MANAGERIAL ABILITY AND EARNINGS QUALITY[*]

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ABSTRACT

We examine the relation between managerial ability and earnings quality. We find that earnings quality is positively associated with managerial ability. Specifically, more able managers are associated with fewer subsequent restatements, higher earnings and accruals persistence, lower errors in the bad debt provision, and higher quality accrual estimations. The results are consistent with the premise that managers can and do impact the quality of the judgments and estimates used to form earnings.

Keywords: Managerial ability, managerial efficiency, earnings quality, accruals quality.

Data Availability: Data is publicly available from the sources identified in the text.

MANAGERIAL ABILITY AND EARNINGS QUALITY

I. INTRODUCTION

We examine the relation between managerial ability and earnings quality. We anticipate that superior managers are more knowledgeable of their business, leading to better judgments and estimates and thus higher quality earnings.[1] Alternatively, the benefit of higher quality earnings may not be sufficient to warrant the time and attention of skilled management, especially if the variance of feasible estimates is small, in which case we may not find an association between managerial ability and earnings quality.[2]

While the archival literature in the area of earnings quality has largely focused on firm-specific characteristics, such as firm size and board independence (Dechow and Dichev 2002; Klein 2002), we examine the manager-specific aspect of earnings quality. Our study is in the vein of Bertrand and Schoar (2003), who find that managers have an effect on firm choices such as acquisitions or research and development expenditures; Aier et al. (2005), who document that CFOs with more accounting expertise have fewer restatements; and Francis et al. (2008), who document that earnings quality varies inversely with CEO reputation.[3]

Our main measure of managerial ability is developed in Demerjian et al. (2012), although we perform robustness checks using historical returns, media citations, and manager fixed effects (e.g., Fee and Hadlock 2003; Milbourn 2003; Francis et al. 2008; Dyreng et al. 2010). Demerjian

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[1] Following Dechow and Schrand (2004), we consider high quality earnings to be those that accurately reflect companies' current operating performance, and assume that managers take a shareholder/analyst perspective when determining the desired attributes of earnings (see Dechow et al. 2010). As we discuss further below, we focus on the effect of CFOs and their delegates, as we are interested in the accuracy of accrual estimations.

[2] Costs to poor earnings quality include higher cost of capital (Francis et al. 2004) and economically significant negative price reactions to the announcement of earnings restatements (Palmrose et al. 2004).

[3] We hypothesize a positive relation between ability and earnings quality, which is opposite to the relation documented in Francis et al. (2008). Francis et al. (2008) measure CEO reputation with the number of articles mentioning the executive and find that the number of news articles pertaining to the company's CEO and earnings quality based on the Dechow and Dichev (2002) accruals quality measure are negatively associated. We find that this negative relation in Francis et al. (2008) appears to be due, at least in part, to measurement error in the accruals quality measure (see Section IV).

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et al. (2012) first estimate total firm efficiency, where efficient firms are those that generate more revenues from a given set of inputs. Total firm efficiency is influenced by both the manager (i.e., managers can, to varying degrees, predict future demand and understand industry trends) and the firm (i.e., managers in larger firms can negotiate better terms). Thus, Demerjian et al. (2012) partition total efficiency between the firm and the manager, and verify that the component attributed to the manager is associated with a variety of characteristics, including managerial pay and the price reaction to management departures from the firm.[4] Prior research is limited to measures such as media coverage and historical returns, which are difficult to attribute solely to the manager (versus the firm; e.g., Francis et al. 2008), or manager fixed effects, where there is evidence of a manager-specific effect, but the quantifiable effect is limited to managers who switch firms (e.g., Bertrand and Schoar 2003; Bamber et al. 2010; Ge et al. 2011). The Demerjian et al. ability score allows us to better separate the manager from the firm and retain an ordinal ranking of quality for a large sample of firms.[5]

We expect a more able management team to estimate accruals more accurately. For example, we expect more able managers to be more knowledgeable of their client base and macro-economic conditions when estimating bad debt expense, be more knowledgeable of the expected future benefits of recorded assets, and to be more able to understand and apply complex standards (e.g., McNichols 2002; Plumlee and Yohn 2010).

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[4] As we clarify in the following sections, Demerjian et al. (2012) estimate total firm efficiency using data envelopment analysis, a type of frontier analysis that measures relative efficiency (see also Knechel et al. 2009). They then remove identifiable firm characteristics, such as size, that affect the firm's relative efficiency but are unlikely to be a direct result of the quality of management. They attribute the unexplained portion of total firm efficiency to the management team. They document that their measure outperforms existing measures of ability such as historical stock returns and media citations.

[5] The ability score is for the management team. In our setting we would like to determine the quality of CFOs and their delegates, as we focus on the estimation of accruals, whereas CEOs are more focused on the overall strategy of the firm. Although we cannot disentangle the ability score by CEO and CFO, the ability score does encompass CFOs and their delegates, whereas media citations are, by definition, focused on the CEO. We also identify CFOs that switch firms within our sample to document CFO-specific fixed effects on accruals quality and correlate the CFOs' scores from their old firms with the accruals quality after their arrival in their new firms (see Section V).

We consider four measures of earnings quality: the existence of an earnings restatement (Anderson and Yohn 2002), the persistence of earnings (Richardson et al. 2005), errors in the bad debt provision (McNichols and Wilson 1988), and the extent to which accruals map into cash flows (Dechow and Dichev 2002).[6] In general, we find that earnings quality is positively associated with managerial ability. This finding is consistent with the premise that capable managers are better able to estimate accruals, which results in a more precise measure of earnings.

We contribute to both the earnings quality literature and the managerial ability literature by establishing a positive and significant relation between managerial ability and earnings quality, which suggests a means to improving earnings quality. Many of the factors associated with earnings quality, such as firm size, industry, or operating cycle, result from strategic goals and competitive advantages of the firm. Consequently, it may not be advantageous to improve earnings quality by changing these characteristics. In contrast, we conclude that given the set of earnings-estimation challenges resulting from the firm's operating decisions, higher-ability managers will be able to better deal with these complexities and report higher quality earnings relative to similar firms operating in similar environments. This finding is important for board members considering the costs and benefits of managers; managerial ability affects not only the operations of the firm, but also the quality of its reported earnings, and in turn, its share-price attributes and litigation exposure.

Our results also help reconcile the counter-intuitive prior findings that more reputable managers are associated with lower accruals quality (Francis et al. 2008). We find that this relation appears to be due, in part, to the impact of fundamental firm characteristics on the

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[6] We use the term earnings quality to capture the general construct of higher quality reported earnings, while we use the term accruals quality to discuss the Dechow and Dichev (2002) estimate of earnings quality (the mapping of accruals to cash flows).

accruals quality measure. As noted by Dechow and Dichev (2002) the accruals quality measure is impacted by both intentional and unintentional errors, and many unavoidable unintentional errors stem from complex operating environments (Dechow and Dichev, 2002, 53). Following the spirit of Ball and Shivakumar (2006), we modify the Dechow and Dichev model to allow the coefficients of the model to vary with firm fundamentals. This allows the model to incorporate variations in the expected relation between accruals and cash flows across firms (see also Wysocki 2009). Our modifications allow us to document a positive and significant association between managerial ability and accruals quality.

In the next section, we develop our hypothesis with a review of the literature. In Section III we describe our sample, test variables, and descriptive statistics. In Section IV we present the main results, and in Section V we consider alternative ability measures and conduct a change analysis for a subset of managers in our sample who switch firms. We conclude the study in the final section.

II. HYPOTHESIS DEVELOPMENT AND RELATED LITERATURE

Earnings quality is an important characteristic of financial reports that affects the efficient allocation of resources. Earnings are the main input to investors' and analysts' valuation models, and accordingly, firms with poor earnings quality tend to have higher cost of capital (e.g., Francis et al. 2004) and those experiencing restatements or SEC enforcement actions tend to experience an economically significant negative price reaction to the announcement (Feroz et al. 1991; Palmrose et al. 2004). Following Dechow and Schrand (2004), we define high quality earnings to be those that accurately reflect companies' current operating performance.

We expect managers' ability to form accurate judgments and estimates to vary across individuals. We expect more able managers to be more knowledgeable about the firm and the

industry, as well as to be better able to synthesize information into reliable forward-looking estimates to report higher quality earnings (e.g., Libby and Luft 1993). Specifically, we expect accruals estimated by high-ability managers to be more accurate than those estimated by low-ability managers. For example, consider the allowance for bad debt estimate. A weaker manager might apply the historical rate of bad debt for the firm, while a more knowledgeable manager will adjust the historical rate by considering the macro-economic and industry trends, as well as changes in the firm's customer base. Similarly, we expect better managers to report more accurate and justifiable depreciation rates, fair values, and other accrual estimates. Thus, holding the firm constant, we expect a more able manager to report higher quality earnings.

H1: Managerial ability is positively associated with earnings quality.

It is possible that the majority of the variation in earnings quality is driven by innate firm characteristics that managers cannot affect, in which case we will not find an association between the ability of managers and the quality of earnings. It is also possible that the benefits to the incremental improvement in earnings quality resulting from the intervention by an able manager do not exceed the cost of that manager's time, in which case, again, we will not find an association between the manager's ability and the firm's earnings quality.

To date, the bulk of the literature on earnings quality has examined firm-specific characteristics. For example, Dechow and Dichev (2002) document that earnings quality is poorer for firms that are smaller, are experiencing losses, have greater sales and cash flow volatility, and have longer operating cycles. Each of these innate firm characteristics makes accruals more difficult to estimate. In addition to these innate characteristics, earnings quality has been found to vary with firm infrastructure, such as internal control quality (Doyle et al.

2007; Ashbaugh-Skaife et al. 2008) and monitors such as auditors (e.g., Becker et al. 1998) and boards (Klein 2002).

With respect to the effects of managers on the firm, Bamber et al. (2010) find that individual managers appear to have preferred "styles" that are associated with their propensity to issue guidance and the characteristics of the resulting guidance (e.g., the precision of the guidance). In a similar vein, both Ge et al. (2011) and DeJong and Ling (2010) examine manager fixed effects on certain financial reporting policies, and, similar to Bamber et al. (2010), document that individual managers matter: firms' accounting and disclosure policies vary with manager fixed effects. As previously noted, this approach allows researchers to document a manager-specific effect, but it is constrained to managers who switch employers among the sample firms. Fixed effects are also usually limited to larger firms as executives within smaller firms often switch to private firms (see Ge et al. 2011).

Most closely related to our study, both Aier et al. (2005) and Francis et al. (2008) examine whether earnings quality varies with managerial characteristics. Aier et al. (2005) document an association between CFO expertise (e.g., years worked as CFO, experience at another company, advanced degrees and professional certifications) and restatements; they find that firms employing CFOs with greater expertise have fewer restatements. Francis et al. (2008) examine the relation between earnings quality and CEO reputation, measured by the number of business press articles mentioning each CEO. They find a *negative* relation between CEO reputation and earnings quality. They conclude that "boards of directors hire specific managers due to the reputation and expertise these individuals bring to managing the more complex and volatile operating environments of these firms."

In sum, there is mixed archival evidence on the impact of managers on earnings quality. Although there is some evidence that managers with greater expertise are associated with fewer earnings restatements, Francis et al. (2008) document that more reputable managers are associated with lower earnings quality. The latter association is consistent with some firms having less predictable (and thus lower-quality) earnings by the nature of their business (e.g., Dechow and Schrand 2004; LaFond 2008) and these firms hiring better managers. Although it is more difficult to estimate accruals within certain environments, such as more volatile firms, we expect that better managers can estimate accruals more accurately for a given environment (i.e., within loss firms).

We consider four earnings quality measures. The first is earnings restatements, which are de facto evidence of inaccurate earnings (Dechow et al. 2010).[7] The second is earnings persistence; we partition earnings into accrual and cash flow components to examine accruals persistence more directly (Sloan 1996; Richardson et al. 2005). Our third earnings quality measure is the accuracy of a specific accrual: the bad debt provision (McNichols and Wilson 1988). Finally, we examine the mapping of working capital accruals into cash from operations, based on Dechow and Dichev (2002).

Each of these measures is affected by both unintentional errors and intentional errors (i.e., earnings management), and more able managers may be more likely to introduce intentional errors, either to signal their private information about the firm or to extract perquisites from the

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[7] Some erroneous estimates of accruals are restated prospectively, in that adjustments are made going forward, but prior earnings are not restated. For these, restatements offer an arguably weaker measure of earnings quality than the other measures we examine. Many erroneous judgments and estimates, however, are retrospectively restated. For example, when marking-to-market, managers must determine whether to rely on traded prices or other valuations when traded prices do not appear to be reflective of the fair value. And managers must determine whether or not to write-down assets based on their judgment of whether or not the assets will be realized as future benefits. Plumlee and Yohn (2010) highlight restatements for both of these settings; where managers' judgments were ex post deemed to be wrong (see their appendix). We corroborate in subsequent analyses that a large number of restatements are attributable to managerial judgments and estimates, and that these are the types of restatements that are associated with managerial ability.

firm and the shareholders. We focus on earnings quality measures the capture estimation errors

in accruals, but do not attempt to distinguish between intentional and unintentional errors.[8]

III.   DATA, VARIABLE DEFINITIONS, AND DESCRIPTIVE STATISTICS

We obtain our data from the 2010 Annual Compustat File (to calculate the bulk of our

earnings quality variables and controls), CRSP (to form historical returns, an alternate

managerial ability measure), Execucomp (to track CFOs across firms), IRRC (to obtain board

independence data), and Audit Analytics (for recent years of restatements and internal control

opinions). We also obtain several datasets made available by researchers: managerial ability

(from Demerjian et al. 2012), media citations (from Baik et al. 2012), restatements (from Hennes

et al. 2008 and Plumlee and Yohn 2010) and internal control quality data (from Doyle et al.

2007).

We begin with all firms with managerial ability data and at least one of our earnings

quality variables. We then exclude firm-years with acquisition activity in excess of five percent

of assets, resulting in a maximum of 78,423 firm-year observations from 1989–2009. The period

begins with 1989 because 1988 is the first year for which firms widely reported cash flow

statements, and the Dechow and Dichev (2002) earnings quality variable requires one year of

historical cash flow data. The sample ends in 2009, as our earnings quality variables (described

in the following section) require at least one year of future realizations. We exclude firms with

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[8] Because we examine a broad cross-section, we do not expect to find strong evidence of earnings management, on average (e.g., Dechow and Skinner 2000). It is possible that better managers are more likely to smooth earnings or otherwise use earnings management as a signaling mechanism (e.g., Tan and Jamal 2006), but it is also possible that they can more effectively use earnings management for personal benefits; our measure of managerial ability is based on efficiency, and does not incorporate ethical considerations (e.g., Kim et al. 2012). In the event of earnings management, however, we expect more able managers to be better able to manage earnings *successfully*, for example, accelerating sales only if they know there will be sufficient sales in the next period to cover the acceleration, thereby avoiding large accrual reversals and restatements. We leave a direct examination of the interaction between managerial ability and earnings management for future research.

material acquisition activity as it could unduly affect both the measure of managerial ability and our earnings quality measures.

Variable Definitions
Managerial Ability Measure

Our main measure of managerial ability is the metric developed by Demerjian et al. (2012). Their measure of managerial ability generates an estimate of how efficiently managers use their firms' resources. All firms use common resources—capital, labor, innovative assets—to generate output: revenues. High quality managers will generate a higher rate of output from given inputs than lower quality managers, for example by applying superior business systems and processes (supply chains, compensation systems).

Demerjian et al. (2012), use data envelopment analysis (DEA) to estimate firm efficiency within industries, comparing the sales generated by each firm conditional on the inputs used by the firm (Cost of Goods Sold, Selling and Administrative Expenses, Net PP&E, Net Operating Leases, Net Research and Development, Purchased Goodwill, and Other Intangible Assets).[9] Thus, the measured resources reflect assets (tangible and intangible), innovative capital (R&D), and other inputs that are not reported separately in the financial statements (labor, consulting services) but whose costs are included in cost of sales and SG&A. We provide the motivation for, and definition of, each of these variables in the appendix (see also Demerjian et al. 2012).

Demerjian et al. use DEA to solve the following optimization problem:

$$max_v \; \boldsymbol{\theta} = \frac{Sales}{v_1 CoGS + v_2 SG\&A + v_3 PPE + v_4 OpsLease + v_5 R\&D + v_6 Goodwill + v_7 OtherIntan}$$

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[9] DEA is a form of frontier analysis. DEA calculates efficiency as the ratio of weighted outputs to weighted inputs. DEA uses an optimization program to determine the firm-specific optimal weights (termed "implicit weights") on the inputs and outputs. The implicit weights capture the efficiency of the firm based on the selected inputs and outputs, allowing the optimal mix of inputs and outputs to vary by firm. This differs from other efficiency measures (e.g., ROA or ROE) that require an explicit set of weights (generally equal to one). Since Demerjian et al. (2012) have only one output (sales), its weight is standardized to one across observations. For the general DEA model, please see the appendix.

The optimization finds the firm-specific vector of optimal weights on the seven inputs, $\boldsymbol{v}$, by comparing each of the input choices of the firm under study to those of the other firms in its estimation group. The efficiency measure that DEA produces, $\boldsymbol{\theta}$, can take a value between zero and one (due to constraints in the optimization program). Observations with a value of one are the most efficient; the set of firms with efficiency equal to one trace a frontier through the efficient set of possible input combinations. Observations with efficiency measures less than one fall below the frontier. The score indicates the degree to which the firm is efficient. A firm with a score of less than one would need to reduce costs or increase revenues to achieve efficiency.

The efficiency measure generated by the DEA estimation is attributable to both the firm and the manager, similar to other measures of managerial ability such as historical returns and media coverage. For example, a more able manager will be better able to predict trends, regardless of the size of the firm, while a manager in a larger firm will be better able to negotiate terms with suppliers, regardless of his or her quality. Demerjian et al. (2012) therefore modify the DEA-generated firm efficiency measure by purging it of key firm-specific characteristics that they expect to aid or hinder management's efforts: firm size, market share, positive free cash flow, and firm age (all aiding management), and complex multi-segment and international operations (challenges to management).[10] They estimate the following Tobit regression model by industry:

Firm Efficiency = β₀ + β₁Ln(Total Assets) + β₂Market Share + β₃Positive Free Cash Flow + β₄Ln(Age) + β₅BusinessSegmentConcentration + β₆Foreign Currency Indicator + Year Indicators + ε (1)

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[10] To the extent that managers also affect some of the independent variables in Equation (1), such as free cash flow, the final managerial ability score is a conservative (understated) measure of managerial efficiency. We also supplement Demerjian et al.'s estimation by including risk as an additional independent variable (measured using leverage and beta). We control for risk because superior operating performance that results from riskier operations is not necessarily indicative of higher ability managers. We find similar results when we control for risk, indicating that the ability measure is not simply picking up firms with riskier operations.

The residual from the estimation is attributed to the management team, and is our main measure of managerial ability. We decile rank *Managerial Ability* by year and industry to make the score more comparable across time and industries and to mitigate the influence of extreme observations. Results are similar using a continuous variable (results not tabulated).

Demerjian et al. (2012) corroborate this measure by performing a number of validity tests. First, the managerial ability measure is strongly associated with manager fixed effects, suggesting it reflects manager characteristics, not just firm characteristics omitted from Equation (1). Second, they document a negative (positive) stock price reaction when high-ability (low-ability) CEOs announce they are leaving the firm. Third, they find that replacing CEOs with new CEOs of higher ability (lower ability) is associated with improvements (declines) in subsequent firm performance. The managerial ability score is also positively correlated with CEO pay and historical returns and outperforms historical returns, historical ROA, compensation, tenure and media citations in each of their tests. Together, their validity tests provide strong evidence that the managerial ability score reflects managerial talent that is distinct from the firm.

While the Demerjian et al. (2012) score is our main measure of managerial ability, it has several possible sources of error in its measurement. First, as acknowledged in Demerjian et al. (2012), in the first-stage (DEA estimation) the inputs and output are measured with noise. For example, the accounting variables can be manipulated by management (e.g., sales) and can be measured differently across firms (e.g., cost of goods sold), and some variables of interest, such as advertising or purchased research and development are not available for most firm-year observations. To the extent that certain input data is not available or is measured with error, the production function underlying the DEA estimation is potentially incomplete or inaccurate. In addition, the second-stage estimation attributes any firm efficiency outside of the set of the

identified firm features (i.e., the explanatory variables in Equation (1)) to managerial ability. If

the set of firm features is incomplete, the measure may overstate managerial ability by attributing

efficiency inherent to the firm to the manager. Thus, in Section V we also consider alternative

measures, including media citations, historical stock returns, and manager fixed effects.

Earnings Quality Measures

As noted in the review of earnings quality by Dechow et al. (2010), there are a multitude

of earnings quality measures used in the literature (see their page 345). Our goal in this study is

to examine the impact of managers on accrual estimation, so we select earnings restatements,

earnings persistence, errors in the bad debt provision, and the mapping of accruals into cash

flows as our four measures of earnings quality. We select these measures because increased

correspondence between accruals and the associated economic activity likely reduces earnings

restatements, increases earnings persistence, and lowers the likelihood of errors in accruals. We

expect that better managers are able to report accruals that more closely correspond to the

underlying economic activity; thus we expect the earnings quality metrics that are affected by

judgments and accrual estimation to vary with managerial ability. For each of these measures, we

consider earnings quality in year t+1 onwards, i.e., in subsequent periods to when managerial

ability is measured (in year t). This reduces the likelihood that an economic shock concurrently

affects both our measurement of ability and earnings quality. We discuss each earnings quality

metric in greater detail in Section IV.[11]

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[11] We do not consider the absolute value of discretionary accruals, earnings smoothness and benchmarking, as the
relation between improved accruals estimation and these metrics is not clear. For example, abnormally high accruals
may be high quality accruals that are associated with cash flows, while abnormally low accruals may simply reflect
extremely negative performance, which also reflects the underlying economics of the firm. Neither of these
"abnormal" accruals provides information on the manager's ability to appropriately estimate accruals, as the
measure does not incorporate ex post realizations. We do not consider timely loss recognition, as it is not apparent
whether more or less timely loss recognition better reflects the underlying economics of the firm. As noted in
Dechow et al. (2010), ERCs are a poor measure of earnings quality because much of the earnings information can be
voluntarily disclosed prior to the earnings announcement. Finally, of the three external indicators of earnings
quality—restatements, AAERs and internal control disclosures—we consider only restatements. We do not consider

Control Variables

Our main set of control variables is based on the firm-specific determinants of earnings quality noted in Dechow and Dichev (2002) and Hribar and Nichols (2007): firm size, proportion of losses, sales volatility, cash flow volatility, and operating cycle. We also control for whether or not the company's auditor is a national audit firm, which is associated with earnings quality (e.g., Becker et al. 1998). Finally, we control for change in sales growth and abnormal returns to control for growth and economic shocks to performance, both of which could potentially impact our measures of managerial ability and earnings quality. We provide variable definitions and measurement periods in Table 1.

Descriptive Statistics

We present descriptive statistics in Table 1; for each of our transformed variables (*MgrlAbility, Historical Ret, Media Citations, AQ* (and modifications thereof), *Firm Size,* and *Operating Cycle*), we present the untransformed variable for ease of interpretation. Managerial ability has a mean and median close to zero, by construction, as this is a residual from Equation (1). The five-year historical return has a mean of approximately 6 percent, and on average, CEOs are cited by the media approximately 44 times a year (219 times over five years). Approximately 13 percent of firms experience a restatement in the next three years, and firm-specific earnings persistence is approximately 0.23, on average.[12] The error in the provision for bad debt as a percentage of sales (*BDE Error*) has a mean and median of 0.01. Mean (median) *AQ* is –0.03 (–

AAERs because these tend to be more fraudulent than basic errors in estimation (Hennes et al. 2008). We do not consider internal control deficiencies as an outcome because the determinants of internal control problems are largely firm-specific, such as having adequate resources to establish and maintain these controls. The role of an able manager in the determination of strong internal controls is less clear, and does not speak to management's ability to estimate accruals.

[12] We identify the firm-specific persistence in order to have a stand-alone measure of persistence. The 0.23 firm-specific persistence coefficient is lower than typical coefficient for cross-sectional persistence because it is a time-series, firm-specific coefficient, based on quarterly observations of earnings per share (rather than the more traditional annual observations of ROA). When we estimate a cross-sectional regression by year, we find a mean earnings per share persistence coefficient one and an ROA persistence coefficient of about 0.70

0.03), similar to that in Francis et al. (2004) and Dechow and Dichev (2002) (we have multiplied the standard deviation by negative one).

In Panel B of Table 1 we partition our main earnings quality measures by managerial ability, where low-quality (high-quality) managers are those in the bottom (top) quintile of managerial ability; quintiles are formed by industry-year. Historical returns are significantly larger among high quality managers, consistent with Fee and Hadlock (2003) and Demerjian et al. (2012), although media citations are significantly lower for managers with higher ability (which we explore more completely in Section V). Restatements are more prevalent among low-quality managers, median firm-specific earnings persistence is higher among high-quality managers, and errors in the provision for bad debt are larger among low-quality managers, providing initial support for our hypothesis. We do not, however, find consistent evidence when examining earnings quality based on the Dechow and Dichev (2002) measure; we explore this further in our multivariate analysis.

We present a correlation matrix in Table 2. In general, the results support our ability measure: better managers are positively correlated with future earnings and negatively correlated with historical losses. Managerial ability is negatively correlated with restatements and errors in the provision for bad debt, and positively correlated with firm-specific earnings persistence. The Dechow and Dichev (2002) accruals quality measure, however, is negatively associated with managerial ability, consistent with Francis et al. (2008) and our results in Panel B of Table 1.

IV. TEST DESIGN AND RESULTS
Earnings Restatements

Our first measure of earnings quality is earnings restatements, which are ex post evidence of erroneous earnings and thus have been used as a signal of poor earnings quality (e.g., Anderson and Yohn 2002; Aier et al. 2005; Doyle et al. 2007; Dechow et al. 2010). Although

restatements can occur for reasons other than errors in accrual estimation (our focus), this earnings quality measure is the least reliant on an estimation procedure and thus provides a relatively unambiguous signal of earnings quality. Moreover, we expect restatements to be associated with errors in accrual estimation, as most restatements impact an accrual account (Palmrose and Shultz 2004). This assertion is supported by Plumlee and Yohn (2010) who find that a large number of restatements are a result of management's judgments and estimates.[13]

Restate is an indicator variable that is equal to one if there is an announcement of a financial restatement in years t+1, 2 or 3. In our main analysis, we use the restatement data from Hennes et al. (2008) for restatements announced from 1997–2006 and from Audit Analytics for restatements announced from 2007–2010.[14] We then supplement our main analysis with those restatements identified as due to management's judgments and estimates per Plumlee and Yohn (2010), using the sample from their study.[15]

To determine whether managerial ability varies with earnings restatements, we estimate the following equation using a pooled logistic regression:

$$
\begin{aligned}
Restate_{t+1,t+3} = {} & \alpha_0 + \boldsymbol{\alpha_1\ MgrlAbility_t} + \alpha_2\ Firm\ Size_t + \alpha_3\ Sales\ Volatilty_{t\text{-}4,t} \\
& + \alpha_4\ Cash\ Flow\ Volatility_{t\text{-}4,t} + \alpha_5\ Operating\ Cycle_{t\text{-}4,t} + \alpha_6\ Loss\%_{t\text{-}4,t} \\
& + \alpha_7\ NationalAuditor_t + \alpha_8\Delta SalesGrowth_t + \alpha_9\ AbnormalReturn_t + \varepsilon_{t+1,t+3}
\end{aligned}
\qquad (2)
$$

We include each of the control variables discussed above. Because our tests rely on panel data, standard errors may be correlated within years and across time by firm. Thus, unless otherwise

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[13] Although, some accrual errors will result in prospective adjustments, other mistakes in judgments and estimates will result in retroactive restatements (Plumlee and Yohn 2010). For example, Plumlee and Yohn (2010) provide examples of how complexity and mistakes in judgments result in restatements. For example, firms have restated earnings when they chose to rely on their own estimate of fair value for a security whose last traded price was not necessarily indicative of fair value and ex post the SEC disagreed with the judgment made by management. As another example, firms have been required to restate earnings when subsequent information differs from management's expectations at the end of the fiscal year.

[14] We thank the authors for the GAO-based dataset, which is available at http://sbaleone.bus.miami.edu/.

[15] We thank the authors for providing us both the restatement data and their coding of the restatements between those related to judgments and estimates and other restatements.

noted, in this and all subsequent estimations we either cluster our standard errors by firm and year following Petersen (2009) or include firm fixed effects.

Results are presented in Table 3; in the first (second) estimation, we consider all restatements, and exclude (include) firm fixed effects. As in our univariate analysis, we document a negative relation between managerial ability and restatements, supporting our hypothesis that more able managers are associated with higher quality earnings. The more efficient the manager, the less likely the firm is to restate ($\beta_1 = -0.21$; $p < 0.05$). Given that the unconditional likelihood of having a restatement is 13 percent, the marginal effect is economically significant at –2.4 percent (not tabulated).

In the second set of estimations, we examine the restatements from 2003–2006 considered in Plumlee and Yohn (2010) and partition the sample between those restatements associated with management's judgments and estimates (column 3) and all other restatements (column 4). We find that only those restatements associated with management's judgments and estimates are associated with managerial ability.[16] These findings support our use of *Restate* as an earnings quality metric impacted by managers' judgments and estimates. A limitation, however, of *Restate* as a measure of earnings quality is that many errors in judgments and accruals estimates will not result in a retrospective restatement. This illustrates the importance of considering multiple earnings quality measures. We expect each of our remaining earnings quality measures to be lower in the presence of errors in judgments and estimates, even when these errors do not trigger a restatement.

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[16] Other restatements include internal errors and manipulation. We do not estimate these specifications with firm fixed effects, which require variation in the dependent variable for estimation and thus result in a sample size of only 1,834 (of the 10,568) observations.

Earnings Persistence

Our second measure of earnings quality is earnings persistence, which is frequently discussed as a measure of earnings quality (e.g., Dechow et al. 2010). We expect higher-ability managers to choose better projects, have an improved understanding of risk, and better manage the firm's operations (by construction). Thus, we expect more able managers to have more persistent earnings, and expect this effect to come through both accruals and cash flows (both of which are designed to reflect the underlying economics of the firm).[17] Prior research has shown, however, that accruals tend to have a lower persistence than cash flows, and one reason for this is that they contain more uncertainty, thereby requiring managerial estimation (e.g., Richardson et al. 2005). Thus, in addition to more persistent accruals and cash flows related to operations, we expect an incremental effect of managerial ability on the persistence of the accrual component of earnings. In sum, we have two expectations related to our hypothesis that higher-ability managers report higher quality earnings: (1) earnings reported by higher-quality managers are more persistent than earnings reported by lower-ability managers due to both superior operations and superior accrual estimation, and (2) higher-ability managers' impact on accruals exceeds their impact on cash flows because the former reflects both operational efficiency *and* superior accrual estimation. We examine earnings persistence using the following model:

$$Earnings_{t+1,t+n} = \alpha_0 + \alpha_1\ Earnings_t + \pmb{\alpha_2\ Earnings_t \times MgrlAbility_t} + \alpha_3 MgrlAbility_t$$
$$+ \alpha_4 Firm\ Size_t + \alpha_5 SalesVolatility_{t-4,t} + \alpha_6 CashFlowVolatility_{t-4,t} + \alpha_7 OperCycle_{t-4,t}$$
$$+ \alpha_8 Loss\%_{t-4,t} + \alpha_9 NationalAuditor_t + \alpha_{10}\Delta SalesGrowth_t + \alpha_{11}AbnormalReturn_t + \varepsilon_{t+1,\ t+n}\ (3)$$

We calculate earnings as earnings before extraordinary items (Xpressfeed (hereafter "XFN") variable =IBC) scaled by average total assets (XFN=AT) and then separate earnings into

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[17] It is possible for managers to artificially smooth earnings and thus appear to have higher earnings persistence. This artificial persistence should not extend, however, to the breakdown of accruals and cash flows.

accruals and cash flow components. Because earnings persistence is not desirable for loss firms, we estimate profit and loss firms separately and only tabulate results for profit firms.[18]

We present the results in Table 4. We first examine the impact of managerial ability on earnings persistence and then more formally examine our hypothesis by investigating the relative impact of ability on the persistence of accruals and cash flows. Turning to the first column of estimates, which control for firm fixed effects, the base persistence is 0.30 and this persistence is increasing with managerial ability. Earnings persistence is expected to increase from 0.30 to 0.66 (0.30 + 0.36) for firms with positive earnings when moving from the lowest to the highest decile of managerial ability. Although not tabulated, we find similar results when firm fixed effects are excluded.

When we partition earnings into accruals and cash flows, managerial ability increases the persistence of both components, but increases the accrual component more than the cash flow component. The accruals reported by positive earnings firms have a base persistence of 0.36 when firm fixed effects are excluded. The incremental coefficient on accruals for firms with higher ability managers is 0.42 ($p < 0.01$). In comparison, the base persistence of cash flows is 0.69, and the incremental coefficient on cash flows for firms with higher ability managers is 0.26 ($p < 0.01$), and this incremental effect is statistically smaller than that of accruals. We find similar results when we include firm fixed effects in the model. These findings support our hypothesis that higher quality managers are better able to estimate accruals, resulting in higher earnings quality, and also support that higher quality managers are better able to effectively operate their business.

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[18] Note that for this particular test, in order to continue to present the dependent variable in year $t+1$, we include earnings in year t, which are reported in the same period in which managerial ability is estimated. Results are not sensitive to this timing choice. For example, conclusions remain unchanged if we continue to measure managerial ability at time t, but consider how much of year $t+1$ earnings persists into year $t+2$ (not tabulated).

We also replace one-year forward earnings with average earnings from year $t+1$ to $t+3$ in order to reduce the impact of economic shocks occurring in any particular year. Results are similar, although the interaction between managerial ability and accruals becomes insignificant when firm fixed effects are included.

McNichols and Wilson (1988) Error in the Provision for Bad Debt

Our third measure of earnings quality is the provision for bad debt, modeled in McNichols and Wilson (1988), as follows:

$$Bad\ Debt\ Expense_t = \beta_0 + \beta_1\ Allowance\ for\ Doubtful\ Accounts_{t-1}$$
$$+ \beta_2\ Write\text{-}offs_t + \beta_3\ Write\text{-}offs_{t+1} + \phi_t \qquad (4)$$

where *Bad Debt Expense* and *Write-offs* are hand-collected from the firm's SEC filings and *Allowance for Doubtful Accounts* is available from Xpressfeed (XFN = RECD). All variables are deflated by sales in year t. Implicit in our use of this model is a balance sheet perspective to estimating bad debt, adherence to GAAP, and perfect foresight of future write-offs.

The error (ϕ_t) has two components: a discretionary "earnings management" component, and a forecast error component (McNichols and Wilson 1988). If managers' estimates are unbiased, on average, then errors in the bad debt accrual will vary with forecast accuracy, and we expect this error (ϕ_t) to decrease with managerial ability. Jackson and Liu (2010), however, present evidence that the mean earnings management portion of ϕ_t is positive; specifically, they find that managers tend to overstate the allowance for doubtful accounts which they can later reverse into income. Under the assumption that all managers engage in the same degree of earnings management, the variation in the bad debt error will be driven by variation in accrual-estimation quality, and thus we continue to expect the error to decrease with managerial ability.[19]

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[19] Alternatively, if higher-ability managers engage in more earnings management, then our tests are conservative. Only if higher ability managers engage in less earnings management, would the findings of Jackson and Liu (2010)

Because the data for this analysis must be hand-collected from SEC filings, we limit the analysis to firms with managers in the top or bottom quintiles of managerial ability. We further limit the sample to three accounts-receivable-intensive industries: (1) printing and publishing, (2) nondurable wholesale goods, and (3) business services, following McNichols and Wilson (1988), and we estimate:

$$BDE\ Error_{t+1} = \beta_0 + \boldsymbol{\beta_1\ High\ Ability\ Indicator_t} + \beta_2\ Firm\ Size_t + \beta_3\ SalesVolatility_{t\text{-}4,\,t}$$
$$+ \beta_4\ Cash\ Flow\ Volatility_{t\text{-}4,t} + \beta_5\ Operating\ Cycle_{t\text{-}4,\,t} + \beta_6\ Loss\%_{t\text{-}4,\,t}$$
$$+ \beta_7\ NationalAuditor_t + \beta_8\ \Delta SalesGrowth_t + \beta_9\ AbnormalReturn_t + \varepsilon_{t+1} \qquad (5)$$

where *BDE Error* is the absolute value of the residual from Equation (4), and *High Ability Indicator* is an indicator variable that is equal to one (zero) if the managerial ability score in year *t* is in the top (bottom) quintile relative to industry-year peers. A negative coefficient on *High Ability Indicator* is consistent with more able managers forming better estimates of bad debt provisions. Results are presented in Table 5. In support of our hypothesis, β_1 is –0.01 ($p < 0.01$). Managers with higher ability scores produce higher quality bad debt provisions.[20]

The Dechow and Dichev (2002) Measure of Earnings Quality

Our fourth and final measure of earnings quality follows Dechow and Dichev (2002), who posit that high quality accruals are eventually realized as cash flows. Incorrectly estimated accruals are less likely to be realized as cash flows. We hypothesize that the better managers know their business, the less likely they are to have erroneous accruals. We determine how well

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weaken the basis for our conclusions. In this setting, the negative relation between managerial ability and the bad debt error (ϕ_t) could result from better estimations, less earnings management, or both. In this latter case, the bad debt error analysis is a weak test of the relation between managerial ability and estimation quality, but continues to speak to the broader conclusions regarding earnings quality.

[20] Because our sample selection procedures for this analysis result in a small sample of firm-years that do not necessarily contain the same firm over multiple years (i.e., we do not have panel data), we do not cluster standard errors by firm and year, nor do we estimate a firm fixed effects specification. In untabulated results, however, we continue to observe the negative relation between managerial ability and *BDE Error* when we cluster standard errors by year or include year fixed effects.

a firm's accruals map into cash flows by estimating the following regression by industry (Fama and French 1997) and year.[21]

$$\Delta WC_t = \beta_0 + \beta_1\, CFO_{t-1} + \beta_2\, CFO_t + \beta_3\, CFO_{t+1} + \beta_4\, \Delta REV_t + \beta_5\, PPE_t + \varepsilon_t \qquad (6)$$

The residual from the regression measures the extent to which current accruals map into past, present, or future cash flows, with smaller residuals (in absolute terms) indicating superior mapping. Following McNichols (2002), we include the current year change in sales (ΔREV) and the current year level of property, plant, and equipment (PPE) in Equation (6); variable definitions are in Table 1.

Following prior research, we take the standard deviation of the residual over a rolling four-year period, and multiply this standard deviation by negative one so that the variable is increasing with earnings quality. Thus, $AQ_t = -\,1 \times$ Standard Deviation ($\varepsilon_{t+1},\ \varepsilon_{t+2},\ \varepsilon_{t+3},\ \varepsilon_{t+4}$).[22] To maintain consistency with our managerial ability measure, we decile rank our earnings quality variable by year and industry.

To examine our hypothesis using this measure of earnings quality, we estimate the following regression:

$$AQ_{t+1,t+4} = \alpha_0 + \boldsymbol{\alpha_1 MgrlAbility_t} + \alpha_2 Firm\ Size_t + \alpha_3 SalesVolatility_{t-4,t}$$
$$+\ \alpha_4 CashFlowVolatility_{t-4,t} + \alpha_5 OperCycle_{t-4,t} + \alpha_6 Loss\%_{t-4,t} + \alpha_7 NationalAuditor_t$$
$$+\ \alpha_8 \Delta SalesGrowth_t + \alpha_9 AbnormalReturn_t + \varepsilon_{t+1,t+4} \qquad (7)$$

We present the results in Table 6. We find, counter to our expectations, but consistent with Francis et al. (2008), that earnings quality is decreasing in managerial ability when firm fixed effects are excluded, although managerial ability is insignificant when firm fixed effects are

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[21] If an industry group has less than 20 observations in any given year, those observations are deleted.

[22] Because managers may not necessarily be in place for the full aggregation period, we also consider a one-year accrual error by considering the residual from Equation (6) directly. Dechow and Dichev (2002) also estimate a one-year accrual error; see their footnote 6. The greater the residual, in absolute terms, the poorer the accruals quality. Results are qualitatively similar using this modification; thus, we focus on the traditional measure in our main analyses for succinctness. In our additional analyses, however, where we track managers across firms, we use the annual residual to better match accruals quality with specific managers.

included. Prior work notes that some accruals are simply more difficult to estimate, and this estimation difficulty is associated with the firm's operating environment (Dechow and Dichev 2002; McNichols 2002; LaFond 2008). Thus, Francis et al. (2008) conclude that better managers are hired to manage more challenging firms, thereby providing an explanation for this counter-intuitive finding.

As Dechow et al. (2010), among others, note, most model-based accruals quality measures contain a large firm-specific component. One issue is that the Dechow and Dichev (2002) model constrains the coefficient on cash flows to be the same across observations (e.g., Ball and Shivakumar 2006; Wysocki 2009), and thus the resulting measure of accruals quality contains measurement error that is systematically associated with firm characteristics, such as volatility. Although we control for innate factors known to affect accruals quality, it is possible that the effect of these innate factors varies across firms, and thus the controls are inadequate.

Ball and Shivakumar (2006) modify the Dechow and Dichev (2002) model by allowing the coefficient on current period cash flows to vary among observations with negative cash from operations (their proxy for economic losses), and document a large degree of variation.[23] To illustrate the effect of this modification, the pooled coefficient on current period operating cash flows is –0.57 among firms with positive operating cash flows, while it is –0.12 (–0.57 + 0.45) among firms with negative operating cash flows (see their Table 3, Panel A). Absent this type of modification, the coefficient on cash flows is forced to be the same across firms, and differences in the expected relation between accruals and cash flows are relegated to the residual term

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[23] Ball and Shivakumar (2006) highlight that the matching effect of accruals is expected to lead to a negative correlation between accruals and cash flows (e.g., Dechow 1994). In contrast, they note that opposite to the noise-reducing role of operating accruals, the gain and loss recognition role of accruals is a source of positive correlation between accruals and current-period operating cash flow (see their pages 212–213 for the discussion). They then examine several cash flow and market return based measures of economic losses. Note that in Panel A of Table 7, we document a positive association between accruals and cash flows for the quintile of firms with the most losses.

(affecting our measure of earnings quality). Again, it is unlikely that standard control variables, which are also constrained to have the same effect across firms, will be sufficient to ameliorate this effect. Thus, it is possible that better managers can improve the estimation quality of accruals, but the resulting accruals quality still falls below that of a firm with closer-to-average associations between accruals and cash flows.

Although Ball and Shivakumar (2006) focus on the effect of economic losses, Wysocki (2009) notes that a number of different innate factors affect the relation between accruals and cash. Thus, rather than focusing solely on differences in current-period cash flows, we investigate a broader range of firm characteristics. We examine the correlation between working capital accruals and current period cash from operations for each quintile rank of the "innate" firm characteristics from Francis et al. (2004), such as firm size, losses, and operating volatility, as well as losses before special items (Dechow and Ge 2006) and negative cash flows (Ball and Shivakumar 2006); see Panel A of Table 7.[24]

Of these innate firm characteristics, the proportion of losses from year t–4 to year t has the starkest difference in correlations across quintiles, with a correlation between operating cash flows and accruals of –0.57 among firms with the fewest losses, to 0.03 among firms with the most losses; see Panel A of Table 7. The range also varies widely for the proportion of losses before special items (a range of 0.56), firm size (a range of 0.45), and the proportion of negative cash flows (a range of 0.42). In subsequent analyses discussed below, we exclude firm size as a partitioning variable for two reasons. First, the variation in firm size is driven almost entirely by the smallest size quintile, while the other partitioning variables have more monotonic changes in the association between accruals and cash flows. Second, in our setting, we are concerned with

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[24] We examine five years of cash flows, analogous to our loss proportion measure.

systematic biases in the accruals quality measure that are associated with managerial ability; referring to Table 2, managerial ability and firm size are not associated.[25]

For three partitioning variables (Loss%, Loss% Before Special Items, and Negative CFO%), we re-estimate Equation (6) and allow the coefficients on each of the variables to vary by each of these quintiles, i.e., to vary with the magnitude of the negative relation between accruals and cash flows as measured by the quintile rank of the firm's fundamentals. Thus, we estimate a modification of Equation (6).

$$\Delta WC_t = \beta_0 + \beta_1\,CFO_{t-1} + \beta_2\,CFO_t + \beta_3\,CFO_{t+1} + \beta_4\,\Delta REV_t + \beta_5\,PPE_t + Year\ Indicators + \varepsilon_t\ (8)$$

We estimate Equation (8) by the various quintiles and industry, and include year fixed effects. As illustrated in Panel B of Table 7, allowing the coefficients on the independent variables to vary with Loss% results in large differences across the estimations. For example the mean R^2 falls from 66% in the group with the fewest losses to 37% in the group with the most losses. More related to the above-described measurement error, the coefficient on current period cash flows varies from a mean of –0.56 to a mean of –0.30, while the traditional estimation procedure restricts the mean coefficient to be approximately –0.38.[26]

Results are similar for the proportion of losses before special items, with the coefficient on current year operating cash flows ranging from –0.63 to –0.22. Finally, the coefficients on current period operating cash flows range from –0.53 to –0.25 across negative cash flows quintiles.

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[25] Results are not affected by our treatment of firm size. Results are similar if we exclude the smallest size quintile from our sample, and are also similar *within* the smallest size quintile (not tabulated).

[26] All coefficients are the mean coefficient across estimations; for the traditional model, regressions are estimated by industry and year, for the modified model, regressions are estimated by industry and Loss% quintile, and we include year fixed effects. Estimating the modified model by industry, Loss% quintile, and year, results in a severe loss of observations.

We next explore the extent to which these modifications are associated with a) other measures of earnings quality, and b) managerial ability. Turning first to $ModifiedAQ_{Loss\%}$, this accruals quality measure appears to be more correlated with our other measures of earnings quality than the traditional Dechow and Dichev accruals quality measure. For example, while AQ is not correlated with restatements, $ModifiedAQ_{Loss\%}$ is negatively correlated with restatements, as we would expect. Of great interest for our study, $ModifiedAQ_{Loss\%}$ is positively associated with managerial ability, in contrast to the traditional model of accruals quality which exhibits a negative association with managerial ability.

Turning next to $ModifiedAQ_{SI\_Loss\%}$, the correlations are similar to those of $ModifiedAQ_{Loss\%}$, which is not surprising as these two measures are correlated at 0.92. Our third modification, $ModifiedAQ_{Neg\_CFO\%}$, does not appear to be as strongly associated with the other measures of earnings quality. Like the traditional measure, it is not associated with restatements, and the association with earnings persistence is the same as the traditional measure. Finally, the association with managerial ability is not significant.

We explore the relation between the modified measures of accruals quality and managerial ability in Table 8.[27] In five of the six estimations, we find that managerial ability is positively associated with accruals quality, consistent with the relations with other earnings quality measures: restatements, earnings persistence, and bad debt expense. Thus, it appears that the counter-intuitive result in Table 6 and Francis et al. (2008) was due to measurement error in the Dechow and Dichev (2002) accruals quality measure. In sum, we find that higher ability managers report lower accruals quality errors relative to industry-peers with similar forecasting enviroments.

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[27] Because we condition on losses in our estimation of two of the modifications, we do not include losses as a control variable.

V. ADDITIONAL ANALYSES

In this section we discuss three sets of results aimed at calibrating conclusions from our main analyses. First, we explore the robustness of our results to alternative measures of managerial ability (i.e., historical returns and media citations). Second, we investigate whether earnings quality increases when a new CFO of superior ability is hired. Third, we investigate the sensitivity of our results to the inclusion of additional control variables in our models.

Alternate Managerial Ability Measures

Our main managerial ability measure is the managerial efficiency metric developed by Demerjian et al. (2012). In this section we investigate two additional ability measures: historical returns, following Fee and Hadlock (2003), and media citations, following Francis et al. (2008); definitions are provided in Panel C of Table 1.[28] We begin by examining the correlations among the variables (see Table 2). Managerial ability and historical returns are correlated at 0.23, consistent with these two variables measuring different aspects of "ability," while there is a *negative* correlation between media citations and ability and no relation between media citations and historical returns. Consistent with historical returns and media citations containing a large firm component, they are correlated with firm size at 0.22 and 0.52, respectively based on Spearman correlation coefficients, while managerial ability is not correlated with firm size. Interestingly, both ability and historical returns are negatively correlated with losses and positively correlated with future earnings; however, these associations do not extend to media citations. Generally, the correlations suggest that historical returns and our main managerial ability measure have the expected associations with perceptions of managerial ability.

To examine the association between earnings quality and managerial ability, we consider a composite measure of total earnings quality, which is the sum of (1) the rank of one modified

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[28] Following our examination of these alternate measures, we also examine manager fixed effects.

accruals quality measure (*ModifiedAQ_{Loss%}*), (2) the rank of firm-specific earnings persistence, and (3) $-1 \times$ *Restate*.[29] Thus, the variable ranges from a low of negative one to a high of two. In Table 9, we consider the associations between total earnings quality and each of the three ability measures.[30] Turning first to the Demerjian et al. (2012) measure, we see that more able managers have higher total earnings quality, as was the case with the individual components. Turning next to historical returns, we see that the greater the historical returns, the greater total earnings quality, consistent with our hypothesis. Our inferences remain unchanged if we use historical returns as an alternate ability measure in each of our tests in the paper (not tabulated), however, as previously noted, the Demerjian et al. ability score allows us to better separate the manager from the firm.

Media citations, however, are negatively associated with earnings quality. Perhaps media interest increases as restatements and other negative earnings-related items occur. One difficulty in comparing results across measures is that media citations are available only for a small subset of our sample; thus we next consider all three measures simultaneously for the reduced sample. The coefficient on media citations remains negative and significant, while the coefficients on historical returns and managerial ability remain positive and significant in the reduced sample.

CFO-Specific Analysis

Although our results are similar using historical returns, both the Demerjian et al. (2012) ability score and historical returns likely contain a firm-specific element. To better abstract away from the firm, we consider herein how earnings quality changes across different CFO regimes. We first explore whether there are CFO fixed effects, following Dyreng et al. (2010) among

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[29] We exclude the bad debt expense error as it severely limits the available observations.
[30] Results are similar if we consider the individual components of total earnings quality, with the exception that the relation between historical returns and firm-specific earnings persistence is not significant (not tabulated). As with the results reported in Table 8, we exclude *Loss*% as a control variable because it is used to identify *ModifiedAQLoss%*. Results are similar if we include *Loss*% as an additional control variable.

others. We next explore whether the CFO's ability at their initial firm is associated with the accruals quality at their subsequent firm. Together, these analyses provide evidence on the CFO-specific effect on accruals quality.

We identify 195 CFOs that switch employment among firms covered by Execucomp (where CFOs have specific identifiers) and are able to estimate CFO fixed effects for 62 of these executives across 158 firms. We estimate the following (not tabulated):

$$TotalEarnQuality2_{i,t} = \beta_0 + \sum_t \beta_t YEAR_t + \sum_i \beta_i FIRM_t + \sum_m \beta_m MANAGER_m + \varepsilon_{i,t} \qquad (10)$$

TotalEarnQuality2 is defined the same as *TotalEarnQuality* except that we measure accruals quality as the decile rank (within industry year) of the *annual* accrual error from the modified accruals model (Equation (8)) estimated by historical loss proportion (*ModifiedAQ_{Loss%Ann}*).[31] We undertake this change to better match specific managers with the years they managed the firm. The average manager fixed effect increases by 1.92 when moving from the lowest to the highest quartile of manager fixed effects. For comparison purposes, the average firm fixed effect increases by 2.25 when moving from the lowest to the highest quartile of firm fixed effects. Although fixed effects are quantifiable only for CFOs switching firms within our sample, clearly manager-specific effects are economically significant.[32]

We next investigate if the CFO's score from their first firm is associated with accruals quality at their subsequent firm. We expect firms that hire a more efficient CFO to experience an improvement in their earnings quality, and firms that hire a less efficient CFO to experience a decline in their earnings quality. Thus, using the sample of the 195 CFOs examined above who

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[31] Both Jones et al. (2008) and Dechow and Dichev (2002) use the absolute value of the annual residual from the Dechow and Dichev (2002) accrual model as a measure of accruals quality.

[32] Note that the Demerjian et al. (2012) managerial ability score is also positively correlated with the CFO-specific fixed effects (not tabulated).

switched across our sample firms, we identify 116 with sufficient information to estimate the following:

$$\Delta ModifiedAQ_{Loss\%Ann} = \beta_0 + \pmb{\beta_1} \, \Delta \pmb{MgrlAbility} + \beta_2 \, \Delta Firm \; Size + \beta_3 \, \Delta Sales \; Volatilty$$
$$+ \; \beta_4 \, \Delta Cash \; Flow \; Volatility + \beta_5 \, \Delta Operating \; Cycle \; + \beta_6 \Delta SalesGrowth_t$$
$$+ \; \beta_7 \Delta AbnormalReturn_t + \varepsilon \qquad\qquad\qquad (11)$$

where the change in earnings quality, as well as the change in each of the control variables, is measured from year $Variable_{c+1}$–$Variable_{c-1}$, where c is the year in which the CFO changed.[33] Thus, a positive value of $\Delta ModifiedAQ_{Loss\%Ann}$ signifies an improvement in earnings quality following the new CFO appointment.[34] The change in managerial ability reflects the difference between the newly appointed CFO's score from his or her prior firm and the departing CFO's score from the current firm (i.e., $MgrlAbility_{j,b,c-1} - MgrlAbility_{i,a,c-1}$, where manager b was hired by firm i and was previously employed by firm j). A positive value of $\Delta MgrlAbility$ signifies that the incoming manager is deemed more efficient than the outgoing manager. Thus, we expect β_1 to be positive. Turning to Table 10, we find a positive and significant coefficient on $\Delta MgrlAbility$, as expected. That the association between ability and earnings quality spans firms helps to alleviate the general concern that the associations documented herein are attributable to the firm, rather than the manager.

Additional Control Variables

We consider two infrastructure-related control variables that have been shown to be associated with earnings quality—governance (Klein 2002) and internal control quality (Doyle et al. 2007). We measure governance with the percentage of independent board members, obtained from IRRC from 1996–2007, ranked by year and industry (*PctInd*). We proxy for internal control

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[33] We exclude *Loss*% as a control variable because it is used to identify *ModifiedAQLoss%*. Results are similar if we include *Loss%* as an additional control variable.

[34] As with the prior analysis, we use the annual accrual error (i.e., the absolute value of the error term from Equation (8)) for this analysis to better match the accruals quality with the specific manager in place at that time.

quality with the disclosure of material weaknesses in internal control (*ICW*). We obtain internal control data from Doyle et al. (2007) for 2002–2004 and from Audit Analytics from 2005–2007.[35] We find qualitatively similar results to those reported when models include these two additional controls.

We also explore the sensitivity of our results to using abnormal performance variables other than the change in sales growth. We replace the change in sales growth with the level of sales growth and with historical three-year average change in sales growth; we find similar results to those reported.

VI. CONCLUSION

We examine the relation between managerial ability and earnings quality. While empirical literature in the area of earnings quality has largely focused on firm-specific characteristics, such as size and board independence (Dechow and Dichev 2002; Klein 2002), we examine manager-specific effects by using a measure of managerial ability developed by Demerjian et al. (2012). Our study is in the vein of Bertrand and Schoar (2003), who find that managers have an effect on firm choices such as acquisitions or research and development expenditures, and Francis et al. (2008), who find that earnings quality appears to vary with CEO reputation. Using four alternative earnings quality measures (restatements, earnings persistence, error in the bad debt provision and modified accruals quality), we find that more able managers report higher quality earnings.

Our study contributes to the earnings quality and managerial ability literatures. We document a positive association between managerial ability and earnings quality. We find that higher quality managers are associated with higher quality earnings. This finding is consistent

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[35] The Doyle et al. (2007) data is available at http://faculty.washington.edu/geweili/ICdata.html. We end the analysis in 2007 because of limitations in our board independence data.

with the premise that the more capable the manager, the better able he or she is to estimate accruals, and it suggests that firms can improve their earnings quality by employing higher quality managers. We also contribute to the earnings quality literature by offering a modification of the Dechow and Dichev (2002) accruals quality measure that is more able to partition accruals quality from firms' underlying earnings processes.

Our study is subject to limitations. First, as previously acknowledged, our evidence relies on proxies for both managerial ability and earnings quality. Although we attempt to control for correlated variables such as economic shocks, the possibility of correlated omitted variables remains. Second, the ability score we examine is for the entire management team, while our focus in on the effect of CFOs and their delegates. We mitigate this concern to some extent by documenting economically significant CFO fixed effects on earnings quality—a methodology that does not rely on our managerial ability measure. We further corroborate our analysis by tracking CFOs across firms and documenting that hiring a higher-quality CFO is associated with an improvement in the firm's earnings quality. Finally, our focus is on accrual estimation, and as such we abstract away from the decision to manage earnings. Future researchers might explore the association between managerial ability and earnings management, and similarly, the inter-relations between ability and infrastructure choices that have been shown to improve earnings quality, such as governance and internal control quality.

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APPENDIX

Estimation of Total Firm Efficiency (from Demerjian et al. 2012)

Our main measure of managerial ability is the metric developed by Demerjian et al. (2012). They use data envelopment analysis (DEA), a non-linear optimization program that calculates unit-specific relative efficiency. The program is as follows:

$$\max_{v,u} \theta = \frac{\sum_{i=1}^{S} u_i y_{ik}}{\sum_{j=1}^{m} v_j x_{jk}} \tag{A1}$$

Subject to:
$$\frac{\sum_{i=1}^{S} u_i y_{ik}}{\sum_{j=1}^{m} v_j x_{jk}} \leq 1 \ (k = 1,\dots,n) \tag{A2}$$

$$v_1, v_2, \dots v_m \geq 0 \tag{A3}$$

$$u_1, u_2, \dots, u_s \geq 0 \tag{A4}$$

DEA measures the efficiency of a single unit (in our case firm) k relative to a set of comparable firms. The objective function measures efficiency as the weighted outputs scaled by the weighted inputs. There are s outputs and m inputs, indexed by i and j respectively. The quantities of each output i and input j for firm k are y_{ik} and x_{jk}. The optimization program maximizes A1 by selecting the weights on each output (u_i) and input (v_j). The vectors of weights on the outputs (***u***) and inputs (***v***) are termed implicit weights. Efficiency is based on the level of the weighted outputs to the level of the weighted inputs. The most efficient firms have the highest level of outputs for a fixed level of inputs (or equivalently, the lowest level of inputs for a fixed level of outputs). DEA calculates a unique set of implicit weights for each firm k.

The first constraint, A2, scales the implicit weights so that the most efficient firm (or firms) has (have) an efficiency value of one. The optimal weights for each firm k are tested for all the other comparable firms (*1,…n; ≠k*). This calculates what the efficiency would be for each comparable firm under the implicit weights calculated in A1 for firm k, allowing for the determination of relative efficiency. Constraints A3 and A4 require implicit weights to be non-negative, which prevents solutions calling for negative input levels.

Total firm efficiency is estimated using a single output and seven inputs. Total revenue ("SALE") is the output, as the principal objective of the firm is to produce sales. The most successful firms are those that produce the maximum sales at the lowest cost. The cost of producing the sales is captured by the seven inputs. The first five correspond to assets the company invests in that are expected to affect their revenue generation. Demerjian et al. consider the beginning of period balance for each of these assets, since managers' past decisions regarding these assets are expected to affect current period revenues.

1. Net Property, Plant and Equipment (PP&E; "PPENT").

2. Capitalized Operating Leases. The discounted present value of the next five years of required operating lease payments (available in the firm's footnotes to the financial statements and on Compustat).[36] The inclusion of Net Operating Leases as an input increases the input comparability among firms that effectively have the same operations, but either lease or buy their revenue-generating equipment.

3. Net Research and Development (R&D). To calculate net R&D, which is not reported as an asset on the balance sheet, Demerjian et al. follow Lev and Sougiannis (1996), who use a five-year capitalization period of R&D expense ("XRD"), where the net value (net of amortization) is: $RD_{cap} = \sum_{t=-4}^{0}(1 + 0.2t) \times RD_{exp}$. Thus, for example, R&D expenditures from five years back receive a weight of .2 (they were already amortized 80%), four years back a weight of .4 (amortized 60%), etc., with the prior year's R&D ($t = -1$) receiving full weight.

4. Purchased goodwill, reported on the balance sheet, which is the premium paid over the fair value of a business acquisition ("GDWL"). Goodwill generally reflects the value of the acquired intangible assets.

5. Other acquired and capitalized intangibles ("INTAN" less "GDWL"), also reported on the balance sheet, which includes items such as client lists, patent costs and copyrights.

They also include two year t expenses: Cost of Goods Sold and Selling General and Administrative Expense to account for the cost of inventory (Cost of Goods Sold) and sales

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[36] Demerjian et al. use a discount rate of 10 percent per year. Data items for the five lease obligations are "MRC1–MRC5." They note that they would also like to discount the "thereafter" payments; however, this line item was not collected by Compustat for the bulk of the sample period. Note that capital leases are included in Net PP&E.

generated from advertising and the quality of the sales force (advertising, training costs and IT services are included in SG&A).

They estimate DEA efficiency by industry (based on Fama and French 1997) to increase the likelihood that the peer firms have similar business models and cost structures within the estimations. The resulting score ranges from zero to one, with one being the optimal output for a given mix of inputs.

Using DEA instead of traditional ratio analysis has several advantages. First, DEA allows the weightings on each of the inputs to vary, whereas traditional efficiency ratios restrict all weightings to be equal to one. For example, within DEA, a dollar at historical cost (i.e., PPE) can count differently than a dollar at or near replacement cost (i.e., COGS), but both are weighted identically in a traditional efficiency ratio. Second, DEA compares each firm within an industry to the most efficient firm, whereas traditional efficiency analysis compares each firm to the mean or median firm. See Demerjian et al. (2012) for additional information, explicit comparisons of this score with a residual from an OLS regression, and a comparison of variable ratios, such as return on assets.

Table 1
Descriptive Statistics

Panel A – Descriptive Statistics for the Full Sample (1989–2009)

Variable	N	Mean	Median	Std Dev	25%	75%
$MgrlAbility$♦	78,423	0.00	–0.01	0.15	–0.09	0.07
$Historical\ Ret$♦	40,871	0.06	–0.35	2.17	–1.00	0.50
$Media\ Citations$♦	10,110	219.11	93.00	693.55	46.00	180.00
$Restate$	46,022	0.13	0.00	0.33	0.00	0.00
$F.S.\ EarnPer$	68,447	0.23	0.18	0.40	–0.02	0.48
$BDE\ Error$	1,124	0.01	0.01	0.05	0.00	0.01
AQ♦	51,925	–0.03	–0.03	0.03	–0.05	–0.01
$Modified\ AQ_{LOSS\%}$♦	52,316	–0.05	–0.03	0.05	–0.07	–0.02
$Modified\ AQ_{SI\_LOSS\%}$♦	52,316	–0.05	–0.04	0.05	–0.07	–0.02
$Modified\ AQ_{NEGCFO\%}$♦	52,317	–0.05	–0.04	0.05	–0.07	–0.02
$TotalEarnQuality$	17,128	0.91	1.00	0.56	0.55	1.33
ΔWC	78,423	0.01	0.01	0.12	–0.03	0.05
CFO	78,423	–0.01	0.06	0.32	–0.03	0.13
$Firm\ Size$♦	78,423	1,134.66	84.80	4,645.46	17.92	423.29
$Loss\%$	73,231	0.40	0.33	0.37	0.00	0.80
$SalesVolatility$	68,152	0.23	0.16	0.23	0.09	0.30
$CashFlowVolatility$	65,641	0.10	0.06	0.14	0.04	0.12
$OperCycle$♦	77,444	158.72	112.65	281.68	68.01	174.53
$\Delta SalesGrowth$	67,849	–0.05	0.00	3.14	–0.15	0.31
$AbnormalRet$	62,928	0.02	–0.11	0.73	–0.39	0.23
$FutureEarnings$	78,423	–0.12	0.02	0.73	–0.10	0.08

Panel B – Accruals Quality Variables by Managerial Ability

Variable	Lowest Quintile of $MgrlAbility$		Highest Quintile of $MgrlAbility$		Diff. Mean	Diff. Med.
	Mean	Median	Mean	Median		
$MgrlAbility$♦	–0.18	–0.17	0.20	0.18	***	***
$Historical\ Ret$♦	–0.42	–0.65	0.79	0.09	***	***
$Media\ Citations$♦	278.48	107.00	151.07	79.00	***	***
$Restate$	0.14	0.00	0.12	0.00	***	***
$F.S.\ EarnPer$	0.21	0.15	0.25	0.20		***
$BDE\ Error$	0.02	0.01	0.00	0.01	***	***
AQ♦	–0.036	–0.025	–0.037	–0.028	***	***
$TotalEarnQuality$	0.82	0.89	0.93	1.00	***	***

Notes: *, **, *** denotes a difference in the mean (median) under a *t*-test (Chi-Square test) with a two-tailed p-value of less than 0.10, 0.05, and 0.01, respectively (Panel B). All continuous variables are winsorized at the extreme 1%. All variables are reported as of year t in this table only; subscripts in Panel C correspond to the timing of the variable in all subsequent tables.

♦ For each of our transformed variables (*MgrlAbility, Historical Ret, Media Citations, AQ, Modified AQ, Firm Size, and Operating Cycle*), we present the untransformed variable for ease of interpretation.

Panel C: Variable Definitions

Variable	Description	Definition
		Ability Measures
MgrlAbility	*Managerial Ability*	The decile rank (by industry and year) of managerial efficiency from Demerjian et al. (2012) in year t; the residual from Equation (1); see also the appendix.
Historical Ret	*Historical Return*	The decile rank (by industry and year) of the 5-year past value-weighted industry-adjusted return (year t–4 to t) using monthly CRSP data.
Media Citations	*Media Citations*	The decile rank (by industry and year) of the number of articles mentioning the CEO over the preceding five year period (year t–4 to t).
		Earnings Quality Measures
Restate	*Restatement*	An indicator variable that is equal to one if the firm announced a restatement in years t+1, t+2, or t+3, and zero otherwise (available from 1997–2009).
Restate Judgments	*Restatement relating to judgments and estimates*	An indicator variable that is equal to one if the firm announced a restatement in years t+1, t+2, or t+3 classified as *standard-based* or *complexity-based* per Plumlee and Yohn (2010), and zero otherwise (available from 2003–2006). Standards-based restatements are one of three types: 1) restatements stemming from lack of clarity in the standard, 2) restatements resulting from mistakes in judgment, and 3) restatements stemming from errors in applying complex rules. Complexity-based restatements are those resulting from complexity of a transaction.
Restate Other	*Restatement relating to items other than judgment*	An indicator variable that is equal to one if the firm announced a restatement in years t+1, t+2, or t+3 not classified as a restatement relating to judgments and estimates as defined above, per Plumlee and Yohn (2010), and zero otherwise (available from 2003–2006).
F.S. EarnPer	*Firm-Specific Earnings Persistence*	The firm-specific time-series coefficient on earnings (per share) in a regression of one-quarter forward earnings on current-quarter earnings. We estimate firm-specific quarterly earnings persistence over years t+1 through year t+4.
BDE Error	*Unexplained Bad Debt Expense*	The absolute value of the residual (ϕ_t) from Equation (4), estimated by industry, where three industries are considered: printing and publishing, nondurable wholesale goods, and business services.
AQ	*Std Dev of Accrual Errors*	The decile rank (by industry and year) of $-1 \times$ Standard Deviation (ε_{t+1}, ε_{t+2}, ε_{t+3}, ε_{t+4}), where ε_{t+n} is the residual from Equation (6) estimated by industry-year, where industries are defined per Fama and French (1997).
Modified AQ$_{Loss\%}$	*Modified Std Dev of Accrual Errors*	The decile rank (by industry and year) of $-1 \times$ Standard Deviation (ε_{t+1}, ε_{t+2}, ε_{t+3}, ε_{t+4}), where ε_{t+n} is the residual from Equation (8) estimated by industry and the quintile rank of *Loss%*, where ranks are assigned annually by industry. Industries are defined per Fama and French (1997).

Modified AQ$_{SI\_Loss\%}$	*Modified Std Dev of Accrual Errors*	The decile rank (by industry and year) of $-1 \times$ Standard Deviation (ε_{t+1}, ε_{t+2}, ε_{t+3}, ε_{t+4}), where ε_{t+n} is the residual from Equation (8) estimated by industry and the quintile rank of *Loss%Before Special Items,* where ranks are assigned annually by industry. Industries are defined per Fama and French (1997). *Loss%Before Special Items* is the percentage of years reporting losses in net income (IBC) excluding the impact of special items over at least three of the last five years (t–4, t). We exclude the impact of special items by subtracting positive special items from IBC and adding back negative special items to IBC.
Modified AQ$_{NegCFO\%}$	*Modified Std Dev of Accrual Errors*	The decile rank (by industry and year) of $-1 \times$ Standard Deviation (ε_{t+1}, ε_{t+2}, ε_{t+3}, ε_{t+4}), where ε_{t+n} is the residual from Equation (8) estimated by industry and the quintile rank of *Negative CFO%* where ranks are assigned annually by industry. Industries are defined per Fama and French (1997). *Negative CFO%* is the percentage of years reporting negative cash flows from operations over at least three of the last five years (t–4, t).
Total Earn Quality	*Earnings Quality Summation Variable*	The sum of three earnings quality variables: (1) the rank of estimation accruals quality (*Modified AQ$_{Loss\%}$*), (2) the rank of firm-specific earnings persistence, and (3) $-1 \times Restate$. Thus, the variable ranges from a low of negative one to a high of two.
Total Earn Quality2	*Earnings Quality Summation Variable*	The sum of three earnings quality variables: (1) the rank of estimation accruals quality using the annual AQ metric (*Modified AQ$_{Loss\%Ann}$*), (2) the rank of firm-specific earnings persistence, and (3) $-1 \times Restate$. Thus, the variable ranges from a low of negative one to a high of two.
Control Variables		
Firm Size	*Firm Size*	The natural log of the firm's assets (AT) reported at the end of year t.
Sales Volatility	*Sales Volatility*	The standard deviation of [sales (SALE) / average assets (AT)] over at least three of the last five years (t–4, t).
Cash Flow Volatility	*Cash Flow Volatility*	The standard deviation of [cash from operations (OANCF) / average assets (AT)] over at least three of the last five years (t–4, t).
OperCycle	*Operating Cycle*	The natural log of the length of the firm's operating cycle, defined as sales turnover plus days in inventory [(SALE/360)/(average RECT) + (COGS/360)/(average INVT)] and is averaged over at least three of the last five years (t–4, t).
Loss%	*Loss History*	The percentage of years reporting losses in net income (IBC) over at least three of the last five years (t–4, t).
National Auditor	*National Auditor Indicator*	An indicator variable set equal to one for firms audited by national audit firms in year t; zero otherwise.
ΔSales Growth	*One-year Change in %Sales Growth*	The one-year change in sales growth defined as current year's sales growth ($\Delta SALE_t$ /$SALE_{t-1}$) less prior year's sales growth ($\Delta SALE_{t-1}$ /$SALE_{t-2}$).
Abnormal Returns	*Abnormal Return*	One-year market-adjusted buy-and-hold return for year t where market-returns are value weighted.
PctInd	*Board Independence*	The percentage of board members classified as independent based on IRRC's classification (available from 1996–2007).
ICW	*Internal Control Weakness*	An indicator variable for firms reporting material weaknesses in internal control (available from 2002–2007).

	Other Variables	
Future Earnings	*Future Net Income*	Future Earnings (IBC) scaled by average total assets (AT).
Earnings	*Net Income*	Earnings (IBC) scaled by average total assets (AT).
ΔWC	*Working Capital Accruals*	The change in working capital scaled by average total assets, where working capital is defined as follows: [– (RECCH + INVCH + APALCH + TXACH + AOLOCH)].
ΔREV	*Change in Sales*	Current year change in sales (SALE) scaled by average total assets (AT).
PPE	*Property, Plant and Equipment*	Current year level of property, plant, and equipment (PPENT) scaled by average total assets (AT).
CFO	*Cash From Operations*	Cash from operations (OANCF) scaled by average total assets (AT).
Accruals	*Accruals*	Accruals (scaled by average total assets (AT)), where Accruals = Earnings – CFO.

Table 2
Univariate Correlations

	Mgrl Ability	Hist Ret	Media Cites	Future Earn.	Loss%	Firm Size	Restate	F.S. EarnPer	BDE Error	AQ	Mod. AQ_{LOSS}	Mod. AQ_{SI}	Mod. AQ_{CFO}
MgrlAbility		0.23	–0.10	0.27	–0.22	0.00	–0.02	0.04	–0.22	–0.02	0.03	0.03	0.00
Historical Ret	0.24		–0.02	0.41	–0.44	0.22	–0.03	0.13	–0.05	0.16	0.23	0.22	0.20
Media Cites	–0.09	–0.01		–0.10	0.02	0.52	0.01	–0.10	–0.03	0.11	0.07	0.08	0.10
Future Earnings	0.08	0.26	–0.02		–0.56	0.29	–0.02	0.12	–0.17	0.23	0.33	0.32	0.29
Loss%	–0.21	–0.43	0.00	–0.33		–0.45	0.01	–0.07	0.32	–0.31	–0.42	–0.41	–0.37
Firm Size	–0.02	0.21	0.53	0.30	–0.45		0.06	0.02	–0.18	0.41	0.42	0.42	0.43
Restate	–0.02	–0.03	0.01	–0.01	0.01	0.06		–0.03	–0.03	0.00	–0.02	–0.01	0.00
F.S. EarnPer	0.04	0.13	–0.10	0.03	–0.06	0.02	–0.03		0.09	0.02	0.04	0.03	0.02
BDE Error	–0.16	–0.13	0.11	–0.13	0.32	–0.18	0.00	0.07		0.02	0.04	0.04	0.06
AQ	–0.02	0.17	0.11	0.18	–0.31	0.41	0.00	0.01	0.02		0.79	0.79	0.83
Modified AQ_{LOSS}	0.03	0.23	0.08	0.22	–0.41	0.42	–0.02	0.03	–0.05	0.78		0.92	0.87
Modified AQ_{SI}	0.03	0.23	0.08	0.22	–0.41	0.43	–0.01	0.03	–0.07	0.79	0.92		0.87
Modified AQ_{CFO}	0.00	0.20	0.10	0.21	–0.37	0.44	–0.01	0.02	–0.02	0.83	0.87	0.87	

Notes: This table reports Pearson correlation coefficients below the diagonal and Spearman correlation coefficients above the diagonal. See Table 1, Panel C for variable definitions. We decile rank *MgrlAbility, Historical Ret, Media Citations, F.S.EarnPer, AQ,* and *AQ* modifications by industry-year. We denote significant correlation coefficients at the ten percent alpha level with bold font.

Table 3
Restatements and Managerial Ability

$$Restate_{t+1,t+3} = \alpha_0 + \mathbf{\alpha_1 MgrlAbility_t} + \alpha_2 Firm\ Size_t + \alpha_3 SalesVolatility_{t-4,t} + \alpha_4 CashFlowVolatility_{t-4,t}$$
$$+ \alpha_5 OperCycle_{t-4,t} + \alpha_6 Loss\%_{t-4,t} + \alpha_7 NationalAuditor_t + \alpha_8 \Delta SalesGrowth_t$$
$$+ \alpha_9 AbnormalReturn_t + \varepsilon_{t+1,\ t+3}$$

		Dependent Variable =			
	Pred.	*Restate*	*Restate*	*Restate Judgments*	*Restate Other*
MgrlAbility	–	–0.21**	–0.22**	–0.50**	–0.13
		–2.09	–2.20	–2.33	–1.08
Firm Size	+	0.13***	0.47***	–0.06	–0.02
		3.81	11.39	1.26	0.35
SalesVolatility	+	0.21*	–0.26	–0.05	0.83***
		1.62	–1.58	–0.21	3.74
CashFlowVolatility	+	0.07	–0.35	0.74	–0.33
		0.83	–0.90	1.57	–0.88
OperCycle	+	–0.08*	–0.11	–0.20***	0.10*
		–1.78	–1.31	–2.86	1.83
Loss%	+	0.32***	0.32***	0.03	0.29***
		3.47	2.78	0.19	2.58
NationalAuditor	–	–0.23	–0.09	0.42	0.24
		–1.58	–1.04	1.60	0.98
ΔSalesGrowth	?	0.00	0.00	0.00	0.02
		0.53	0.26	0.00	0.94
AbnormalReturn	?	0.05	0.04	0.07	0.02
		1.00	1.54	0.92	0.20
Restatement Obs		4,453	4,453	1,104	1,393
Total Observations		33,035	12,182	10,568	10,568
Pseudo R^2		1.00%	n.a.	1.14%	0.85%
Firm Fixed Effects		Excluded	Included	Excluded	Excluded

Notes: This table reports the results from the logistic regression of earnings restatements on managerial ability and controls for innate firm characteristics. *Z-statistics* are presented below the coefficients and are based on standard errors that are clustered by firm and year for specifications excluding firm fixed effects. We decile rank *MgrlAbility* by industry-year. Intercept is included, but not tabulated. See Table 1, Panel C for variable definitions.
*, **, *** denotes a two-tailed p-value of less than 0.10, 0.05, and 0.01, respectively.

Table 4

Earnings Persistence and Managerial Ability

$Earnings_{t+1,t+n} = \alpha_0 + \alpha_1\,Earnings_t + \alpha_2\,\textbf{\textit{Earnings}}_t\times\textbf{\textit{MgrlAbility}}_t + \alpha_3 MgrlAbility_t + \alpha_4 Firm\ Size_t + \alpha_5 SalesVolatility_{t-4,t}$
$+ \alpha_6 CashFlowVolatility_{t-4,t} + \alpha_7 OperCycle_{t-4,t} + \alpha_8 Loss\%_{t-4,t} + \alpha_9 NationalAuditor_t + \alpha_{10}\Delta SalesGrowth_t$
$+ \alpha_{11} AbnormalReturn_t + \varepsilon_{t+1,\ t+n}$

	Pred.	Dependent Variable =					
		Future Earnings$_{t+1}$			*Average Future Earnings$_{t+1,t+3}$*		
Earnings	+	0.30***			0.25***		
		9.01			6.81		
Earnings × MgrlAbility	+	0.36***			0.09*		
		7.90			1.74		
Accruals	+		0.36***	0.23***		0.31***	0.24***
			5.18	6.64		4.99	6.25
Accruals × MgrlAbility	+		0.42***	0.35***		0.41***	0.03
			6.55	7.14		4.71	0.51
CFO	+		0.69***	0.45***		0.62***	0.30***
			12.63	12.36		7.52	7.37
CFO× MgrlAbility	+		0.26***	0.26***		0.28***	0.08
			5.01	5.46		2.84	1.57
MgrlAbility	?	−0.01**	0.00	0.00	0.00	0.00	0.00
		−2.01	0.66	0.49	0.01	0.62	0.13
Total Observations		33,735	33,735	33,735	28,016	28,016	28,016
R^2		2.07%	15.96%	3.11%	0.07%	10.20%	0.01%
Test (F-statistic): *Accruals × MgrlAbility = CFO × MgrlAbility*			5.62**	7.04***		2.66*	2.41
Firm Fixed Effects		Included	Excluded	Included	Included	Excluded	Included

Notes: This table presents the OLS regression results investigating the relation between managerial ability and earnings persistence for firms with positive earnings in year *t*. *t*-statistics are presented below the coefficients and are based on standard errors that are clustered by firm and year in specifications excluding firm fixed effects. We decile rank *MgrlAbility* by industry-year. Our main set of control variables (*Firm Size*, *Sales Volatility*, *Cash Flow Volatility*, *OperCycle*, *Loss%, ΔSalesGrowth, AbnormalReturn, and NationalAuditor*) are included in the model. For succinctness, however, results for the control variables are not tabulated. Intercept is included, but not tabulated. See Table 1, Panel C for variable definitions. *, **, *** denotes a two-tailed p-value of less than 0.10, 0.05, and 0.01, respectively.

Table 5
Errors in the Allowance for Bad Debt and Managerial Ability

$$BDE\ Error_{t+1} = \beta_0 + \beta_1\ High\ Ability\ Indicator_t + \beta_2\ Firm\ Size_t + \beta_3\ Sales\ Volatilty_{t-4,t}$$
$$+ \beta_4\ Cash\ Flow\ Volatility_{t-4,\ t} + \beta_5\ OperCycle_{t-4,t} + \beta_6\ Loss\%_{t-4,\ t}$$
$$+ \beta_7\ NationalAuditor_t + \beta_8\ \Delta SalesGrowth_t + \beta_9\ AbnormalReturn_t + \varepsilon_{t+1}$$

	Prediction	Dependent Variable = BDE Error
High Ability Indicator	–	–0.01***
		–2.77
Firm Size	+	0.00
		1.13
SalesVolatility	+	0.00
		1.25
CashFlowVolatility	+	0.02*
		1.65
OperCycle	+	0.01
		1.74
Loss%	+	0.01***
		4.24
NationalAuditor	–	0.00
		0.60
ΔSalesGrowth	?	0.00
		1.32
AbnormalReturn	?	0.00
		1.12
Total Observations		838
R^2		9.00%

Notes: This table presents the OLS regression results investigating the relation between managerial ability and errors in the bad debt provision. *t-statistics* are presented below the coefficients (we do not cluster by firm and year or include firm fixed effects because we do not have a sufficient number of same-firm observations). *BDE Error* is the absolute value of the residual from Equation (5), and *High Ability Indicator* is an indicator variable that is equal to one (zero) if the managerial ability score in year *t* is in the top (bottom) quintile relative to industry-year peers. Requisite information for this test requires hand collection from SEC filings. Thus, we limit the analysis to firms in three industries (following McNichols and Wilson 1988) where accounts receivable (relative to assets) and bad debt expense (relative to earnings) are large: (1) printing and publishing, (2) nondurable wholesale goods, and (3) business services. We consider only those firm-year observations where managerial ability falls among the highest and lowest quintile relative to industry-year peers. Intercept is included, but not tabulated. See Table 1, Panel C for variable definitions.
*, **, *** denotes a two-tailed p-value of less than 0.10, 0.05, and 0.01, respectively.

Table 6
Accruals Quality and Managerial Ability

$AQ_{t+1,t+4} = \alpha_0 + \alpha_1 MgrlAbility_t + \alpha_2 Firm\ Size_t + \alpha_3 SalesVolatility_{t-4,t} + \alpha_4 CashFlowVolatility_{t-4,t}$
$+ \alpha_5 OperCycle_{t-4,t} + \alpha_6 Loss\%_{t-4,t} + \alpha_7 NationalAuditor_t + \alpha_8 \Delta SalesGrowth_t$
$+ \alpha_9 AbnormalReturn_t + \varepsilon_{t+1,t+4}$

		Dependent Variable =	
	Prediction	AQ	
MgrlAbility	+	–0.03***	0.00
		–3.39	0.52
Firm Size	+	0.04***	0.02***
		17.11	7.63
SalesVolatility	–	–0.14***	0.05***
		–8.53	4.48
CashFlowVolatility	–	–0.42***	0.15***
		–8.08	4.94
OperCycle	–	0.00	0.00
		0.04	0.13
Loss%	–	–0.11***	–0.04***
		–8.17	–4.56
NationalAuditor	+	0.02***	0.02***
		2.66	3.28
ΔSalesGrowth	?	–0.01*	0.00
		–1.64	0.15
AbnormalReturn	?	0.01***	0.00
		4.57	0.83
Total Observations		31,957	
R^2		18.93%	9.83%
Firm Fixed Effects		Excluded	Included

Notes: This table reports the results from the OLS regression of accruals quality on managerial ability and controls for innate firm characteristics. *t-statistics* are presented below the coefficients and are based on standard errors that are clustered by firm and year in specifications excluding firm fixed effects. We decile rank *MgrlAbility* and *AQ,* by industry-year. Intercept is included, but not tabulated. See Table 1, Panel C for variable definitions.
*, **, *** denotes a two-tailed p-value of less than 0.10, 0.05, and 0.01, respectively.

Table 7
Accruals, Cash Flows, and Firm Characteristics

Panel A – Correlation between Working Capital Accruals and Current Period Cash Flows Within Innate Quintiles

	Innate Characteristic Quintiles =					
Innate Characteristic	**1**	**2**	**3**	**4**	**5**	**Difference**
Firm Size corr(ΔWC_t, CFO_t)	0.09***	–0.22***	–0.28***	–0.33***	–0.36***	–0.45
SalesVolatility corr(ΔWC_t, CFO_t)	–0.05***	–0.08***	–0.09***	–0.09***	0.06***	0.11
CashFlowVolatility corr(ΔWC_t, CFO_t)	–0.11***	–0.13***	–0.17***	–0.15***	0.03***	0.14
OperCycle corr(ΔWC_t, CFO_t)	0.00	–0.09***	–0.12***	–0.09***	0.07***	0.07
Loss% corr(ΔWC_t, CFO_t)	–0.57***	–0.50***	–0.21***	–0.07***	0.03***	0.60
Loss% Before SI corr(ΔWC_t, CFO_t)	–0.52***	–0.50***	–0.19***	–0.08***	0.04**	0.56
Negative CFO% corr(ΔWC_t, CFO_t)	–0.32***	–0.30***	–0.28***	–0.06***	0.11***	0.42

Table 7, Continued

Panel B: The Mean Coefficients from Regressions of Working Capital Accruals on Cash Flows, Change in Revenue and PPE Estimated by Industry and Loss% Quintile

	Loss% Quintile =					Traditional: Estimated by Industry-Year
	1	**2**	**3**	**4**	**5**	
	Fewer Losses				More Losses	
CFOt–1	0.15*	0.22***	0.06	0.21***	0.18***	0.24***
CFO	–0.56***	–0.58***	–0.44***	–0.42***	–0.30***	–0.38***
CFOt+1	0.16***	0.11***	0.02	0.12***	0.12***	0.15***
ΔRev	0.04	0.10***	0.10***	0.10***	0.10***	0.09***
PPE	0.02	0.00	–0.01	–0.03***	–0.01	–0.02***
Intercept	0.03**	0.04***	0.03***	0.02***	0.00	0.01***
R^2	66%	58%	52%	44%	37%	45%

Panel C: The Mean Coefficients from Regressions of Working Capital Accruals on Cash Flows, Change in Revenue and PPE Estimated by Industry and Loss% Adj. for SI Quintile

	Loss% Before SI Quintile =					Traditional: Estimated by Industry-Year
	1	**2**	**3**	**4**	**5**	
	Fewer Losses				More Losses	
CFOt–1	0.22***	0.19***	0.13***	0.18***	0.16***	0.24***
CFO	–0.63***	–0.55***	–0.50***	–0.43***	–0.22***	–0.38***
CFOt+1	0.15***	0.10***	0.08***	0.13***	0.11***	0.15***
ΔRev	0.08***	0.06***	0.11***	0.10***	0.09***	0.09***
PPE	0.03**	–0.01	0.00	–0.03***	0.00	–0.02***
Intercept	0.03***	0.04***	0.02***	0.02***	–0.01	0.01***
R^2	62%	55%	53%	45%	36%	45%

Panel D: The Mean Coefficients from Regressions of Working Capital Accruals on Cash Flows, Change in Revenue and PPE Estimated by Industry and Negative CFO% Quintile

	Negative CFO% Quintile =					Traditional: Estimated by Industry-Year
	1	**2**	**3**	**4**	**5**	
	Positive CFO				Negative CFO	
CFOt–1	0.18***	0.22***	0.19***	0.16***	0.21***	0.24***
CFO	–0.53***	–0.49***	–0.53***	–0.45***	–0.25***	–0.38***
CFOt+1	0.18***	0.13***	0.17***	0.12***	0.14***	0.15***
ΔRev	–0.09	0.08***	0.10***	0.11***	0.09***	0.09***
PPE	0.01	0.00	–0.01	–0.02*	–0.03*	–0.02***
Intercept	0.02***	0.02***	0.02*	0.02***	0.03***	0.01***
R^2	50%	43%	54%	49%	37%	45%

*** (*) indicates a significant time-series mean per the Fama/McBeth method at the one (ten) percent alpha level. Year indicator variables are included in models estimated by industry and innate firm characteristic rank, but coefficients are not tabulated. See the appendix for variable definitions.

Table 8
Modified Accruals Quality and Managerial Ability

$Modified\ Accruals\ Quality_{t+1,t+4} = \alpha_0 + \alpha_1 MgrlAbility_t + \alpha_2 Firm\ Size_t + \alpha_3 SalesVolatility_{t-4,t}$
$+ \alpha_4 CashFlowVolatility_{t-4,t} + \alpha_5 OperCycle_{t-4,t} + \alpha_6 NationalAuditor_t$
$+ \alpha_7 \Delta SalesGrowth_t + \alpha_8 AbnormalReturn_t + \varepsilon_{t+1,t+4}$

	Pred.	Dependent Variable =					
		Modified AQ$_{Loss\%}$		*Modified AQ$_{SI\_Loss\%}$*		*Modified AQ$_{NegCFO\%}$*	
MgrlAbility	+	0.06***	0.03***	0.05***	0.02***	0.03***	0.01
		6.53	*4.05*	*5.55*	*3.70*	*3.26*	*1.28*
Firm Size	+	0.04***	0.02***	0.04***	0.02***	0.04***	0.02***
		23.57	*8.93*	*22.44*	*9.14*	*21.69*	*9.99*
SalesVolatility	–	–0.16***	0.05***	–0.15***	0.06***	–0.15***	0.07***
		–9.35	*4.74*	*–9.23*	*5.71*	*–8.02*	*6.06*
CashFlowVolatility	–	–0.61***	0.11***	–0.59***	0.11***	–0.59***	0.14***
		–10.95	*3.39*	*–10.24*	*3.71*	*–9.85*	*4.45*
OperCycle	–	0.00	–0.01	0.00	0.00	–0.01	–0.01*
		1.14	*–0.54*	*–0.06*	*–0.96*	*–1.17*	*–1.85*
NationalAuditor	+	0.01	0.02**	0.01	0.02***	0.02**	0.03***
		1.44	*2.88*	*1.42*	*2.63*	*2.22*	*4.58*
ΔSalesGrowth	?	0.00	0.00	0.00	0.00	0.00	0.01
		–0.85	*–0.06*	*–0.92*	*–0.33*	*–0.94*	*0.43*
AbnormalReturn	?	0.02***	0.003*	0.02***	0.01**	0.02***	0.01**
		4.42	*1.76*	*4.85*	*2.25*	*4.03*	*2.26*
Total Observations		28,119		28,119		28,119	
R^2		19.06%	9.35%	19.14%	8.72%	19.98%	9.14%
Firm Fixed Effects		Excluded	Included	Excluded	Included	Excluded	Included

Notes: This table reports the results from the OLS regression of modified accruals quality on managerial ability and controls for innate firm characteristics. *t-statistics* are presented below the coefficients and are based on standard errors that are clustered by firm and year in specifications excluding firm fixed effects. We decile rank *MgrlAbility* and the *AQ* modifications, by industry-year. Intercept is included, but not tabulated. See Table 1, Panel C for variable definitions.
*, **, *** denotes a two-tailed p-value of less than 0.10, 0.05, and 0.01, respectively.

Table 9
Earnings Quality and Alternative Proxies for Managerial Ability

$TotalEarnQuality_{t+1,t+4} = \alpha_0 + \boldsymbol{\alpha_1 MgrlAbility_t} + \alpha_2 Firm\ Size_t + \alpha_3 SalesVolatility_{t-4,t}$
$+ \ \alpha_4 CashFlowVolatility_{t-4,t} + \alpha_5 OperCycle_{t-4,t} + \alpha_6 NationalAuditor_t +$
$\alpha_7 \Delta SalesGrowth_t + \alpha_8 AbnormalReturn_t + \varepsilon_{t+1,t+4}$

	Pred.	Dependent Variable =			
		TotalEarnQuality			
MgrlAbility	+	*0.44****			0.38***
		6.07			*2.58*
Historical Ret	+		0.69***		0.83***
			12.29		*5.94*
Media Citations	+			–0.42***	–0.28*
				2.76	*–1.78*
Firm Size	+	0.08***	0.06***	0.08**	0.07*
		5.64	*3.72*	*2.23*	*1.92*
SalesVolatility	–	–0.49***	–0.73***	–0.66**	–0.87***
		–4.77	*–4.93*	*–2.19*	*–2.52*
CashFlowVolatility	–	–1.57***	–1.56***	–2.15***	–2.45***
		5.99	*–4.42*	*–2.55*	*–2.56*
OperCycle	–	–0.04	–0.07	–0.07	–0.07
		–1.29	*–1.86*	*–1.06*	*–1.01*
NationalAuditor	+	0.19***	0.04	0.33	0.06
		3.08	*0.56*	*1.13*	*0.22*
ΔSalesGrowth	?	–0.01*	–0.03*	0.01	0.04
		–1.65	*–1.75*	*0.21*	*0.65*
AbnormalReturn	?	0.09***	0.04*	0.17***	0.09**
		5.29	*1.82*	*4.53*	*2.19*
Total Observations		13,157	9,673	3,770	3,348
Pseudo R^2		0.80%	1.09%	0.40%	0.88%

Notes This table reports the results from the ordered logistic regression of total earnings quality (*TotalEarnQuality*) on managerial ability and controls. *TotalEarnQuality* is the sum of three earnings quality variables: (1) the rank of estimation accruals quality (*Modified AQ$_{Loss\%}$*), (2) the rank of firm-specific earnings persistence, and (3) –1 × *Restate*. Thus, the variable ranges from a low of negative one to a high of two. We decile rank *MgrlAbility, Historical Returns,* and *Media Citations* by industry-year. The sample size is reduced for specifications including Media Citations as this variable is limited to Execucomp firms from 1995–2005. Intercept is included, but not tabulated. See Table 1, Panel C for variable definitions. Standard errors reflect robust standard errors that are clustered by firm. We find similar results when we cluster by year.
*, **, *** denotes a two-tailed p-value of less than 0.10, 0.05, and 0.01, respectively.

Table 10
Change in Accruals Quality and Change in Managerial Ability

$\Delta ModifiedAQ_{Loss\%Ann} = \beta_0 + \boldsymbol{\beta_1} \Delta \boldsymbol{MgrlAbility} + \beta_2 \Delta Firm\ Size + \beta_3 \Delta Sales\ Volatilty$
$\qquad + \beta_4 \Delta Cash\ Flow\ Volatility + \beta_5 \Delta Operating\ Cycle + \beta_6 \Delta SalesGrowth$
$\qquad + \beta_7 \Delta AbnormalReturn + \varepsilon$

	Prediction	Dependent Variable = $\Delta ModifiedAQ_{Loss\%Ann}$
$\Delta MgrlAbility$	+	0.04**
		1.98
$\Delta Firm\ Size$	+	0.00
		0.49
$\Delta SalesVolatility$	–	–0.02
		–0.77
$\Delta CashFlowVolatility$	–	–0.02
		–0.19
$\Delta OperCycle$	–	0.01
		0.39
$\Delta SalesGrowth$	?	0.02***
		2.60
$\Delta AbnormalReturn$	?	–0.01**
		–2.40
Total Observations		123
R^2		10.55%

Notes: This table presents the OLS regression of changes in accruals quality on changes in managerial ability and changes in control variables. As our measure of managerial ability, we examine an annual version of the modified accruals quality measure examined in Table 8 (*Modified AQ_{Loss%}*). The change in earnings quality, as well as the change in each of the control variables, is measured from year Variable$_{c+1}$–Variable$_{c-1}$, where c is the year in which the CFO changed. Thus, a positive value of $\Delta ModifiedAQ_{Loss\%Ann}$ signifies an improvement in earnings quality following the new CFO appointment. The change in managerial ability reflects the difference between the newly appointed CFO's score from his or her prior firm and the departing CFO's score from the current firm (i.e., $MgrlAbility_{j,b,c-1} - MgrlAbility_{i,a,c-1}$, where manager b was hired by firm *i* and was previously employed by firm *j*). A positive value of $\Delta MgrlAbility$ signifies that the incoming manager is deemed more efficient than the outgoing manager. We do not include $\Delta National\ Auditor$ as a control variable due to lack of variation. Intercept is included, but not tabulated. See Table 1, Panel C for variable definitions.
*, **, *** denotes a two-tailed p-value of less than 0.10, 0.05, and 0.01, respectively.