ	–	–	344.222** (2.38)	399.943*** (3.27)	–	–	–	–
INSIDER20*AQ	–	–	194.790 (1.13)	204.88 (1.39)	–	–	–	–
INSIDER5*MTB	–	–	–	–	8.050** (2.49)	1.849*** (3.20)	–	–
INSIDER20* MTB	–	–	–	–	6.382* (1.79)	1.446* (1.80)	–	–
INSIDER5*MTB*AQ	–	–	–	–	–	–	3.639 (1.41)	3.652* (1.65)
INSIDER20*	–	–	–	–	–	–	3.197	3.376*

MTB*AQ							(0.50)	(1.66)
Adjusted R^2	0.168	0.169	0.181	0.185	0.182	0.187	0.186	0.186
Obs	786	786	786	786	786	786	786	786

, **, and * denote significance at the 10%, 5%, and 1% levels, respectively*

Table 9 Tobit Regressions Explaining the Choice of Acquisition Financing in Mergers and Acquisitions (earnings Quality is measured by Earnings Variability)

The dependent variable in all the regression models is the percent cash paid (%cash) in M&A deals. EARNVAR is the standard deviation of the firm's earnings over 7 years before the M&A event. FINLEVER is the total interest bearing debt to total assets, prior to deal announcement. RUN_UP is the cumulative stock buy and hold return of the bidder over the year preceding the announcement month. MTB is the ratio of the market value of equity over the book value of equity prior to deal announcement. INSIDEROWN is the shares owned by corporate insiders divided by total shares outstanding. BLOCK is a (01) dummy variable that has a value of 1 if outside blockholders owning more than 5% of the stock, and is 0 otherwise. CASH and STOCK are the percentage of cash and stock financed in deals respectively. INDR equals 1 if the bidder's and the target's primary 4-digit SIC code coincides, and equals 0 otherwise. UNLISTEDTGT equals 1 if the target is an unlisted stand-alone company, and equals 0 otherwise. SUBSID equals 1 if the target is an unlisted subsidiary of another firm and equals 0 otherwise. RELSIZE is the ratio of the deal value over the sum of the deal value plus the bidder's market capitalization as of the year-end prior to deal announcement. INSIDER5 equals 1 when insider ownership is less than 5%, and equals 0 otherwise. INSIDER20 equals 1 when insider ownership is greater than 20% and equals 0 otherwise. Z-statistic is reported in the parenthesis.

%Cash = EARNVAR + RELSIZE + MTB + INDR + UNLISTED_TGT + BLOCK + INSIDER<5+ INSIDER>20 + INSIDER<5*EARNVAR + INSIDER>20*AQ + INSIDER<5*MTB + INSIDER>20*MTB + INSIDER<5*MTB*EARVAR + INSIDER>20*MTB*EARNVAR

Variables	1	2	3	4	5	6	7	8
Intercept	76.000***	70.234***	70.133***	75.900***	77.287***	77.975***	69.109***	75.991***
	(22.35)	(18.88)	(18.17)	(22.09)	(14.93)	(20.83)	(17.14)	(21.44)
EARNVAR	-29.784**	-30.845**	-18.819**	-43.223**	-30.561**	-30.167**	-20.095**	-29.147*
	(-1.89)	(-2.01)	(-1.89)	(-2.40)	(-1.89)	(-1.88)	(-1.89)	(-1.64)
RELSIZE	-186.88***	-190.38***	-190.57***	-189.21***	-190.92***	-190.47***	-190.30***	-186.74***
	(-6.60)	(-6.67)	(-6.61)	(-6.63)	(-7.03)	(-7.09)	(-6.50)	(-6.07)

MTB	-0.846*** (-4.54)	-0.899*** (- 5.05)	-0.892*** (- 4.98)	-0.859*** (- 4.77)	-2.623*** (-3.39)	-2.677*** (-4.31)	-0.692** (-2.21)	-0.839*** (-2.89)
INDR	-7.333** (-2.38)	-6.852** (-2.24)	-6.575** (-2.13)	-6.609** (-2.16)	-6.669** (-2.20)	-6.709** (-2.21)	-6.932** (-2.21)	-7.226** (-2.30)
UNLISTED TGT	-39.88*** (-6.29)	-39.82*** (-6.44)	-40.59*** (-6.27)	-40.18*** (-6.28)	-39.28*** (-6.80)	-39.35*** (-6.88)	-39.75*** (-6.20)	-40.01*** (-12.15)
INSIDEROWN	0.279 (0.15)	–	–	–	–	–	–	–
BLOCK	0.409 (0.14)	1.466 (0.49)	0.698 (0.23)	0.392 (0.13)	0.359 (0.11)	0.054 (-0.02)	1.129 (0.371)	0.265 (0.08)
INSIDER5	–	8.330** (2.35)	8.597** (2.02)	–	1.051 (0.22)	–	9.502** (2.33)	–
INSIDER20	–	4.078 (0.85)	9.122 (1.59)	–	-1.296 (-0.22)	–	5.155 (1.04)	–
INSIDER5*EARNVAR	–	–	5.565* (1.62)	30.033* (1.59)	–	–	–	–
INSIDER20*EARNVAR	–	–	80.996 (1.55)	40.620 (0.95)	–	–	–	–
INSIDER5*MTB	–	–	–	–	1.867** (2.31)	1.948*** (3.26)	–	–
INSIDER20* MTB	–	–	–	–	1.413 (1.41)	1.380* (1.70)	–	–
INSIDER5*MTB *EARNVAR	–	–	–	–	–	–	4.612 (1.53)	0.340* (1.66)

INSIDER20* MTB*EARNVAR	–	–	–	–	–	–	4.912 (0.77)	3.270 (0.56)
Adjusted R^2	0.164	0.170	0.183	0.185	0.186	0.188	0.187	0.186
Obs	786	786	786	786	786	786	786	786

, **, and * denote significance at the 10%, 5%, and 1% levels, respectively*

Table 10 Descriptive Statistics (1980-2005)

The sample includes all Compustat firm-year observations from 1980 to 2005 with positive data for the book value of total assets and sales revenue and non-missing data for Earnings Quality variables for firms incorporated in the United States. Financial firms (SIC code 6000-6999), utilities (SIC codes 4900-4999) and ADRs are excluded from the sample yielding a panel of 83,287 observations for 9,417 unique firms. Missing explanatory values reduce the panel to 71,544 firm-year observations for 8,621 unique firms. Means and medians of measures of firm characteristics of 71,544 firm years are presented. AQ is measured by the standard deviation of firm j's residuals from cross-sectional regressions over year t-4 to year t based on Dechow-Dichev (2002) model. EARNVAR is the standard deviation of the firm's earnings over 7 years. The absolute value of abnormal accruals is generated by the modified Jones (1991) approach. Cash ratio is the ratio of cash and marketable securities to the book value of total assets. Industry sigma is the mean of standard deviations of cash flow/assets over 10 years *for* firms in the same industry as defined by two-digit SIC code. Market to book is measured as: (book value of total assets - book value of equity + market value of equity)/book value of total assets. Real size is the natural log of the book value of total assets in 2005 dollars. Cash flow is defined as (EBITDA - interest - taxes - common dividends). NWC is defined as net working capital minus cash and marketable securities. Leverage is defined as the ratio of total debt to the book value of total assets. Other variables are included to control for R&D spending, dividend, acquisitions, and capital expenditures. Dividend is the common dividend payments over a particular year. Acquisition activity is measured as the ratio of expenditures on acquisitions (Compustat data item #129) relative to the book value of total assets.

Variables	Full Sample	First Quartile (Highest AQ quality)	Second Quartile	Third Quartile	Fourth Quartile (Lowest AQ quality)	T-statistic (p-value)
Cash ratio	0.130	0.088	0.106	0.136	0.191	-57.19***
	(0.063)	(0.044)	(0.053)	(0.070)	(0.110)	(0.0001)
Real size	4.454	4.957	4.992	4.396	3.470	62.86***
	(4.362)	(4.938)	(4.992)	(4.276)	(3.296)	(0.0001)
MTB	2.104	1.636	0.098	1.757	3.437	-6.08***
	(1.306)	(1.218)	(0.050)	(1.284)	(1.623)	(0.0001)
Cash flow/assets	0.017	0.022	0.045	0.035	-0.170	6.66***
	(0.063)	(0.069)	(0.071)	(0.065)	(0.036)	(0.0001)
NWC/assets	0.037	0.079	0.118	0.127	-0.176	5.03***
	(0.118)	(0.120)	(0.136)	(0.139)	(0.067)	(0.0001)
Capital expenditures/assets	0.067	0.070	0.072	0.068	0.059	12.90***
	(0.047)	(0.053)	(0.055)	(0.046)	(0.034)	(0.0001)
Indusigma	0.128	0.092	0.105	0.135	0.178	-81.15***
	(0.118)	(0.070)	(0.083)	(0.118)	(0.158)	(0.0001)
R&D/sales	0.515	0.103	0.234	0.209	1.514	-3.70***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.030)	(0.0002)
Leverage	0.301	0.302	0.045	0.262	0.367	-2.58**
	(0.227)	(0.255)	(0.071)	(0.216)	(0.180)	(0.01)
Acquisition/ assets	0.017	0.018	0.018	0.017	0.016	1.86*
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.06)
Dividend/assets	0.010	0.014	0.013	0.009	0.004	26.24***
	(0.00)	(0.005)	(0.004)	(0.00)	(0.00)	(0.0001)
AQ	0.064	0.011	0.031	0.056	0.157	-146.13***
	(0.042)	(0.012)	(0.031)	(0.055)	(0.118)	(0.0001)

*, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively

Table 11 Regressions of the impact of Earnings Quality on the value of excess cash holdings (1990-2003)

Panel A

The value regression sample consists of our sample starting from 1990 to 2003 for which the required data items are available. We begin our sample in 1990 because our corporate governance measures, the Gompers, ishii, and Metrick (2003) corporate governance index (GIM index), is only available since 1990. Also we use a Fama-MacBeth model over the period 1980-1989 to predict optimal cash holding for each firm over 1990 to 2003. In all variables, assets are computed net of cash. The dependent variable in all models is the ratio of the firm's market value to assets. The independent variables include: Xcash is calculated as the ratio of the difference between the actual cash holdings and the optimal cash holdings to assets. AQ is measured by the standard deviation of firm j's residuals from cross-sectional regressions over year t-4 to year t based on the Dechow-Dichev (2002) model. EARNVAR is the standard deviation of the firm's earnings over 7 years. The absolute value of abnormal accruals is generated by the modified Jones (1991) approach. Govindex is measured as GIM scores varying between zero and 24. The two-year lagged change (dL2), the 2-year future change (d2), and the current realizations of the ratios of the following variables over assets: Earnings, Assets, R&D, Interest Expenses, Dividends, and Market Value (only future change). Following Hartford et al. (2007) paper, as an endogeneity control, we include the lagged market value to assets in the models. P-values are given in parenthesis.

Variables	Model 1	Model 2	Model 3
Intercept	-0.451 (0.63)	0.360** (0.02)	-0.218 (0.87)
AQ	-1.994*** (<0.0001)	–	–
ABS_ABN_ACC	–	0.033 (0.55)	–
EARNVAR	–	–	-0.341** (0.05)
Xcash	3.011*** (<0.0001)	1.602*** (<0.0001)	1.795*** (<0.0001)
(Xcash * AQ)	-27.115*** (<0.0001)	–	–
(Xcash * ABS_ABN_ACC)	–	-0.310 (0.77)	–
(Xcash * EARN)	–	–	-11.176*** (<0.0001)
(Xcash*AQ*Govindex)	1.704*** (0.0005)	–	–
(Xcash* ABS_ABN_ACC *Govindex)	–	0.409** (0.01)	–
(Xcash*EARNVAR*Govindex)	–	–	1.825*** (<0.0001)
$(\text{Market Value/assets})_{(t-1)}$	0.434*** (<0.0001)	0.618*** (<0.0001)	0.649*** (<0.0001)

Govindex	-0.017* (0.10)	-0.002 (0.82)	-0.002 (0.80)
Earnings/assets	7.126*** (<0.0001)	4.250*** (<0.0001)	4.251*** (<0.0001)
D2 Earnings/assets	-2.824*** (<0.0001)	-2.074*** (<0.0001)	-2.051*** (<0.0001)
DL2 Earnings/assets	-0.413** (0.03)	-0.076 (0.62)	0.006 (0.97)
R&D/assets	7.896*** (<0.0001)	4.335*** (<0.0001)	4.352*** (<0.0001)
D2 R&D /assets	-4.163*** (<0.0001)	-3.335*** (<0.0001)	-3.244*** (<0.0001)
DL2 R&D/assets	1.503 (0.11)	-0.346 (0.63)	-1.342* (0.07)
Interests/assets	1.093 (0.23)	-6.441*** (<0.0001)	-5.348*** (<0.0001)
D2 Interests/assets	5.405*** (<0.0001)	13.136*** (<0.0001)	10.564*** (<0.0001)
DL2 Interests/assets	-3.228*** (0.0002)	-1.134 (0.46)	-1.177 (-0.81)
D2 assets/assets	0.258*** (<0.0001)	-0.009 (0.86)	0.015 (0.74)
DL2 assets/assets	-0.010 (0.72)	-0.270** (0.003)	-0.278*** (0.0005)
Dividends/assets	8.738*** (<0.0001)	5.802*** (<0.0001)	3.013*** (<0.0001)
D2 Dividends/assets	-6.542*** (<0.0001)	-5.764*** (<0.0001)	-3.718*** (<0.0001)
DL2 Dividends/assets	1.803** (0.03)	1.163** (0.05)	1.009* (0.07)
D2 Market Value/assets	0.140*** (0.0001)	0.129*** (<0.0001)	0.110*** (<0.0001)
Year Dummy	Yes	Yes	Yes
N of observations	3,778	3,785	4,021
Pseudo R-squared	0.55	0.56	0.56

*, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively

Panel B

The value regression sample consists of our sample starting from 1990 to 2003 for which the required data items are available. We begin our sample in 1990 because our corporate governance measures, the Gompers, ishii, and Metrick (2003) corporate governance index (GIM index), is only available since 1990. Also we use a Fama-MacBeth model over the period 1980-1989 to predict optimal cash holding for each firm over 1990 to 2003. In all variables, assets are computed net of cash. The dependent variable in all models is the ratio of the firm's market value to assets. The independent variables include: Xcash is calculated as the ratio of the difference between the actual cash holdings and the optimal cash holdings to assets. AQ is measured by the standard deviation of firm j's residuals from cross-sectional regressions over year t-4 to year t based on the Dechow-Dichev (2002) model. EARNVAR is the standard deviation of the firm's earnings over 7 years. The absolute value of abnormal accruals generated by the modified Jones (1991) approach. Govindex is measured as GIM scores varying between zero and 24. The two-year lagged change (dL2), the 2-year future change (d2), and the current realizations of the ratios of the following variables over assets: Earnings, Assets, R&D, Interest Expenses, Dividends, and Market Value (only future change). Following Hartford et al.(2007) paper, as an endogeneity control, we include the lagged market value to assets , lagged earnings quality proxies, lagged governance index and their corresponding interaction terms. P-values are given in parenthesis.

Variables	Model 1	Model 2	Model 3
Intercept	-0.505 (0.54)	0.427*** (0.005)	-0.270 (0.84)
$AQ1_{(t-1)}$	-1.542*** (0.0009)	–	–
$ABS\_ABN\_ACC_{(t-1)}$	–	-0.706*** (<0.0001)	–
$EARNVAR_{(t-1)}$	–	–	0.123 (0.45)
Xcash	0.958*** (<0.0001)	2.036*** (<0.0001)	1.911*** (<0.0001)
$(Xcash * AQ1)_{(t-1)}$	-15.492*** (0.0023)	–	–
$(Xcash * ABS\_ABN\_ACC)_{(t-1)}$	–	-14.042*** (<0.0001)	–
$(Xcash * EARN)_{(t-1)}$	–	–	-10.781*** (<0.0001)
$(Xcash*AQ1*Govindex)_{(t-1)}$	1.060** (0.03)	–	–
$(Xcash* ABS\_ABN\_ACC *Govindex)_{(t-1)}$	–	1.883*** (<0.0001)	–
$(Xcash*EARNVAR*Govindex)_{(t-1)}$	–	–	1.508*** (<0.0001)
$(Market\ Value/assets)_{(t-1)}$	0.449*** (<0.0001)	0.634*** (<0.0001)	0.652*** (<0.0001)

$Govindex_{(t-1)}$	-0.029*** (0.004)	-0.0004 (0.97)	-0.002 (0.80)
Earnings/assets	7.133*** (<0.0001)	4.157*** (<0.0001)	4.175*** (<0.0001)
D2 Earnings/assets	-2.832*** (<0.0001)	-1.852*** (<0.0001)	-1.950*** (<0.0001)
DL2 Earnings/assets	-0.390** (0.03)	0.178 (0.25)	0.060 (0.70)
R&D/assets	8.756*** (<0.0001)	4.621*** (<0.0001)	4.443*** (<0.0001)
D2 R&D /assets	-4.018*** (<0.0001)	-3.175*** (<0.0001)	-3.521*** (<0.0001)
DL2 R&D/assets	1.020 (0.27)	-0.911 (0.21)	-2.280*** (0.002)
Interests/assets	1.119 (0.23)	-6.600** (<0.0001)	-4.178*** (0.001)
D2 Interests/assets	5.791*** (<0.0001)	13.048*** (<0.0001)	13.660*** (<0.0001)
DL2 Interests/assets	-3.160*** (0.0003)	-1.228 (-0.42)	2.462 (0.11)
D2 assets/assets	0.244*** (<0.0001)	-0.036 (0.46)	-0.066 (0.14)
DL2 assets/assets	-0.010 (-0.36)	-0.270*** (0.003)	-0.308*** (0.0001)
Dividends/assets	8.737*** (<0.0001)	4.904*** (<0.0001)	3.015*** (<0.0001)
D2 Dividends/assets	-6.493*** (<0.0001)	-5.126*** (<0.0001)	-3.879*** (<0.0001)
DL2 Dividends/assets	1.545* (0.06)	1.168** (0.05)	1.100** (0.05)
D2 Market Value/assets	0.139*** (0.0001)	0.111*** (<0.0001)	0.115*** (<0.0001)
Year Dummy	Yes	Yes	Yes
N of observations	3,778	3,785	4,021
Pseudo R-squared	0.55	0.56	0.56

*, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively

Table 12 Mean and Median Values of Cash Holdings by Earnings Quality Quartile (1980-2005)

Four measures of earnings quality are reported in this table. AQ is measured by the standard deviation of firm j's residuals from cross-sectional regressions over year t-4 to year t based on the Dechow-Dichev (2002) model . EARNVAR is the standard deviation of the firm's earnings over 7 years. The absolute value of abnormal accruals generated by the modified Jones (1991) approach. Cash ratio is the ratio of cash and marketable securities to the book value of total assets. The columns labeled "Q4-Q1" show the difference in the mean values between the worst (Q4) and best (Q1) earnings quality quartiles, along with t-statistic of whether the difference is significantly from zero. Median values are in the parenthesis. N is the numbers of observations in each quartile for each measure of earnings quality.

Variable	Earnings Quality Quartile (Q1=high earnings quality; Q4=low earnings quality)					Q4-Q1	
	Q1	Q2	Q3	Q4	N	Diff.	t-stat.
AQ	0.088 (0.044)	0.106 (0.053)	0.136 (0.070)	0.191 (0.110)	18,103	0.103	57.19***
ABS_ABN_ACC	0.128 (0.056)	0.144 (0.067)	0.163 (0.079)	0.210 (0.113)	28,493	0.082	47.39***
EARNVAR	0.092 (0.042)	0.124 (0.056)	0.187 (0.097)	0.291 (0.184)	41,388	0.199	120.45***

*** *denote significance at the 1% level.*

Table 13: Regressions estimating the determinants of cash holdings (1980-2005) Panel A (AQ as the measure for Earning Quality)

The sample includes all Compustat firm-year observations from 1980 to 2005 with positive data for the book value of total assets and sales revenue and non-missing data for Accruals quality (AQ) for firms incorporated in the US. Financial firms (SIC code 6000-6999), utilities (SIC codes 4900-4999) and ADRs are excluded from the sample yielding a panel of 83,287 observations for 9,417 unique firms. Missing explanatory values reduce the panel to 71,544 firm-year observations for 8,621 unique firms. The dependent variable in all regressions is the ratio of cash and marketable securities to the book value of total assets (the cash ratio). AQ is measured by standard deviation of firm j's residuals, from year t-4 to t from annual cross-sectional estimations of the Dechow-Dichev (2002) model. Industry sigma is the mean of standard deviations of cash flow/assets over 10 years *for* firms in the same industry as defined by two-digit SIC code. Market to book is measured as: (book value of total assets - book value of equity + market value of equity)/book value of total assets. Real size is the natural log of the book value of total assets in 2005 dollars. Cash flow is defined as (EBITDA - interest - taxes - common dividends). NWC is defined as net working capital minus cash and marketable securities. Capex is the ratio of capital expenditures to the book value of total assets. Leverage is defined as the ratio of total debt to the book value of total assets. R&D is the spending and capital expenditures on research and development. Dividummy is a dummy variable set to one if the firm paid a common dividend in that year, and 0 if it did not. Acquisition activity is measured as the ratio of expenditures on acquisitions (Compustat data item #129) relative to the book value of total assets. The Fama-MacBeth model gives the average of the time series of coefficients from annual cross-sectional regressions. The cross-sectional regression uses the means of all variables for each firm. T statistics are reported in the parenthesis. We report Newey-west adjusted t-values for Fama-Macbeth Model.

Independent variable	Fama-Macbeth Model	Regression using dummy variables for:		Cross-Sectional Regression
		Year	Year and industry	
Intercept	0.195*** (21.78)	0.152*** (53.11)	0.153*** (6.01)	0.147*** (28.99)
AQ	0.093*** (6.36)	0.177*** (23.40)	0.117*** (15.55)	0.203*** (11.26)
Industry sigma	0.136*** (3.67)	0.190*** (29.89)	-0.087 (-0.31)	0.245*** (15.04)
Market to book	0.011*** (4.90)	0.0008*** (17.47)	0.0007*** (17.08)	0.0003* (1.95)
Real size	-0.009*** (-11.69)	-0.010*** (-29.98)	-0.009*** (-27.85)	0.003*** (3.05)
Cash flow/assets	0.025* (1.79)	0.012*** (22.05)	0.013*** (23.25)	0.006*** (3.47)
NWC/assets	-0.082*** (-4.03)	-0.017*** (-29.11)	-0.017*** (-30.54)	-0.012*** (-9.24)

Capex	-0.224*** (-4.32)	0.234*** (38.31)	0.286*** (46.18)	-0.430*** (-15.47)
Leverage	-0.140*** (-5.64)	-0.030*** (-29.89)	-0.030*** (-30.66)	-0.018*** (-9.83)
R&D/sales	0.042 (1.65)	0.0003*** (11.96)	0.0002*** (10.84)	0.0002*** (4.90)
Dividummy	-0.019** (-2.49)	-0.015*** (-10.48)	-0.016*** (-10.90)	-0.059*** (-13.01)
Acquisition activity	-0.158*** (-5.02)	-0.170*** (-16.76)	-0.170*** (-17.15)	-0.462*** (-9.10)
N	26	71,544	71,544	8,631
Adjusted R-square	0.143	0.125	0.172	0.139

*, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively

Table 13 continued. Panel B (Earnvar as the measure for Earning Quality)

The sample includes all Compustat firm-year observations from 1980 to 2005 with positive data for the book value of total assets and sales revenue and non-missing data for Earnings variability for firms incorporated in the US. Financial firms (SIC code 6000-6999), utilities (SIC codes 4900-4999) and ADRs are excluded from the sample. Missing explanatory values reduce the panel to 166,972 firm-year observations for 15,166 unique firms. The dependent variable in all regressions is the ratio of cash and marketable securities to the book value of total assets (the cash ratio). EARNVAR is the standard deviation of the firm's earnings over 7 years. Industry sigma is the mean of standard deviations of cash flow/assets over 10 years *for* firms in the same industry as defined by two-digit SIC code. Market to book is measured as: (book value of total assets - book value of equity + market value of equity)/book value of total assets. Real size is the natural log of the book value of total assets in 2005 dollars. Cash flow is defined as (EBITDA - interest - taxes - common dividends). NWC is defined as net working capital minus cash and marketable securities. Capex is the ratio of capital expenditures to the book value of total assets. Leverage is defined as the ratio of total debt to the book value of total assets. R&D is the spending and capital expenditures on research and development. Dividummy is a dummy variable set to one if the firm paid a common dividend in that year, and 0 if it did not. Acquisition activity is measured as the ratio of expenditures on acquisitions (Compustat data item #129) relative to the book value of total assets. The Fama-MacBeth model gives the average of the time series of coefficients from annual cross-sectional regressions. The cross-sectional regression uses the means of all variables for each firm. T statistics are reported in the parenthesis. We report Newey-west adjusted t-values for Fama-Macbeth Model.

Independent variable	Fama-Macbeth Model	Regression using dummy variables for:		Cross-Sectional Regression
		Year	Year and industry	
Intercept	0.259*** (36.09)	0.211*** (58.26)	0.234*** (92.38)	2.168*** (67.97)
Earnvar	0.0003 (1.04)	0.0003*** (3.51)	0.0002** (2.51)	0.0007*** (3.62)
Industry sigma	0.016*** (3.98)	0.020*** (34.79)	0.019*** (32.94)	0.023*** (15.95)
Market to book	0.006*** (3.25)	0.0004*** (5.25)	0.0003*** (3.94)	0.00006 (0.03)
Real size	-0.011*** (-11.79)	-0.010*** (-35.93)	-0.013*** (-46.99)	-0.007*** (-10.33)
Cash flow/assets	0.004 (0.85)	0.0002*** (2.70)	0.0002*** (3.15)	0.0002* (1.64)
NWC/assets	-0.078*** (-3.67)	-0.004*** (-8.58)	-0.004*** (-9.03)	-0.0014** (-2.22)
Capex	-0.241*** (-11.68)	-0.114*** (-27.53)	-0.101*** (-24.48)	-0.456*** (-15.61)

Leverage	-0.165*** (-4.31)	-0.001*** (-9.56)	-0.002*** (-10.17)	0.002 (0.13)
R&D/sales	0.0047* (1.87)	0.0033*** (22.21)	0.0032*** (21.65)	0.0123*** (17.89)
Dividummy	-0.047*** (-5.30)	-0.059*** (-42.46)	-0.043*** (-29.54)	-0.105*** (-22.40)
Acquisition activity	-0.190*** (-5.81)	-0.232*** (-28.63)	-0.232*** (-28.69)	-0.123*** (-7.16)
N	26	120,651	120,651	15,166
Adjusted R-square	0.177	0.086	0.091	0.116

*, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively

Table 14: Modified regressions estimating the determinants of cash holdings (1980-2005)

Panel A (AQ as the measure for Earning Quality)

The dependent variable in all regressions is the ratio of cash and marketable securities to the book value of total assets (the cash ratio). Panel A shows reduced form regressions that omit capital expenditures, leverage and dividends. Panel B shows regressions that include a measure for the difference in cash holdings. AQ is measured by standard deviation of firm j's residuals, from year t-4 to t from annual cross-sectional estimations of the Dechow-Dichev (2002) model. Industry sigma is the mean of standard deviations of cash flow/assets over 10 years *for* firms in the same industry as defined by two-digit SIC code. Market to book is measured as: (book value of total assets - book value of equity + market value of equity)/book value of total assets. Real size is the natural log of the book value of total assets in 2005 dollars. Cash flow is defined as (EBITDA - interest - taxes - common dividends). NWC is defined as net working capital minus cash and marketable securities. Capex is the ratio of capital expenditures to the book value of total assets. Leverage is defined as the ratio of total debt to the book value of total assets. R&D is the spending and capital expenditures on research and development. Dividummy is a dummy variable set to one if the firm paid a common dividend in that year, and 0 if it did not. Acquisition activity is measured as the ratio of expenditures on acquisitions (Compustat data item #129) relative to the book value of total assets. Difference in cash is the change in cash over net assets from year t to year $t + 1$. The Fama-MacBeth model gives the average of the time series of coefficients from annual cross-sectional regressions. The cross-sectional regression uses the means of all variables for each firm. T statistics are reported in the parenthesis. We report Newey-west adjusted t-values for Fama-Macbeth Model.

Independent variables	Fama-Macbeth Model	Regression using dummy variables for:		Cross-Sectional Regression
		Year	Year and Industry	
Reduced Form Regressions				
Intercept	0.137*** (13.28)	0.151*** (5.34)	0.138*** (5.41)	0.103*** (21.41)
AQ	0.069** (2.10)	0.191*** (25.19)	0.131*** (17.25)	0.258*** (14.06)
Industry sigma	0.164*** (4.08)	0.199*** (31.04)	0.116 (0.47)	0.292*** (17.37)
Market to book	0.011*** (4.88)	0.0008*** (17.88)	0.0008*** (17.90)	0.0003* (1.94)
Real size	-0.011*** (-14.75)	-0.010*** (-34.33)	-0.010*** (-32.01)	-0.002* (-1.82)
Cash flow/assets	0.043** (2.28)	0.008*** (15.35)	0.009*** (16.25)	0.003 (1.55)

NWC/assets	-0.022* (-1.91)	-0.001*** (-5.24)	-0.002*** (-6.69)	-0.0001 (-0.20)
R&D/sales	0.049* (1.67)	0.0003*** (12.01)	0.0002*** (11.00)	0.0002*** (4.81)
Acquisition activity	-0.188*** (-14.75)	-0.198*** (-19.24)	-0.199*** (-19.75)	-0.366*** (-6.99)
N	26	72,412	72,412	8,659
Adjusted R-square	0.151	0.095	0.137	0.090

*, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively

Table 14 continued.

Panel B (Earnvar as the measure for Earning Quality)

The sample includes all Compustat firm-year observations from 1980 to 2005 with positive data for the book value of total assets and sales revenue and non-missing data for Earnings variability for firms incorporated in the US. Financial firms (SIC code 6000-6999), utilities (SIC codes 4900-4999) and ADRs are excluded from the sample. Missing explanatory values reduce the panel to 166,972 firm-year observations for 15,166 unique firms. The dependent variable in all regressions is the ratio of cash and marketable securities to the book value of total assets (the cash ratio). EARNVAR is the standard deviation of the firm's earnings over 7 years. Industry sigma is the mean of standard deviations of cash flow/assets over 10 years for firms in the same industry as defined by two-digit SIC code. Market to book is measured as: (book value of total assets - book value of equity + market value of equity)/book value of total assets. Real size is the natural log of the book value of total assets in 2005 dollars. Cash flow is defined as (EBITDA - interest - taxes - common dividends). NWC is defined as net working capital minus cash and marketable securities. Capex is the ratio of capital expenditures to the book value of total assets. Leverage is defined as the ratio of total debt to the book value of total assets. R&D is the spending and capital expenditures on research and development. Dividummy is a dummy variable set to one if the firm paid a common dividend in that year, and 0 if it did not. Acquisition activity is measured as the ratio of expenditures on acquisitions (Compustat data item #129) relative to the book value of total assets. Difference in cash is the change in cash over net assets from year t to year t + 1. The Fama-MacBeth model gives the average of the time series of coefficients from annual cross-sectional regressions. The cross-sectional regression uses the means of all variables for each firm. T statistics are reported in the parenthesis. We report Newey-west adjusted t-values for Fama-Macbeth Model.

Independent variables	Fama-Macbeth Model	Regression using dummy variables for:		Cross-Sectional Regression
		Year	Year and Industry	
Reduced Form Regressions				
Intercept	0.198***	0.201***	0.223***	2.106***
	(24.05)	(55.09)	(88.80)	(66.73)
Earnvar	0.0004	0.0003***	0.0002**	0.0007***
	(1.40)	(3.65)	(2.47)	(3.35)
Industry sigma	0.018***	0.022***	0.020***	0.025***
	(4.15)	(38.21)	(34.56)	(17.55)
Market to book	0.007***	0.0004***	0.0003***	-0.0001
	(3.37)	(5.34)	(3.94)	(-0.45)
Real size	-0.017***	-0.014***	-0.017***	-0.015*
	(-17.83)	(-57.89)	(-68.91)	(-21.69)

Cash flow/assets	0.015** (2.20)	0.0002*** (3.05)	0.0002*** (3.28)	0.0003** (2.22)
NWC/assets	-0.004 (-0.94)	-0.0001 (-0.68)	-0.0001 (-0.50)	-0.001** (-2.29)
R&D/sales	0.005* (1.82)	0.0003*** (22.11)	0.0003*** (21.42)	0.001*** (18.28)
Acquisition activity	-0.202*** (-7.90)	-0.210*** (-25.82)	-0.215*** (-26.71)	-0.106*** (-6.13)
N	26	122,186	122,186	15,192
Adjusted R-square	0.151	0.056	0.079	0.084

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

Table 15 (Panel A): Predicted cash ratios and their deviations from actual cash holdings over time using BKS and AQ (1990-2005), And difference in Prediction Errors between two models

This table summarizes the differences between actual and predicted cash ratios, by year, for the whole sample (n =39,881 firm-year observations) using BKS and AQ augmented model respectively, and the difference in predicted error (Actual-predicted) between BKS model and AQ model is also presented. The difference in prediction errors between two models is calculated as the absolute value of the predicted error from BKS model minus the absolute value of the predicted error from AQ augmented model. The cash ratio is computed as the ratio of cash and marketable securities to the book value of total assets. Estimates from AQ model regression are as follows: Cash ratio = 0.2148 + 0.1233 AQ + 0.0430 Industry cash flow volatility + 0.0114 Market-to-book - 0.0104 Real size + 0.0745 Cash-flow/Assets - 0.1493 Net working capital/Assets - 0.3275 Capital expenditures/Assets - 0.2068 Leverage + 0.1561 R&D/Sales +0.4147 Dividends/Assets - 0.1582 Acquisitions/Assets + 0.0508 Net equity/Assets + 0.1166 Net debt/Assets. Estimates from the BKS model regression are as follows: Cash ratio = 0.2192 + 0.0532 Industry cash flow volatility + 0.0119 Market-to-book - 0.0108 Real size + 0.0705 Cash-flow/Assets - 0.1495 Net working capital/Assets - 0.3247 Capital expenditures/Assets - 0.2066 Leverage + 0.1597 R&D/Sales +0.4000 Dividends/Assets - 0.1579 Acquisitions/Assets + 0.0523 Net equity/Assets + 0.1168 Net debt/Assets.

	AQ Augmented Model			BKS Model			Difference between BKS and AQ models	
Year	Predicted	Actual- Predicted	t-value	Predicted	Actual- Predicted	t-value	Difference in Error	t-value
1990	0.110	0.0001	0.06	0.109	0.0009	0.30	-0.0001	-0.89
1991	0.131	-0.009	-0.88	0.131	-0.008	-0.82	0.0001	0.06
1992	0.156	-0.031	-1.52	0.156	-0.030	-1.48	0.0005	0.96
1993	0.167	-0.039	-1.98	0.167	-0.039	-1.94	0.0007	1.49
1994	0.202	-0.080	-1.25	0.203	-0.081	-1.23	0.002	1.67
1995	0.284	-0.162	-2.19	0.286	-0.165	-2.17	0.003	1.92
1996	0.150	-0.021	-2.16	0.149	-0.019	-2.00	-0.0002	-0.65
1997	0.155	-0.019	-2.03	0.155	-0.018	-1.84	0.0008	1.56
1998	0.139	-0.011	-2.24	0.137	-0.009	-1.84	-0.0003	-1.08
1999	0.186	-0.056	-2.75	0.185	-0.055	-2.63	0.0008	1.50
2000	0.508	-0.374	-1.22	0.513	-0.379	-1.21	0.008	1.75
2001	0.416	-0.267	-1.08	0.419	-0.271	-1.07	0.006	1.10
2002	0.241	-0.082	-1.83	0.241	-0.083	-1.78	0.004	2.00
2003	0.227	-0.047	-1.54	0.226	-0.046	-1.47	0.002	3.08
2004	0.261	-0.064	-1.98	0.261	-0.064	-1.93	0.003	3.59
2005	0.343	-0.149	-1.97	0.346	-0.152	-1.96	0.005	2.74

Table 15 (Panel B): Predicted cash ratios and their deviations from actual cash holdings over time using BKS and EARNVAR models (1990-2005) And difference in Prediction Errors between two models This table summarizes the differences between actual and predicted cash ratios, by year, for the whole sample (n = 67,029 firm-year observations) using BKS and EARNVAR augmented model respectively, and the difference in predicted error (Actual-predicted) between BKS model and AQ model is also presented. The difference in prediction errors between two models is calculated as the absolute value of the predicted error from BKS model minus the absolute value of the predicted error from EARNVAR augmented model. The cash ratio is computed as the ratio of cash and marketable securities to the book value of total assets. Estimates from EARNVAR model regression are as follows: Cash ratio=0.2569+0.00023Earnings Variablilty+0.0057Market-to-book-0.0140Real size+0.0702Capital expenditures/Assets-0.1370Networking capital/Assets-0.2663Capital expenditures/Assets-0.2365leverage+0.0055Industry cash flow volatility+0.0088 R&D/Sales-0.1923Acquisitions/Assets+0.1520Dividends/Assets+0.1409Net equity/Assets+0.1228Net debt/Assets; Estimates from the BKS model regression are as follows: Cash ratio = 0.1409 + 0.0055 Industry cash flow volatility + 0.0058 Market-to-book - 0.0140 Real size + 0.0701 Cash-flow/Assets - 0.1371 Net working capital/Assets - 0.2668 Capital expenditures/Assets - 0.2368 Leverage + 0.0089 R&D/Sales +0.1506 Dividends/Assets - 0.1937 Acquisitions/Assets + 0.1411 Net equity/Assets + 0.1237 Net debt/Assets.

	EARNVAR Augmented Model			BKS Model			Difference between BKS and EARNVAR models	
Year	Predicted	Actual- Predicted	t-value	Predicted	Actual- Predicted	t-value	Difference in Error	t-value
1990	0.131	-0.0008	-0.30	0.131	-0.0007	0.26	-0.0001	-1.54
1991	0.148	0.0032	0.88	0.148	0.0032	0.79	-0.0001	-0.23
1992	0.149	0.008	1.56	0.149	0.008	1.54	-0.0001	-0.46
1993	0.152	0.016	5.83	0.152	0.016	5.85	-0.0001	-0.66
1994	0.147	0.004	0.79	0.147	0.004	0.79	-0.0002	-1.64
1995	0.164	-0.003	-0.55	0.164	-0.004	-0.57	0.0001	0.75
1996	0.153	0.023	6.22	0.153	0.022	6.15	0.0001	1.11
1997	0.144	0.024	5.88	0.144	0.024	5.87	-0.0001	-0.39
1998	0.134	0.023	4.85	0.134	0.023	4.87	-0.0003	-1.08
1999	0.163	0.011	2.34	0.163	0.011	2.28	-0.0001	-0.43
2000	0.194	-0.018	-0.96	0.195	-0.018	-0.97	0.0002	0.58
2001	0.199	-0.018	-0.53	0.199	-0.018	-0.53	0.0001	0.25
2002	0.126	0.058	-1.71	0.126	0.058	-1.71	-0.0005	-0.59
2003	0.188	0.011	0.54	0.188	0.011	0.54	-0.0001	-0.54
2004	0.248	-0.035	-1.43	0.247	-0.035	-1.43	-0.0001	-0.49
2005	0.234	-0.024	-1.56	0.234	-0.024	-1.56	0.0004	0.79

VITA

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