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Managerial Ability, Tone of Earnings Announcements, and Market Reaction

Abstract

Purpose – This study examines the effect of managerial ability on the tone of earnings announcements and on the market response to the tone.

Design/methodology/approach – This study constructs a model of the determinants of earnings announcement tone in order to examine whether managerial ability plays a significant role in determining earnings announcement tone. Further, to test whether the market response to the tone of earnings announcements is affected by managerial ability, this study also examines the interactive term between earnings announcement tone and managerial ability. The tone of earnings announcements is measured using the spread in the proportion of positive and negative words. Managerial ability is measured using the managerial ability rank developed by Demerjian *et al.* (2012).

Findings – More able management teams use a more positive tone in their earnings announcements. Stock markets have more pronounced positive reactions to positive tones in the earnings announcements issued by companies with more able management teams.

Originality/value – This study identifies managerial ability as a previously unrecognized determinant of tone in earnings announcements and of the stock price reaction to earnings announcements.

Keywords Earnings Announcement, Managerial Ability, Market Reaction, Tone

Paper Type Research Paper

Managerial Ability, Tone of Earnings Announcements, and Market Reaction

1. Introduction

To what extent does management team ability affect the language used in a firm's earnings announcement? Perhaps the most commonly studied feature of corporate communication is the spread in the proportion of positive and negative words—often referred to as “tone” (e.g., Frankel *et al.*, 2010; Price *et al.*, 2012; Davis and Tama-Sweet, 2012; Davis *et al.*, 2012; Demers and Vega, 2014; Huang *et al.*, 2014; Arslan-Ayaydin *et al.*, 2016). Prior studies have found that the tone of corporate disclosure is related to both current firm profitability and to management incentives. This study explores an alternative determinant of tone, i.e., managerial ability, which is defined as a management team's efficiency, relative to its industry peers, in transforming corporate resources into revenues (Demerjian *et al.*, 2012).

The study also examines how managerial ability influences the market response to the tone of earnings announcements. Earnings announcements have been characterized as the most visible and timely channel for managers to communicate quarterly operational performance and are known to contain contents that affect stock returns (Davis and Tama-Sweet, 2012; Chen *et al.*, 2015), and have been described in the Financial Times as “the most prized communication between the companies and investors” (Jopson, 2007). Prior research shows that the tone of earnings announcements not only signals managers' expectations regarding economic performance, but that the market reacts positively to a positive tone in the short window around an earnings announcements date (Henry, 2008; Davis *et al.*, 2012; Davis and Tama-Sweet, 2012).

This study is informed by three lines of research. First, Demerjian *et al.* (2012, 2013) and Krishnan and Wang (2015) document that managerial ability impacts operational outcomes, firm

value, earnings quality, audit risk, and auditors' reporting decision. Second, Davis *et al.* (2015) document that individual manager-specific characteristics play a significant role in the language used in voluntary disclosures (e.g., earnings announcement-related conference calls). Third, Davis *et al.* (2012) and Henry (2008) suggest that stock markets price tone into their valuations at the time of an earnings announcement. Therefore, this study posits that managerial ability impacts the tone of earnings announcements and that the market is in fact reacting to managerial ability when it reacts to the tone in earnings announcements.

In this study, managerial ability is measured using the managerial ability rank (*MA_R* hereafter) developed by Demerjian *et al.* (2012). The analysis of a sample of 15,885 quarterly earnings announcement releases from the 1994Q1 to 2011Q4 period shows that firms with higher managerial ability adopt a more positive tone in their earnings announcements, and that the market has a stronger response to a positive tone in the earnings announcements issued by firms with stronger management teams. Overall, these findings suggest that managerial ability is an important determinant of tone that complements other documented determinants of tone, such as operational performance, managerial incentives, growth opportunities, and firm size. The implication is that a superior management team is more knowledgeable about its business (e.g., the firm, the industry, the client base, and the macro-economic condition), is more able to achieve a better operational outcome, and is likely to create more positive expectations of its firm's operational performance, resulting in a more positive tone in earnings announcements.¹ This insight is helpful for interpreting market reactions to the tone of earnings announcements. Specifically, the stronger positive response to a positive tone in the earnings announcements of strong management teams suggests that investors are capable of effectively incorporating the qualitative information signal conveyed in the tone of the earnings announcements.

This study contributes to the literature in two ways. First, the tone of earnings announcements has been the subject of growing scholarly interest. This study contributes to this literature by not only identifying a new determinant of tone, i.e., management team ability, but also by showing that managerial ability helps to explain the price reaction around earnings announcements. This study's findings on the impact of management teams on the tone of earnings announcements supplement the recent findings by Davis *et al.* (2015), who suggest that individual manager-specific tendencies to be optimistic influence the tone of voluntary disclosures (e.g. conference calls); this study extends this insight by suggesting that a management team's ability as a group impacts the tone of voluntary disclosures (e.g., management earnings announcement). Furthermore, the study provides evidence that managerial ability not only enhances the earnings quality in GAAP accounting numbers in regulated, mandatory financial statements (Demerjian *et al.*, 2013) and audit quality (Krishnan and Wang, 2015), it also increases the impact of the qualitative information provided in voluntary disclosures, specifically, the tone of earnings announcements.

The remainder of the paper is organized as follows. Section II discusses the related literature and hypotheses development. Section III explains the sample selection process, measurements of key variables, and descriptive statistics. Section IV presents the empirical models and main results. Section V provides additional analysis. Part VI discusses some robustness checks. Part VII concludes the paper.

2. Hypotheses development

A number of studies have examined the determinants of and market reactions to the tone of different types of corporate disclosure. Davis *et al.* (2012) and Demers and Vega (2014) examine tone in earnings announcements and find that (1) tone is related to corporate performance and (2) the market reacts positively to the tone expressed in earnings

announcements. These studies generally interpret their results as consistent with the notion that managers use tone to communicate private information about the performance of the firm. This study examines the effect of management-team ability on the tone of earnings announcements and its impact on the market reaction to the tone at the time of the earnings announcement.

2.1 Managerial ability and tone of earnings announcements

Prior studies have identified manager-specific effects on a firm's performance, investment and financing decisions (Bertrand and Schoar, 2003), accounting choices (Ge *et al.*, 2011), forecast choices (Bamber *et al.*, 2010; Yang, 2012), and tax aggressiveness (Dyregang *et al.*, 2010). Davis *et al.* (2015) explicitly point out that individual managers impact a firm's financial reporting and disclosure choices beyond the economic factors that are specific to the firm, even though many of these reporting decisions are constrained by factors such as Generally Accepted Accounting Principles, external auditors, and regulators. Given the unstructured and unregulated nature of the choice of language in voluntary disclosures, the tone of such disclosures (e.g., earnings announcements and conference calls) is likely to be more influenced by manager-specific characteristics (Hambrick, 2007; Davis and Tama-Sweet, 2012; Davis *et al.*, 2015). Davis *et al.* (2015) test this proposition and find that an individual manager's tendency to be optimistic influences the tone of conference calls as well as a firm's operational performance. This study extends Davis *et al.* (2015) by examining how a management team's ability affects the tone used in its earnings announcements.

Demerjian *et al.* (2012) define managerial ability as a management team's efficiency, relative to its industry peers, in transforming corporate resources into revenues. Demerjian *et al.* argue that more able managers are better than less able managers at understanding technological and industrial trends, predicting product demand, investing in higher value projects, managing

their employees, and successfully identifying and capitalizing on investment opportunities. The superior knowledge and efficiency of more able management teams helps their firms to achieve better operational performance (Demerjian *et al.*, 2012) and to provide the market with higher quality financial reporting information (Demerjian *et al.*, 2013; Krishnan and Wang, 2015)[2].

Given the above, the prediction is that there is a management team-specific component to the tone of earnings announcements. In particular, managerial ability might have a significant effect on the language used in earnings announcements through at least two channels: management private information and management optimism. First, according to the argument in Demerjian *et al.* (2013), a superior management team is more knowledgeable about its business (e.g., the firm, the industry, the client base, and the macro-economic condition), and is more able to achieve a better operational outcome. Thus, a superior management team is likely to create more positive expectations of its firm's operational performance, which should result in a more positive tone in their earnings announcement. Second, managerial ability is associated with management's confidence and optimism (Gul, 1983), which also result in more optimistic accounting numbers (Ahmed and Duellman, 2013) and more optimistic tones in conference calls (Davis *et al.*, 2015). Both arguments suggest that managerial ability is likely to be positively associated with the tone of earnings announcement. Stated in alternative form, the first hypothesis is as follows:

Hypothesis 1. *Ceteris paribus*, a more able management team is likely to issue an earnings announcement with a more positive tone.

The null of Hypothesis 1 (H1) might occur for three reasons. First, the potential litigation risk and reputational costs associated with overly positive language are two major factors constraining more able management teams from issuing more positive earnings announcements (e.g., Rogers *et al.*, 2011; Gordon *et al.*, 2013; Arslan-Ayaydin *et al.*, 2016; Davis *et al.*, 2015).

Second, each earnings announcement is carefully scrutinized by the board and its audit committee before being released (Deloitte, 2015), limiting the impact of a management team on its tone. Third, it is possible that the majority of the variation in the tone of earnings announcements is driven by innate firm characteristics that managers cannot affect; in this case, there will not be any association between management team ability and the tone of earnings announcements

2.2 Relevance of managerial ability to understanding the market reaction to the tone of earnings announcements

Earnings announcements have been characterized as the most visible and timely channel for managers to communicate quarterly operational performance (Davis and Tama-Sweet, 2012). There exists strong evidence that the market uses qualitative information from earnings announcements to infer managers' private information about firms' prospects and value. For example, Henry (2008), Davis *et al.* (2012), Price *et al.* (2012), and Demers and Vega (2014) document the immediate effect of the tone of earnings announcements on investors' perceptions of a firm's operational performance. They show that the 3-day cumulative abnormal return around an earnings announcement increases with the positive tone of the earnings announcement, even after controlling for a firm's financial information and earnings surprise. These early studies (e.g., Henry, 2008; Davis *et al.*, 2012) of the qualitative information in earnings press releases mainly interpret tone as an unbiased signal of a manager's private information about corporate performance. However, Huang *et al.* (2014) provide evidence that managers can, at their discretion, use optimistic language (tone) in earnings announcements to hype a stock before important events, including equity offerings, mergers and acquisitions, and stock options grants. Similarly, Arslan-Ayaydin *et al.* (2016) find that equity incentives increase the likelihood that managers will inflate the tone of earnings announcements, but that as

investors anticipate the opportunistic behavior of managers with large equity incentives, they discount the (inflated) tone in their valuation of such firms' stock.

Recent studies by Price *et al.* (2012) and Davis *et al.* (2015) find evidence of a manager-specific component in the market reaction to the tone of conference calls, which is consistent with the notion that manager-specific optimism impacts investors' interpretation of voluntary disclosures (e.g., conference calls). This study complements this line of research by examining the impact of management teams' ability on the market response to tone. This study posits that managerial ability is relevant to investors' valuation of a firm's stock in the short window around an earnings announcement. Furthermore, as opportunistic tone management is anticipated by investors (Huang *et al.*, 2014; Arslan-Ayaydin *et al.*, 2016), this study posits that investors are also likely to take managerial ability into account by increasing (decreasing) the influence of the tone on firm valuation for firms with more (less) able management teams. Stated in alternative form, the second hypothesis is as follows:

Hypothesis 2. *Ceteris paribus*, the market reacts more positively to a positive tone in an earnings announcement issued by a company with a more able management team.

The null of Hypothesis 2 (H2) might occur for two reasons. First, previous findings show an immediate positive stock market reaction to positivism in earnings announcements (e.g., Henry, 2008; Davis *et al.*, 2012; Davis and Tama-Sweet, 2012). This empirical evidence suggests that market participants consider an optimistic tone in earnings announcement as, to some extent, an unbiased positive signal about a company's economic conditions (Henry, 2008; Davis *et al.*, 2012). If this belief in an unbiased signal dominates, the market will not respond differently to the tone of earnings announcements issued by more or less able management teams. Second, if market participants are not able to differentiate companies with better or worse

managerial teams, the market will not react differently to earnings announcements issued by management teams with different abilities.

3. Sample selection, variable definitions, and descriptive statistics

3.1 Sample selection

The sample dataset used in the analysis of the positivity and negativity of tones in earnings announcements consists of data drawn from WRDS SEC Analytics Suite, managerial ability data developed in Demerjian *et al.* (2012), annual financial data from Compustat, data on executive wealth from ExecuComp, stock return data from the Center for Research in Security Prices (CRSP), and analyst forecast data from Thomson Reuters I/B/E/S. Any observation with missing data is dropped. Observations from regulated industries such as electricity, gas, finance, insurance, and real estate are dropped. The final sample includes 15,885 firm-quarter observations from the 1994Q1 to 2011Q4 period. All of the data are winsorized at 1% and 99%. Table 1 describes the sample selection procedure.

<<Please Insert Table 1 Here>>

3.2 Tone of earnings announcement

Consistent with prior studies (Feldman *et al.*, 2010; Davis and Tama-Sweet, 2012; Twedt and Rees, 2012; Davis *et al.*, 2015), *TONE* is measured as the difference between the number of positive words and the number of negative words divided by the total number of words in the earnings announcement. All of the earnings announcements are retrieved from WRDS SEC Analytics Suite. The number of positive and negative words is pre-calculated using the dictionary developed in Loughran and McDonald (2011). Specifically, Loughran and McDonald (2011) parse the texts of 10-Ks and 10-K405s into vectors of words and word counts, and calculate the tone of the 10-Ks based on word counts, the positivity and negativity of each word, frequency of each word, and importance of each word. They demonstrate that tone calculated in

this way is associated with market abnormal returns, trading volumes, return volatility, and earnings surprises. Their library of positive and negative words has been used by a number of studies such as Twedt and Rees (2012), Garcia (2013), Jegadeesh and Wu (2013), Liu and McConnell (2013), and Loughran and McDonald (2014). In this study, consistent with Huang *et al.* (2014) and Arslan-Ayaydin *et al.* (2016), the abnormal tone, *ABTONE*, is also calculated, as shown in equation (3). Additional analyses using *ABTONE* are presented in Section V.

3.3 Managerial ability measure [3]

Demerjian *et al.* (2012) define managerial ability as the ability of managers, relative to their industry peers, to maximize revenues and profitability. The managerial ability ranking method developed by Demerjian *et al.* produces decile rankings of managerial ability scores. In particular, using data envelopment analysis (DEA), a nonlinear optimization procedure used to evaluate the relative efficiency of decision-making units, they estimate firm efficiency by solving an optimization model in which sales is the output and there are seven inputs: net property, plant and equipment; net operating leases; net R&D; purchased goodwill; other tangible assets; cost of inventory; and selling, general, and administrative expenses. The objective is to identify firms that generate the highest level of revenue from a given set of inputs. The second step involves estimating managerial ability from the firm efficiency measure. As the latter reflects both firm-level and manager-specific efficiency drivers, Demerjian *et al.* (2012) separate the two by estimating for each industry a regression of firm efficiency on six firm characteristics that affect firm efficiency: firm size, firm market share, cash availability, firm age, business segment concentration, and foreign operations. The residual from this regression is the managerial ability score. It indicates managers' ability, relative to their industry peers, to transform corporate

resources to revenues. This study uses the managerial ability rankings published by Demerjian *et al.* as a measure of managerial ability (MA_R) [4].

3.4 Other variables

The cumulative abnormal return is calculated as the difference between the holding period return and the CRSP value-weighted market index return surrounding an event window. As this study is focused on earnings announcements and reactions to earnings announcements, the day of an earnings announcement is day 0; in the calculation of $CAR(-1,1)$, day -1 is the day before an announcement, and day 1 is the day after. $CAR(-60,-2)$ is a control variable, with day -60 being 60 days before an earnings announcement, and day -2 being 2 days before.

The other control variables include return on assets (ROA), firm size ($SIZE$), market-to-book ratio (MTB), stock return volatility (VOL), CEO equity-based wealth ($WEALTH$), earnings surprise ($SURP$), and year, quarter, and industry fixed effects. ROA , calculated as earnings before interest and taxes scaled by total assets, captures firm fundamentals. According to prior studies (e.g., Davis and Tama-Sweet, 2012; Davis *et al.*, 2015), it is necessary to control for ROA , as it is likely to affect the tone in earnings announcements. Further, larger firms are likely to use a different tone than smaller firms, as documented in Jegadeesh and Wu (2013) and Huang *et al.* (2014), and hence this study controls for firm size ($SIZE$), measured as the logarithm of total assets. A number of studies on tone (e.g., Jegadeesh and Wu, 2013; Huang *et al.*, 2014; Davis *et al.*, 2015) suggest that it is also necessary to control for a firm's growth potential, which can be proxied by market-to-book ratio (MTB). VOL is calculated as the standard deviation of monthly stock return in the past 12 months, proxy for firm-specific risk (Huang *et al.* 2014). Arslan-Ayaydin *et al.* (2016) document that the tone of earnings announcements is impacted by CEO equity-based incentives, and therefore this study also controls for CEO equity-based wealth

(*WEALTH*), calculated as the logarithm of the aggregate dollar amount of a CEO's firm-specific equity-based wealth, which includes the total value of shares owned by the CEO, value of unexercisable options, and value of unexercised exercisable options. Earnings surprise (*SURP*) is calculated as the difference between the mean analyst forecast of EPS and the actual EPS.

3.5 Descriptive statistics

Table 2 reports the descriptive statistics of the test variables and control variables. An average firm has a tone of 0.180, suggesting that earnings announcements generally have a positive tone. This observation is consistent with the findings of Davis and Tama-Sweet (2012) and Davis *et al.* (2015), who document positive average tones in earnings announcements. Table 2 also shows that, on average, the sample firms have a positive *ROA*. The mean of CEO's firm-specific equity-based wealth is about \$80 million, while the median is a little over \$14 million. After a logarithm transformation is performed to address the right-skewness of the data, *WEALTH* is found to have a mean of 9.447 and a median of 9.550. Finally, both the average *CAR(-1,1)* and the average *CAR(-60,-2)* are positive.

<<Please Insert Table 2 Here>>

3.6 Correlations

The Pearson correlations are presented in Table 3. They show a positive and significant correlation between *TONE* and *MA_R*. *TONE* is also positively associated with CEO equity-based incentives (proxied by *WEALTH*), firm fundamentals (proxied by *ROA*), and growth potential (proxied by *MTB*). However, *TONE* is negatively associated with *SIZE* and *VOL*, suggesting that larger, risky firms might be more cautious in earnings announcements. In addition, *TONE* is positively associated with *CAR(-1,1)*, indicating that a more positive tone may be associated with a more positive market reaction.

Additionally, MA_R is positively associated with $WEALTH$, ROA , MTB , and $CAR(-1,1)$. This is in line with the notion that MA_R captures managers' relative efficiency in transforming corporate resources into revenues. In particular, higher managerial ability is correlated with higher firm fundamentals (proxied by ROA), higher growth (proxied by MTB), higher CEO equity-based incentive (proxied by $WEALTH$), and a stronger market reaction to earnings announcements (proxied by $CAR(-1,1)$).

<<Please Insert Table 3 Here>>

4. Empirical models and main results

4.1 Empirical models

The following fixed effects regression, in which industry, year, and quarter fixed effects are controlled, is used to test the first hypothesis.

$$TONE_{it} = \alpha_1 MA_R_{it} + \alpha_2 WEALTH_{it} + \alpha_3 ROA_{it} + \alpha_4 SIZE_{it} + \alpha_5 MTB_{it} + \alpha_6 VOL_{it} + \sum IND + \sum YEAR + \sum QUARTER + \varepsilon_{it} \quad (1)$$

Consistent with previous studies on tone (e.g., Davis and Tama-Sweet, 2012; Jegadeesh and Wu, 2013; Huang *et al.*, 2014; Arslan-Ayaydin *et al.*, 2016), model (1) controls for CEO equity-based incentive, performance, size, growth potential, and stock return volatility. According to Jegadeesh and Wu (2013), Huang *et al.* (2014), and Arslan-Ayaydin *et al.* (2016), smaller firms as well as firms with higher CEO equity-based wealth, larger market-to-book ratios, lower stock return volatility, and higher return on assets are likely to use more positive tones in their earnings announcements. The variable of interest is MA_R , with α_1 representing the association between tone and managerial ability. The first hypothesis states that more able management teams are likely to issue earnings announcements with more positive tones; therefore, the testable hypothesis for H1 is that α_1 is positive and significant.

To test the second hypothesis the following fixed effects regression is performed.

$$\begin{aligned}
CAR(-1,1)_{it} = & \beta_1 TONE_{it} + \beta_2 MA_R_{it} + \beta_3 TONE_{it} * MA_R_{it} + \beta_4 CAR(-60,-2)_{it} \\
& + \beta_5 SURP_{it} + \beta_6 ROA_{it} + \beta_7 SIZE_{it} + \beta_8 MTB_{it} + \beta_9 VOL_{it} + \Sigma IND \\
& + \Sigma YEAR + \Sigma QUARTER + \varepsilon_{it} \tag{2}
\end{aligned}$$

A number of studies have shown that the stock market reacts positively to the tone of earnings announcements (e.g., Feldman *et al.*, 2010; Davis and Tama-Sweet, 2012; Twedt and Rees, 2012; Price *et al.*, 2012). Building on this literature, model (2) tests whether managerial ability affects the market reaction to earnings announcement tones. $CAR(-1,1)$ is the 3-day cumulative abnormal return around day 0, i.e., the earnings announcement release day. The control variables are $CAR(-60,-2)$, $SURP$, ROA , $SIZE$, MTB , and the fixed effects on industry, year, and quarter. $CAR(-60,-2)$ is used to capture any possible delayed market reaction to prior events. A positive and significant association between positive market reaction and positive tones is expected. Also, firms with positive earnings surprises, higher earnings, smaller sizes, and lower growth are expected to have higher cumulative abnormal returns (Pinello, 2008; Doran *et al.*, 2012; Davis and Tama-Sweet, 2012; Huang *et al.*, 2014; Davis *et al.*, 2015; Arslan-Ayaydin *et al.*, 2016). Industry, year, and quarter fixed effects are included, as industry-wide and macro economy fluctuations might affect market reactions. The second hypothesis states that the market reacts more positively to a positive tone in an earnings announcement issued by a company with a more able management team. Hence, to support H2, β_3 must be positive and significant.

4.2 Main results

Table 4 reports the empirical results for the first hypothesis. The results of the regression of earnings announcement tone against managerial ability rank (MA_R) show that $TONE$ is positively associated with MA_R , with a coefficient of 0.040 and a significance level of 1%. This suggests that a more able management team is likely to exhibit a more positive tone in its earnings announcements [5]. The empirical results for the control variables are consistent with prior studies (e.g., Doran *et al.*, 2012; Huang *et al.*, 2014; Davis *et al.*, 2015; Arslan-Ayaydin *et*

al., 2016). In particular, CEO equity-based wealth and ROA are significantly and positively associated with a more positive tone, suggesting that firms with higher CEO equity-based wealth and better operational performance are likely to adopt a more positive tone in their earnings announcements. Consistent with Huang *et al.* (2014), *SIZE* is negatively associated with *TONE*, suggesting that larger firms may use more cautious (more negative) tones in their earnings announcements. Overall, the results support the hypothesis that higher managerial ability is associated with a more positive tone in earnings announcements.

<<Please Insert Table 4 Here>>

Table 5 presents the empirical findings for H2. The results presented in column (1) show the result for the base model: there is a positive market reaction to positive tones, with a coefficient of 0.002 that is marginally significant at the 12% level. Column (2) of Table 5, which presents the regression results for *MA_R* and the interaction between *TONE* and *MA_R*, shows that the interaction term is positively associated with cumulative abnormal returns, with a coefficient of 0.012, and a t-value of 2.24. This suggests that when the market reacts to the tone of earnings announcements, it also considers managerial ability. If the management team is more able, the market's abnormal reaction is higher. Further, to test the overall association between *CAR(-1,1)* and *TONE*, this study examines whether $\beta_1 + \beta_3$ equals zero. The parameter is 0.007 and is significantly different from zero at the 1% level, indicating that *CAR(-1,1)* is indeed associated with the tone of earnings announcements. The results for the control variables in both columns are consistent with prior studies. Specifically, larger firms (higher *SIZE*) and more rapid growth (higher *MTB*) are likely to have smaller abnormal reactions, consistent with the evidence in Huang *et al.* (2014), Davis *et al.* (2015), and Arslan-Ayaydin *et al.* (2016). Also, a bigger earnings surprise (*SURP*) is associated with a higher abnormal return, whereas *ROA* is not

significantly associated with a higher abnormal return. This suggests that the market reacts to discrepancies between analyst forecasts and real earnings (*SURP*), but not directly to earnings (*ROA*).

<<Please Insert Table 5 Here>>

5. Additional analyses

5.1 Abnormal tone

In this section, several additional analyses are presented. First, the two hypotheses are reexamined using abnormal tone instead of tone as the variable of interest. Following Huang *et al.* (2014), tone level is decomposed into two components. The normal component reflects a neutral tone that is commensurate with concurrent information about current firm quantitative performance; the residual component, i.e., the abnormal tone, is intended to capture the discretionary and inflated component of tone. Huang *et al.* (2014) argue that managers may manage the tone of earnings announcements so that they can bias investors' understanding of firm fundamentals. The stock market's positive reaction to abnormal tones in the 3-day window around the release of earnings announcements suggests that the market overreacts to abnormal tones (Huang *et al.*, 2014; Arslan-Ayaydin *et al.*, 2016). Previous studies calculate abnormal tone as the residual of a particular tone model that typically controls for CEO equity-based incentives (*WEALTH*) and firm fundamentals such as earnings (*ROA*), size (*SIZE*), market-to-book ratio (*MTB*), and stock return volatility (*VOL*) (Huang *et al.*, 2014; Arslan-Ayaydin *et al.*, 2016; Davis and Tama-Sweet, 2012). In this study, abnormal tone (*ABTONE*) is derived from the residual in model (3):

$$TONE_{it} = \gamma_0 + \gamma_1 WEALTH_{it} + \gamma_2 ROA_{it} + \gamma_3 SIZE_{it} + \gamma_4 MTB_{it} + \gamma_5 VOL_{it} + \varepsilon_{it} \quad (3)$$

Table 2 shows that *ABTONE* has a mean of 0.028 and a median of 0.172, suggesting that earnings announcements usually carry positive abnormal tones. Table 3 also shows that, as expected, *ABTONE* is largely correlated with *TONE*, and is positively correlated with managerial ability (*MA_R*). Additionally, *ABTONE* is significantly correlated with earnings surprise (*SURP*) and abnormal market reactions around earnings announcement release dates (*CAR(-1,1)*).

Fixed effects regressions are used to test both hypotheses using *ABTONE*; the results are reported in Table 6. Column (1) of Table 6 indicates that the portion of the abnormal tone that is not explained by firm fundamentals, CEO incentives, or industry, year, and quarter fixed effects is significantly positively associated with managerial ability at the 1% level, with a coefficient of 0.053. This result is in line with those reported in Table 4 and supports H1, which posits that more able managers tend to express a more positive tone in their earnings announcements. Column (2) of Table 6 reports qualitatively similar results to those in Table 5, supporting H2, which posits that market reactions to abnormal tone are strengthened by managerial ability, as evidenced by the coefficient of 0.011 and the t-value of 2.16 on the interaction between *ABTONE* and *MA_R*. Collectively, the additional analyses based on abnormal tone provide further support for the main results. They provide empirical evidence that managerial ability is relevant in explaining the abnormal tone of earnings announcements and that the market has a stronger positive response to the abnormal tones of announcements made by stronger management teams.

<<Please Insert Table 6 Here>>

5.2 Subsample analysis

To further strengthen the argument that managerial ability affects market reactions to the tone of earnings announcements, the sample is partitioned into two subsamples by the median of

the managerial ability score. Subsample 1 contains 7,944 observations with managerial ability scores that are smaller than or equal to the sample median of 0.005. Subsample 2 contains 7,941 observations with larger-than-median managerial ability scores. The results of the regressions using the subsamples are reported in Table 7. In subsample 1, the 3-day cumulative abnormal return is not significantly associated with the tone of earnings announcements, whereas in subsample 2, the coefficient on tone is 0.006, with a t-value of 2.63. These results suggest that the stock market takes managerial ability into account when reacting to tone. In particular, when managerial ability is higher, the stock market appears to give higher credibility to the tone of earnings announcements, and therefore a more positive tone is associated with a higher cumulative abnormal return. However, when managerial ability is low, the tone of earnings announcements does not seem to be credible to the market and it has no significant association with cumulative abnormal return. This implication is consistent with H2, and with the implications of the results presented in Table 5.

<<Please Insert Table 7 Here>

6. Robustness Checks

6.1 Firm fixed effects

As a robustness check to address the concern that the results might be driven by firm-specific characteristics, firm-specific effects are controlled for in the model. The results remain qualitatively consistent, although the significance level drops to 7.5% (one-tail). The drop in significance is probably because managerial ability is quite stable over the years. In particular, the sample contains 912 firms and 1,455 distinct firm-CEO pairs. This means that 63% of the firms have the same CEO throughout the sample period.

6.2 Additional control variables for operational performance

To further address the concern that earnings announcements tone may be driven by firm performance, two additional control variables are added to the model: operational loss and change in earnings per share. After controlling for these variables, managerial ability remains significantly associated with *TONE*, with a positive coefficient of 0.034 and a t-value of 2.48. Among these two additional control variables, only *LOSS* is significantly and negatively associated with *TONE*, with a coefficient of -0.081 and a t-value of -6.28. Changes in EPS is insignificant and negatively associated with tone.

6.3 Moderating Effect of Corporate Governance

It is important to identify the specific channel through which managerial ability affects the tone of earnings announcements, i.e., management private information or management optimism. If management optimism is the primary driver, then the positive association between *MA_R* and *TONE* should be weaker for firms with stronger governance (i.e., CEO does not play a dual role), as stronger governance constraints management optimism (e.g., Aguilera *et al.* 2017). Two empirical analyses are performed to test this association. First, equation (1) is re-estimated in subsamples of firms with different levels of corporate governance effectiveness, as proxied by *DUALITY*, which takes the value of 1 if the CEO is also the chairman of the board of directors, and 0 otherwise. If *DUALITY* equals 1, the CEO may be more powerful in his/her firm, and this could mean that the tone of earnings announcements could be more biased (Baliga *et al.* 1996; Gul and Leung 2004). The untabulated results suggest that the coefficients of managerial ability in both subsamples are statistically significant at 5%; the coefficient is 0.094 for the subsample where the CEO has a dual role and 0.074 for the subsample where the CEO does not have a dual role. This difference is statistically insignificant. In the second test, equation (1) is expanded by including *DUALITY* and its interaction with *MA_R* as additional control variables.

The untabulated results suggest that *MA_R* has a coefficient of 0.097 and a t-value of 3.53, whereas *DUALITY* itself is statistically insignificant. *DUALITY* does not seem to affect managerial ability's impact on tone, as its interaction with *MA_R* is statistically insignificant with a coefficient of -0.020 and a t-value of -0.40. To sum up, the results based on the subsample tests and interaction term analysis suggest there is no statistical difference in the strength of the association between *MA_R* and *TONE* for companies with different corporate governance effectiveness. This evidence rules out the management optimism channel, and leads to the conclusion that the main findings are primarily driven by the management private information channel.

6.4 Change analysis

This section further examines the effect of managerial ability on tone by investigating whether a change in managerial ability has an effect on tone. Specifically, according to Hypothesis 1, when the managerial ability score increases, the tone of earnings announcements should become more positive. To test this, this study calculates changes in fourth-quarter tone with respect to the same quarter of the previous year, and regresses the difference against changes in managerial ability relative to the previous year. The coefficient on change of MA rank is 0.105, with a p-value of 0.055. This suggests that as the managerial team becomes more able, the tone becomes more positive; this effect is statistically significant.

7. Conclusions

Using the ranked managerial ability measure developed by Demerjian *et al.* (2012), this study examines the effect of managerial ability on the tone of earnings announcements and on the market response to the tone. The study finds that more able management teams use a more positive tone in their earnings announcements; this extends the list of known tone determinants

documented in the literature, such as operational performance, managerial incentives, growth opportunities, and firm size. These results add to the understanding of the determinants of tone in earnings announcements and suggest that tone does not simply reflect a manager's private information about operational performance. Rather, the tone in earnings announcements is related to the management team's efficiency in converting corporate resources into revenue. Moreover, the results of this study suggest that stock markets have more pronounced positive reactions to positive tones in the earnings announcements issued by companies with more able management teams. In other words, investors put more weight on positive tones expressed by more able management teams. Thus, this study adds to the understanding of the market's reaction to earnings announcements. Overall, the study contributes to the understanding of both the determinants of and market reaction to the tone of earnings announcements and to the understanding of the effect of managerial ability on firms' financial reporting behavior.

Our findings have important implications for firms' management and boards of directors, market participants, and academic researchers. For firms' management and boards of directors, the findings suggest that they need to be aware of the tendency of more able management teams to use more positive tones and to take necessary actions to avoid over-optimistic earnings announcements. For market participants, the findings suggest that they should beware of over-confidence in the tone of earnings announcement issued by more able management teams. For academic researchers, the findings indicate that archival researchers need to take into account the determinants of the tone of earnings announcement; otherwise, this omitted, correlated variable could render their findings unreliable.

Future studies could empirically test some of these implications. For example, a study of the moderating effect of corporate governance on the association between managerial ability and

tone would inform us about the effectiveness of boards or audit committees in constraining aggressiveness in the corporation's voluntary disclosure (e.g., earnings announcement and conference calls). Further, future research examining the impact of managerial ability on the conservatism and aggressiveness of GAAP accounting numbers in regulated, mandatory financial statements would further expand the understanding of its impact on financial reporting behavior.

Lastly this study is subject to two caveats. First, due to the innate limitation of OLS regression, the findings mainly show the associations between managerial ability and tone of earnings announcements rather a causal relationship between these variables. Second, the sample only includes large companies, as the control for managerial incentives (*WEALTH*) is constructed from data drawn from the Execucomp database. Therefore, these findings may not be generalizable to small firms.

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Table 1. Sample selection

	Firms	Firm-quarter observations
Non-missing data from Compustat and SEC Analytics Suite	6,504	69,232
Merge with ExecuComp	2,149	32,565
Merge with managerial ability data	1,676	25,202
Merge with CRSP daily data	993	17,807
Merge with I/B/E/S	919	16,064
Remove regulated industries	912	15,956
Merge with CRSP monthly data	909	15,885

Table 2. Descriptive statistics

Variables	# of ob.	Mean	Min.	25%	Median	75%	Max.
<i>TONE</i>	15,885	0.180	-1.739	0.000	0.329	0.420	1.195
<i>ABTONE</i>	15,885	0.028	-1.880	-0.154	0.172	0.270	1.040
<i>MA_R</i>	15,885	0.581	0.1	0.4	0.6	0.8	1.0
<i>WEALTH</i>	15,885	9.450	0.000	8.504	9.549	10.571	14.017
<i>ROA</i>	15,885	0.032	-0.263	0.010	0.030	0.060	0.209
<i>SIZE</i>	15,885	7.557	4.350	6.395	7.407	8.644	12.012
<i>MTB</i>	15,885	1.258	0.143	0.530	0.810	1.420	8.345
<i>VOL</i>	15,885	0.120	0.043	0.083	0.107	0.150	0.319
<i>SURP</i>	15,885	-0.018	-1.182	-0.054	0.003	0.048	0.594
<i>CAR(-1,1)</i>	15,885	0.004	-0.230	-0.038	0.003	0.047	0.231
<i>CAR(-60,-2)</i>	15,885	-0.005	-0.513	-0.099	-0.005	0.089	0.531

Table 3. Pearson correlations

	<i>TONE</i>	<i>ABTONE</i>	<i>MA_R</i>	<i>WEALTH</i>	<i>ROA</i>	<i>SIZE</i>	<i>MTB</i>	<i>VOL</i>	<i>SURP</i>	<i>CAR(-1,1)</i>	<i>CAR(-60,-2)</i>
<i>TONE</i>	1.000	0.998***	0.039***	0.015*	0.077***	-0.037***	0.027***	-0.071***	0.041***	0.018**	-0.007
<i>ABTONE</i>		1.000	0.025***	-0.021***	0.050***	0.002	0.011	-0.084***	0.031***	0.015*	-0.005
<i>MA_R</i>			1.000	0.121***	0.282***	-0.056***	0.241***	-0.010	0.145***	0.011	-0.036***
<i>WEALTH</i>				1.000	0.223***	0.324***	0.104***	-0.153***	0.127***	0.027***	-0.013
<i>ROA</i>					1.000	0.080***	0.193***	-0.201***	0.266***	0.023***	-0.095***
<i>SIZE</i>						1.000	-0.208***	-0.441***	0.011	-0.022***	-0.009
<i>MTB</i>							1.000	0.332***	0.086***	-0.040***	-0.066***
<i>VOL</i>								1.000	-0.007	-0.013	-0.036***
<i>SURP</i>									1.000	0.153***	-0.037***
<i>CAR(-1,1)</i>										1.000	0.008
<i>CAR(-60,-2)</i>											1.000

*, **, and *** indicate significance at a 10%, 5%, and 1% level, respectively.

Table 4. OLS regression of earnings announcement tones

	<i>TONE</i>
<i>MA_R</i>	0.039*** (2.83)
<i>WEALTH</i>	0.007*** (3.63)
<i>ROA</i>	0.398*** (6.45)
<i>SIZE</i>	-0.008*** (-3.27)
<i>MTB</i>	0.0009 (0.31)
<i>VOL</i>	-0.126 (-1.42)
<i>Industry Fixed Effect</i>	Included
<i>Year Fixed Effect</i>	Included
<i>Quarter Fixed Effect</i>	Included
R^2	0.0931
<i>#Obs.</i>	15,885

*, **, and *** indicate significance at a 10%, 5%, and 1% level, respectively. T-statistics are in parentheses.

The above table presents the results from the following regression:

$$TONE_{it} = \alpha_1 MA_{R_{it}} + \alpha_2 WEALTH_{it} + \alpha_3 ROA_{it} + \alpha_4 SIZE_{it} + \alpha_5 MTB_{it} + \alpha_6 VOL_{it} + \sum IND + \sum YEAR + \sum QUARTER + \varepsilon_{it}$$

TONE is measured as 100 multiplied by the difference between the positive word proportion and negative word proportion. *MA_R* is obtained at <http://faculty.washington.edu/smcvay/abilitydata.html>. *WEALTH* is the logarithm of the sum of three components: (1) aggregate value of shares owned by the CEO, (2) aggregate value of unexercisable options, and (3) aggregate value of unexercised exercisable options. *ROA* is earnings before interest and taxes (EBIT) scaled by total assets. *SIZE* is calculated as the logarithm of (1+total assets), market-to-book ratio (*MTB*) is the sum of market capitalization and long-term debt divided by total assets, and stock return volatility (*VOL*) is the volatility of monthly stock returns in the past 12 months.

Table 5. OLS regression of market reaction

	(1) <i>CAR(-1,1)</i>	(2) <i>CAR(-1,1)</i>
<i>TONE</i>	0.002 (1.57)	-0.005 (-1.35)
<i>MA_R</i>		0.001 (0.45)
<i>TONE * MA_R</i>		0.012** (2.24)
<i>CAR(-60,-2)</i>	0.003 (0.82)	0.003 (0.80)
<i>SURP</i>	0.065*** (20.48)	0.065*** (20.40)
<i>ROA</i>	-0.00008 (-0.07)	-0.004 (-0.31)
<i>SIZE</i>	-0.002*** (-3.61)	-0.002*** (-3.50)
<i>MTB</i>	-0.004** (-7.06)	-0.004** (-7.19)
<i>VOL</i>	-0.011 (-0.70)	-0.011 (-0.67)
<i>Industry Fixed Effect</i>	Included	Included
<i>Year Fixed Effect</i>	Included	Included
<i>Quarter Fixed Effect</i>	Included	Included
F-test: $\beta_1 + \beta_3 = 0$		0.007*** (2.72)
R^2	0.0355	0.0359
<i>#Obs.</i>	15,885	15,885

*, **, and *** indicates significance at a 10%, 5%, and 1% level, respectively. T-statistics are in parentheses.

The tables above present the results from the following regression:

$$CAR(-1,1)_{it} = \beta_1 TONE_{it} + \beta_2 MA_R_{it} + \beta_3 TONE_{it} * MA_R_{it} + \beta_4 CAR(-60,-2)_{it} + \beta_5 SURP_{it} + \beta_6 ROA_{it} + \beta_7 SIZE_{it} + \beta_8 MTB_{it} + \beta_9 VOL_{it} + \sum IND + \sum YEAR + \sum QUARTER + \varepsilon_{it}$$

CAR(-1,1) is the cumulative abnormal return in the 3-day window around the release of earnings announcements. *CAR(-60,-2)* is the cumulative abnormal return from 60 days to 2 days prior to the release of earnings announcements. *TONE* is measured as 100 multiplied by the difference between the positive word proportion and negative word proportion. *MA_R* is obtained at <http://faculty.washington.edu/smcvay/abilitydata.html>. *SURP* is measured as the difference between the actual EPS and the average of the mean analyst forecast. *ROA* is earnings before interest and taxes (EBIT) scaled by total assets. *SIZE* is calculated as the logarithm of (1+total assets), market-to-book ratio (*MTB*) is the sum of market capitalization and long-term debt divided by total assets, and stock return volatility (*VOL*) is the volatility of monthly stock returns in the past 12 months.

Table 6. OLS regressions using abnormal tones

	(1) <i>ABTONE</i>	(2) <i>CAR(-1,1)</i>
<i>ABTONE</i>		-0.004 (-1.32)
<i>MA_R</i>	0.053*** (4.08)	0.003 (1.20)
<i>ABTONE * MA_R</i>		0.011** (2.16)
<i>CAR(-60,-2)</i>		0.003 (0.80)
<i>SURP</i>		0.065*** (20.40)
<i>ROA</i>		-0.003 (-0.27)
<i>SIZE</i>		-0.002*** (-3.54)
<i>MTB</i>		-0.004** (-7.16)
<i>VOL</i>		-0.011 (-0.67)
<i>Industry Fixed Effect</i>	Included	Included
<i>Year Fixed Effect</i>	Included	Included
<i>Quarter Fixed Effect</i>	Included	Included
F-test: $\beta_1 + \beta_3 = 0$		0.007*** (2.58)
R^2	0.0870	0.0359
<i>#Obs.</i>	15,885	15,885

*, **, and *** indicate significance at a 10%, 5%, and 1% level, respectively. T-statistics are in parentheses.

The table above presents the results from the following regression:

$$ABTONE_{it} = \alpha_1 MA_R_{it} + \sum IND + \sum YEAR + \sum QUARTER + \varepsilon_{it}$$

$$CAR(-1,1)_{it} = \beta_1 ABTONE_{it} + \beta_2 MA_R_{it} + \beta_3 ABTONE_{it} * MA_R_{it} + \beta_4 CAR(-60,-2)_{it} + \beta_5 SURP_{it} + \beta_6 ROA_{it} + \beta_7 SIZE_{it} + \beta_8 MTB_{it} + \beta_{10} VOL_{it} + \sum IND + \sum YEAR + \sum QUARTER + \varepsilon_{it}$$

ABTONE is the abnormal tone calculated as the residual in the following OLS regression:

$$TONE_{it} = \gamma_0 + \gamma_1 WEALTH_{it} + \gamma_2 ROA_{it} + \gamma_3 SIZE_{it} + \gamma_4 MTB_{it} + \gamma_5 VOL_{it} + \varepsilon_{it}$$

CAR(-1,1) is the cumulative abnormal return in the 3-day window around the release of earnings announcements. *CAR(-60,-2)* is the cumulative abnormal return from 60 days to 2 days prior to the release of the earnings announcements. *TONE* is measured as 100 multiplied by the difference between the positive word proportion and negative word proportion. *MA_R* is obtained at <http://faculty.washington.edu/smcvay/abilitydata.html>. *WEALTH* is the logarithm of the sum of three components: (1) aggregate value of shares owned by the CEO, (2) aggregate value of unexercisable options, and (3) aggregate value of unexercised exercisable options. *SURP* is measured as the difference between the actual EPS and the average of the mean analyst forecast. *ROA* is earnings before interest and taxes (EBIT) scaled by total assets. *SIZE* is calculated as the logarithm of (1+total assets), market-to-book ratio (*MTB*) is the sum of market capitalization and long-term debt divided by total assets, and stock return volatility (*VOL*) is the volatility of monthly stock returns in the past 12 months.

Table 7. OLS regressions of market reaction on high- and low-managerial ability subsamples

	MA SCORE ≤ median	MA SCORE > median
	(1)	(2)
	<i>CAR(-1,1)</i>	<i>CAR(-1,1)</i>
<i>TONE</i>	-0.0003 (-0.15)	0.006*** (2.63)
<i>CAR(-60,-2)</i>	0.005 (0.94)	0.0009 (0.18)
<i>SURP</i>	0.062*** (14.23)	0.071*** (14.64)
<i>ROA</i>	-0.002 (-0.11)	-0.002 (-0.11)
<i>SIZE</i>	-0.002** (-2.34)	-0.002*** (-2.92)
<i>MTB</i>	-0.004*** (-3.81)	-0.004*** (-5.99)
<i>VOL</i>	-0.013 (-0.55)	-0.010 (-0.42)
<i>Industry Fixed Effect</i>	Included	Included
<i>Year Fixed Effect</i>	Included	Included
<i>Quarter Fixed Effect</i>	Included	Included
<i>R</i> ²	0.0386	0.0404
<i>#Obs.</i>	7,944	7,941

*, **, and *** indicate significance at a 10%, 5%, and 1% level, respectively. T-statistics are in parentheses.

The table above presents the results from the following regression on two subsamples:

$$CAR(-1,1)_{it} = \beta_1 ABTONE_{it} + \beta_2 MA_R_{it} + \beta_3 ABTONE_{it} * MA_R_{it} + \beta_4 CAR(-60,-2)_{it} + \beta_5 SURP_{it} + \beta_6 ROA_{it} + \beta_7 SIZE_{it} + \beta_8 MTB_{it} + \beta_{10} VOL_{it} + \Sigma IND + \Sigma YEAR + \Sigma QUARTER + \varepsilon_{it}$$

CAR(-1,1) is the cumulative abnormal return in the 3-day window around the release of earnings announcements. *CAR(-60,-2)* is the cumulative abnormal return from 60 days to 2 days prior to the release of earnings announcements. *TONE* is measured as 100 multiplied by the difference between the positive word proportion and negative word proportion. *SURP* is measured as the difference between the actual EPS and the average of mean analyst forecast. *ROA* is earnings before interest and taxes (EBIT) scaled by total assets. *SIZE* is calculated as the logarithm of (1+total assets), market-to-book ratio (*MTB*) is the sum of market capitalization and long-term debt divided by total assets, and stock return volatility (*VOL*) is the volatility of monthly stock returns in the past 12 months.

Appendix

Variable	Description	Definition
<i>TONE</i>	Tone of earnings announcements	$100 * (\text{Positive word count} - \text{Negative word count}) / \text{Total word count}$
<i>ABTONE</i>	Abnormal tone	Residual from model (3): $TONE_{it} = \gamma_0 + \gamma_1 LOGW_{it} + \gamma_2 ROA_{it} + \gamma_3 SIZE_{it} + \gamma_4 MTB_{it} + \gamma_5 VOL_{it} + \varepsilon_{it}$
<i>MA_R</i>	Decile rank of managerial ability score	Downloaded from http://faculty.washington.edu/smcvay/abilitydata.html
<i>WEALTH</i>	Logarithm of CEO equity-based wealth	Logarithm of the aggregate dollar amount of CEO's firm-specific equity-based wealth, which includes total value of shares owned by the CEO, value of unexercisable options (opt_unex_unexer_est_val in ExecuComp), and value of unexercised exercisable options (opt_unex_exer_est_val in ExecuComp)
<i>ROA</i>	Return on assets	Earnings before interest and taxes/Total assets
<i>SIZE</i>	Firm size	Logarithm of total assets
<i>MTB</i>	Market-to-book ratio	(Market capitalization + Long-term debt)/Total assets
<i>VOL</i>	Stock return volatility	Volatility of monthly stock returns in the past 12 months
<i>SURP</i>	Earnings surprise	Actual EPS – Mean of analyst forecast
<i>CAR(-1,1)</i>	Cumulative abnormal return	Cumulative abnormal return for the (-1,1) window, with day 0 being the earnings announcement day
<i>CAR(-60,-2)</i>	Cumulative abnormal return	Cumulative abnormal return for the (-60,-2) window, with day 0 being the earnings announcement day

Endnotes:

¹ Empirical analyses are performed to identify which of the two potential channels, management private information or management optimism, drives the results of the positive association between managerial ability and the tone of earnings announcements. The empirical evidence drawn from the subsample tests and interaction terms reveals no statistical difference in the strength of the association between managerial ability and tone of earnings announcement, which rules out managerial opportunism as a significant channel and supports the argument that management private information is the main channel of the effect of managerial ability on the tone of earnings announcements.

² Specifically, Demerjian *et al.* (2013) find evidence that managerial ability improves earnings quality by showing that more able management teams are associated with fewer subsequent restatements, higher earnings and accrual persistence, and higher quality accrual estimations. Krishnan and Wang (2015) suggest that managerial ability is informative to auditors in lowering audit risk and improving auditors' reporting decisions.

³ This paragraph relies heavily on Krishnan and Wang (2015, p. 142).

⁴ Please refer to Demerjian *et al.* (2012, 2013) and Krishnann and Wang (2015) for a discussion of how the managerial ability score is calculated. The managerial ability rankings used in this study are downloaded from <http://faculty.washington.edu/smcvay/abilitydata.html>.

⁵ Additional analysis is performed by regressing the decile rank of *TONE* against the decile rank of *MA_R*; the coefficient of *MA_R* is 0.47. This suggests that as *MA_R* increases by one decile rank, *TONE* increases by 0.47 decile rank. Moreover, the analysis using the standardized coefficient suggests that *MA_R* is the second most important explanatory variable for *Tone*, following *ROA*. *MA_R* is more important than CEO-equity based wealth, firm size, and growth.