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Counterparty Responses to Managerial Overconfidence

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Citation

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May 2012 – Comments Welcome

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Abstract

Existing research links CEO personality traits to a number of corporate decisions including overinvestment, external acquisitions, and earnings management. These findings raise the question of whether counterparties distinguish between differences in individual CEO behavior, and how they respond to it. We focus on two key counterparties – auditors and credit rating agencies – and examine whether audit fees and credit ratings are affected by CEO overconfidence. We find a positive association between audit fees and CEO overconfidence, suggesting that auditors exert more effort or increase the risk premium associated with auditing firms with more overconfident CEOs. We also find a significant negative association between CEO overconfidence and credit ratings, suggesting that overconfident CEOs are associated with higher agency costs of debt and higher credit risk.

I. Introduction

Recent studies empirically examine the personality of CEOs, and how it affects decisions such as acquisitions, leverage, earnings management, management forecasting, and tax avoidance (e.g., Bamber, Jiang, and Wang 2010; Bertrand and Schoar 2003; Frank and Goyal 2007; Malmendier and Tate 2005, 2008; Dyreng, Hanlon, and Maydew 2010; Hribar and Yang 2011; Schrand and Zechman 2011).[1] In some cases, the researcher looks for common characteristics by identifying and following CEOs as they change firms over time, without specifying the underlying characteristics of the executive. In other cases, researchers attempt to identify ex-ante characteristics that are expected to affect decisions in a predicted direction. The common theme across these studies is the premise that individual psychology is a persistent determinant of important corporate decisions. However, a less explored consequence of these studies is the extent to which parties that transact with the firm recognize the CEO's personality and modify their contracts with the firm (explicit or implicit) to account for the anticipated effect of the CEO's personality on key firm decisions.

Because an individual's personality is a multi-dimensional construct, we focus on one dimension of CEO personality that has been studied extensively in recent finance and accounting literature: overconfidence. We examine how key counterparties to the firm respond when contracting with CEOs that exhibit varying degrees of overconfidence. In our first setting, we examine whether firms' auditors charge different fees depending on the CEO's level of overconfidence. There are several reasons why CEO overconfidence could affect audit fees. First,

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[1] The first strand of research documents the existence of "manager styles" (i.e., manager fixed effects) across several corporate decisions (Bertrand and Schoar 2003; Frank and Goyal 2007; Bamber et al. 2010; Dyreng et al. 2010; Yang 2012). The second stream of research examines the effect of a specific individual trait (e.g., overconfidence) on firms' investment, financing, forecasting, and earnings management decisions (Malmendier and Tate 2005, 2008; Hribar and Yang 2011; Schrand and Zechman 2011).

a more overconfident CEO should increase litigation risk because of the direct link between CEO overconfidence and financial reporting decisions. For example, Schrand and Zechman (2011) find overconfident CEOs are more likely to commit accounting fraud based on SEC Accounting and Auditing Enforcement Releases (AAERs). Additionally, Hribar and Yang (2011) find that overconfident CEOs are more likely to voluntarily issue optimistic earnings forecasts which they subsequently miss.

Second, more overconfident CEOs should increase litigation risk because of their investment decisions and how their investments affect financial reporting. Prior studies document that overconfident CEOs tend to engage in non-value maximizing activities such as excess investment and unsuccessful acquisitions (Malmendier and Tate 2005, 2008). When managers engage in value-destroying activities, they are more likely to also engage in earnings management to mask bad outcomes from their decisions (Christie and Zimmerman 1994).

Third, the extent of CEO overconfidence affects audit fees directly through the required level of audit effort. Audit texts and the COSO framework suggest that tone at the top is an important consideration when assessing the control risk of a firm.[2] Additionally, theory on CEO overconfidence demonstrates that overconfident CEOs underinvest in information acquisition and provide information of poorer quality to shareholders and the board (Goel and Thakor 2008). This suggests that auditors will need to increase substantive testing to maintain a desired level of overall audit risk for firms with poorer internal information environments due to CEO overconfidence.

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[2] COSO considers "tone at the top" an important factor when describing management's responsibility for maintaining a positive control environment in their Internal Control – Integrated Framework report (COSO 1992). Similarly, AU Section 319 requires auditors to obtain sufficient understanding of a firm's internal control environment by inquiring and observing management in planning the audit.

In our second setting, we examine whether credit analysts are able to identify different CEO personalities and use that information in analyzing the firm's credit risk. Agency theory suggests that one of the key components of the agency cost of debt is the 'asset substitution' or 'risk incentive' problem identified by Jensen and Meckling (1976). The main argument is that managers will substitute riskier projects because their equity position can be viewed as a call option on the firm, and call options have values that increase in the risk of the underlying asset. As such, the agency cost of debt is increasing in the amount of leverage. Combining this with recent research on overconfidence suggests that agency costs of debt will be higher if CEOs are more overconfident. For example, Malmendier and Tate (2005) find more overconfident CEOs exhibit a tendency to overinvest, and rely more heavily on debt financing. Frank and Goyal (2007) show that managerial fixed effects are important for explaining the amount of leverage, but that the effect is well explained by measurable traits such as age, gender, tenure, or educational background. These studies provide a direct link between CEO overconfidence and their investing and financing choices, both of which increase the agency costs of debt.

Also, similar to auditors, credit rating agencies cite tone at the top as an important consideration in their rating decisions. For example, in their 2008 Corporate Ratings Criteria, Standard & Poor's notes that evaluation of top management is "an input for both business risk and financial risk profiles – reflecting the fact that management's strategy, decisions, and policies affect all aspects of a company's activity" (S&P 2008, p. 32). We therefore predict that, as with audit fees, the ratings issued by credit rating agencies will be affected by the degree of overconfidence exhibited by the CEO.[3]

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[3] Our analysis complements the work of Sunder, Sunder, and Tan (2010), who find that bond investors restrict merger and investment activities of overconfident CEOs through the use of direct restrictions on investment and through financing restrictions.

Auditors and credit rating analysts share some characteristics that make them good research settings to examine how counterparties respond to CEO behavior. First, both parties have access to management and are therefore able to perform their own assessment of the CEO's personality. Second, the nature of the relationship between the firm and both auditors and credit rating agencies is such that overconfidence has a predictable effect on the role being served by the counterparties. For reasons discussed above, auditing the financial statements and issuing a credit rating are both expected to be directly affected by the types of business decisions that existing research shows overconfident managers are prone to making (e.g., overinvestment, poor acquisitions, overly optimistic forecasts, and earnings management).

We measure the level of CEO overconfidence in two ways. First, following past research, we determine the relative extent of overconfidence based on popular press characterizations of the CEO (e.g., Malmendier and Tate 2008; Jin and Kothari 2008; Hirshleifer, Low, and Teoh 2011; Hribar and Yang 2011). Specifically, we use a sample of 974 CEOs listed on the Fortune 500 from 2000 to 2007, and determine whether the CEO is more overconfident or more conservative based on the descriptions of the CEO in published articles. Because we are interested in CEOs that fall on both ends of the overconfidence spectrum, we define search terms to capture characteristics that are expected to be both positively and negatively associated with overconfidence, and use the frequency of these descriptions to place the CEO somewhere along the overconfidence continuum. Following Hribar and Yang (2011), we measure this trait at the CEO level (not CEO-year) since it is a personality trait that should be relatively stable across time. This approach also reduces the possibility of unidentified omitted variables that influence both the press characterizations and the counterparty's response, and minimizes the likelihood that other (unidentified) time-varying economic events explain our results. Our second measure

uses the press-based characterization as one variable measuring overconfidence, and adds information about CEO option-exercising behavior and the extent of management forecast bias. We use factor analysis to extract the common variance from these three variables and use this as a second proxy for overconfidence.

Following Simunic (1980), we define audit fees as a function of (1) audit effort and (2) the present value of expected losses to the auditor from being involved with the company's audit. The second component typically arises from litigation. We expect auditors to consider firms with more overconfident CEOs to require more audit effort and to have a higher litigation risk. As such, we expect to observe a positive association between the extent of CEO overconfidence and audit fees. We identify a set of determinants based on prior literature that we expect to be associated with audit fees (e.g., Simunic 1980; Larcker and Richardson 2004; Hanlon, Krishnan, and Mills 2012; Venkataraman, Weber, and Willenborg 2008). The determinants are intended to measure the resources required to complete the audit, with various proxies for size and complexity. Controlling for these determinants, we observe a significant positive association between CEO overconfidence and audit fees. We also examine whether changes in the personality of the CEO, stemming from a change in the CEO, are associated with changes in audit fees. We find that when a firm hires a new CEO who is characterized as more overconfident, auditors respond by increasing fees.

To examine the association between CEO overconfidence and credit ratings we convert Standard & Poor's senior debt ratings from letters into numbers, with larger numbers indicating a higher rating. We then estimate an ordered logistic regression controlling for firm characteristics such as size, profitability, and risk that prior research has shown are associated with the cost of debt (e.g., Kaplan and Urwitz 1979; Ahmed, Billings, Morton, and Stanford-Harris 2002). Our

results indicate a significant negative association between credit ratings and the extent of CEO overconfidence. This result is consistent with credit analysts preferring less overconfident managers and reducing their rating for firms with highly overconfident CEOs. We also estimate a changes specification where we examine changes in credit ratings in response to changes in CEO overconfidence, again based on CEO turnover. Consistent with expectations, we find that replacing the existing CEO with a more overconfident CEO is negatively associated with changes in credit ratings.

One challenge with our research is that we are interested in modeling the effect of overconfidence on audit fees and credit ratings after controlling for the behavior that is predicted by overconfidence. Stated differently, we are interested in showing that CEO overconfidence affects contracting even after controlling for the outcomes predicted by overconfidence, such as acquisitions and earnings management. We predict that after controlling for the business decisions made by overconfident CEOs, the counterparties will still incorporate the level of overconfidence in their fees and credit ratings because of the anticipated future actions of the CEO or the unobservability of potential actions taken by the CEO. In essence, we are trying to determine whether CEO overconfidence provides *incremental* information about audit fees and credit ratings beyond observable and measurable business decisions. We expect CEO overconfidence provides auditors and credit analysts with an additional useful signal about both litigation risk and credit worthiness beyond the information conveyed by other firm characteristics. That is, when these contracting parties observe a more overconfident CEO, they anticipate it is more likely that CEO has or will make investment and financial reporting decisions that will result in outcomes such as default, restatements, or SEC investigations.

Our paper contributes to three areas of research. First, we extend the literature that examines the association between managerial characteristics and corporate decisions. Our analysis suggests counterparties can observe the personality traits of executives and contract with the firm accordingly. We conclude that, in addition to the direct costs stemming from the suboptimal business decisions of overconfident CEOs, there are significant indirect costs imposed by counterparties that bear risk associated with these decisions. Second, we extend research examining the determinants of audit fees by showing that auditors increase fees when managers exhibit characteristics that increase the auditors' litigation risk. Third, we increase the understanding of the factors credit rating agencies use in evaluating firms' creditworthiness. Consistent with the claims made by the agencies, our results suggest that credit ratings are adjusted based on an assessment of management characteristics.

The remainder of the paper proceeds as follows. The next section reviews the relevant prior literature. Section 3 describes the sample selection and variable definitions. We discuss the research design and empirical results for tests of the association between CEO overconfidence, audit fees, and credit ratings in sections 4 and 5, respectively. Section 6 concludes the paper.

II.   **Hypothesis Development**

2.1 Audit Fees and CEO Overconfidence

O'Keefe, Simunic, and Stein (1994) find auditors charge higher fees for riskier clients. Using confidential survey data, Bell, Landsman, and Shackelford (2001) find that when auditors deem inherent risk to be high they respond by increasing the number of audit hours. Krishnan, Pevzner, and Sengupta (2011) point out that both the risk of earnings management and litigation risk increase auditors' expected losses because they increase the probability of litigation against

the auditor. Reynolds and Francis (2000) note that auditors could also lose reputational capital when their clients are sued. Building on the premise that auditors increase fees when they deem accounting quality to be low, Hribar, Kravet, and Wilson (2011) find the unexplained component of audit fees is positively associated with future restatements and cases of fraud. Together, these studies suggest audit fees contain information about auditors' private assessment of the fraud and litigation risk posed by their clients.

Our objective is to determine whether auditors consider aspects of the CEO's personality when making their assessment of the business risk posed by their client.[4] Existing research about the effect of CEO overconfidence on business decisions suggests that CEO overconfidence could serve as a red-flag to auditors of increased litigation risk. Malmendier and Tate (2005) predict that overconfident managers overestimate the returns to their investment projects and view external financing as overly costly. Consistent with their predictions, they find that investments of CEOs identified as being overconfident are significantly more sensitive to cash flow than that of other CEOs. Hribar and Yang (2011) find that overconfident CEOs are more likely to miss their own forecasts of earnings. Making overly optimistic earnings forecasts and suboptimal investments is likely to put overconfident CEOs in a position where they have a strong incentive to manage earnings in order to mask their poor performance.

Consistent with overconfident CEOs being under excessive pressure to manage earnings, Schrand and Zechman (2011) find overconfident CEOs are more likely to commit accounting fraud. They argue that overconfident managers are likely to view earnings shortfalls as temporary and are therefore more inclined to engage in earnings management that they believe will be obscured by strong future performance. Schrand and Zechman (2011) speculate that

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[4] We define an auditor's business risk as the risk the auditor will suffer losses because of their association with a particular client stemming from either litigation or impairment to the auditor's reputation.

when performance does not improve, the overconfident CEO is forced to engage in more egregious forms of earnings management, eventually culminating in fraud. As such, the degree to which the CEO is either more or less overconfident represents a useful signal to auditors of increased fraud risk and litigation risk.

The above research is somewhat one-sided in that it primarily portrays the costs of CEO overconfidence, and seems to raise the question as to why firms would hire or retain overconfident CEOs in equilibrium. However, overconfidence is a characteristic that also has advantages. For example, Hirshleifer et al. (2011) find that overconfident CEOs are more innovative in that they generate more patents. From a shareholder's perspective, it may not be a suboptimal decision to have an overconfident CEO run the firm. In addition, it could well be that overconfidence is associated with likelihood of promotion in the labor market, given that one effect of overconfidence is a higher variance of outcomes due to the riskier project selection (Goel and Thakor 2008).

Our paper provides an additional cost associated with overconfidence. In addition to the effects of CEO personality on auditors' risk assessments, we also expect auditors to take into account the greater amount of effort required to audit firms with overconfident CEOs. Goel and Thakor (2008) analyze the behavior of managers and show that CEOs who are overconfident about their private information underinvest in information acquisition, leading them to provide information of lower quality to investors and the board.[5] If overconfidence leads to suboptimally low information production and a poorer internal information environment, then we expect auditors to also take this into account when assessing their required level of audit effort. Overall, this leads to our first hypothesis:

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[5] The implicit assumption here is that information production is not the CEO's primary task, which is consistent with CEOs being mainly responsible for strategic, operational, and financial decisions.

H1: *Audit fees are positively associated with CEO overconfidence.*

Of course, in order for the CEO's personality to be a useful signal, the auditor must be able to recognize more overconfident CEOs from less overconfident ones, and understand the implications of this for the business risk posed by a client. Consistent with auditors being able to identify and understand the implications of CEO overconfidence, Krishnan et al. (2011) find auditors charge higher fees for firms issuing frequent and optimistic management forecasts. Similarly, Hogan and Wilkins (2008) find audit fees are higher in the year prior to disclosure of internal control deficiencies for a sample of firms with disclosed deficiencies. However, it is not clear from both of these studies whether the auditors are adjusting their fees as a response to the observed optimism in management forecasts, the likelihood of earnings management, or the personalities of the CEOs that give rise to these outcomes. In order to determine whether the actual traits of the CEO provide auditors with incremental useful information, our research design attempts to measure individual traits directly and then control for the outcomes of business decisions that prior research has shown to be associated with overconfidence (e.g., acquisitions and abnormal accruals).

2.2 Credit Ratings and CEO Overconfidence

The second setting where we examine how counterparties respond to CEO personality is credit ratings. Similar to auditors, debtholders bear agency costs associated with excessively risky or optimistic decisions of overconfident managers. Although shareholders can benefit from risky project choices that increase the variance of the firm's future cash flows, these investments likely increase default risk to the detriment of the debtholders. Similar to auditors, credit analysts have private access to management and are expected to assess the personal traits of top

executives, and use this information. For these reasons, we believe this is another powerful setting to examine how counterparties respond to CEO personality.

Credit ratings have important implications for bond yields and bank capital requirements. These ratings are likely to be of particular importance to firms with overconfident CEOs because existing research shows overconfident CEOs tend to avoid equity financing in favor of either debt or internal funds (Malmendier and Tate 2005). Sunder et al. (2010) build on this work by examining how debt investors contract with firms with overconfident CEOs. Sunder et al. (2010) predict bondholders will require more covenant protection for firms with overconfident CEOs because these CEOs have a tendency to overinvest. They find evidence consistent with bondholders placing additional restrictions on the investments of firms with overconfident CEOs. To the extent bondholders place additional restrictions on firms with overconfident CEOs and those restrictions reduce the likelihood of future default, we may not expect to observe an association between credit ratings and CEO overconfidence. However, the fact that Malmendier and Tate (2005, 2008) document that overconfident CEOs tend to overinvest and make more value-destroying acquisitions suggests these additional investment restrictions are not sufficient in all cases to prevent CEOs from making suboptimal decisions.

In addition to the research linking overconfidence to investment decisions, there is a second reason to expect a negative association between overconfidence and credit ratings. Hribar and Yang (2011) find that overconfident CEOs are more likely to issue earnings forecasts with greater error and optimistic bias. Schrand and Zechman (2011) find a positive association between CEO overconfidence and incidence of fraud. Together, these results suggest firms with overconfident CEOs produce lower quality accounting information. Financial reports provide credit analysts with a starting point to forecast future cash flow amounts, volatility, and sources.

Credit markets also react significantly to information in management forecasts (Shivakumar, Urcan, Vasvari, and Zhang 2011). Consequently, low-quality accounting information is likely to be associated with lower credit ratings because the analysts' primary sources of information for forecasting cash flows are less reliable. This leads to our second hypothesis:

H2: *Credit ratings are negatively associated with CEO overconfidence.*

Similar to our analysis of audit fees, we control for the outcomes of the decisional biases of overconfident CEOs when establishing the link between CEO personality and credit ratings. Specifically, we include a measure of accrual quality in our credit rating model as an additional control variable because Ashbaugh-Skaife, Collins, and LaFond (2006) find that higher accrual quality is positively associated with credit ratings. Our objective then is to determine whether credit analysts' assessment of the CEO's personality is incrementally informative about variation in credit ratings.

III. Sample Selection and Variable Definitions

We start with a sample of 640 firms and 974 CEOs listed in the Fortune 500 during the period of 2000 through 2007. We eliminate firms in the financial services industry (SIC codes 60-69) and observations that are missing audit fee data in *Audit Analytics*. We require observations to have sufficient data in *Compustat* to compute a set of control variables in the audit fee model. Our selection criterion results in a sample of 490 firms, 758 CEOs, and 2,833 firm-years, which we refer to as the audit fee sample. To test the association between credit ratings and CEO personality, we further require observations to have Standard & Poor's senior debt ratings and sufficient data in *Compustat* to compute a set of control variables in the credit rating model. This

procedure results in a sample of 369 firms, 568 CEOs, and 2,158 firm-years, which we refer to as the credit rating sample.

Our measure of overconfidence uses popular press characterizations of the CEO. Unlike measures based on equity holdings or option-exercising behavior, press characterizations are not a choice of the CEO, and are less susceptible to concerns about endogeneity or omitted variables.[6] We search for articles that mention CEOs in the New York Times, Business Week, Financial Times, the Economist, Forbes, Fortune, Time, and the Wall Street Journal. We look for words that describe the CEO and are either positively or negatively associated with overconfidence. Specifically, we count the number of articles describing the CEO as confident or optimistic which are expected to be positively associated with overconfidence, and conservative or not confident as terms that are expected to be negatively associated with overconfidence. Specifically, we use the search terms "confident" or "confidence" [*Confident*]; "optimistic" or "optimism" [*Optimistic*]; "conservative", "reliable", "steady", "practical", frugal", or "cautious" [*Conservative*]; and "not confident" or "not optimistic" [*Not Confident*].[7] We also count the number of articles that describe the CEO during the whole sample period (*TOTAL*) to control for total press coverage of a CEO. Using these statistics, we construct a measure of CEO personality that is increasing in CEO confidence and decreasing in CEO conservatism as follows:

CONF_CON = [(*Confident*+ *Optimistic*)-(*Conservative* + *Not Confident*)] / *TOTAL*.

CONF_CON is a continuous variable that measures the relative frequency with which a CEO is described as confident or optimistic versus as conservative or not confident. Note that

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[6] Similar to Malmendier and Tate (2008), Hirshleifer et al. (2011) also show that there is a high correlation between their options-based and press-based measures, with the press-based measure being more stringent in identifying overconfident CEOs.

[7] While it is possible for CEOs to use more confident/optimistic language around specific firm events, Malmendier and Tate (2008) and Hribar and Yang (2011) do not find systematic differences between article types (i.e., confident or optimistic mentions) and sources (i.e., journalist, CEO, other), which mitigates the concern that the press mentions are driven by contemporaneous economic events.

CONF_CON is fixed for each CEO since *Confident*, *Optimistic*, *Conservative*, *Not Confident*, and *TOTAL* are article counts for the entire sample period.[8] In addition to the continuous measure of CEO personality (*CONF_CON*), we also construct a discrete variable that takes the value of one (minus one) [zero] if the number of articles characterizing the CEO as confident or optimistic is greater than (less than) [equal to] the number of articles describing the CEO as conservative or not confident. We refer to this variable as *CONF_DIS*. Similar to *CONF_CON*, *CONF_DIS* is increasing in confidence.[9]

As a second measure, we construct a measure of CEO overconfidence as the first factor (*FACTOR*) obtained from conducting a factor analysis on the continuous press-based measure of overconfidence (*CONF_CON)*, an options-based measure of overconfidence (*DELAYOPTIONS*), and the management earnings forecast bias (*BIAS*). Following Schrand and Zechman (2011), we use the value of the CEO's unexercised but exercisable options on *Execucomp* to construct *DELAYOPTIONS*. We obtain this by computing the log of the mean value of each CEO's unexercised but exercisable options. We then assign this value to years in which data on unexercised but exercisable options are available for each CEO and years in which information about the CEO's unexercised but exercisable options are not available. We do so because we believe that the individual trait that we are interested in should be relatively stable across time. We also proxy for CEO overconfidence using the optimistic bias in management forecasts because Hribar and Yang (2011) find that overconfident CEOs are more likely to provide optimistic forecasts. To construct *BIAS*, we compute the mean of the difference between each

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[8] Refer to Hribar and Yang (2011) for more detailed information about the construction of the measures of CEO overconfidence.

[9] For consistency with prior research, the set of CEOs that are more often described as confident or optimistic are referred to as "overconfident", despite the fact that this measure does not allow us to calibrate the appropriate level of confidence. However, Malmendier and Tate (2008) show that this measure is highly correlated with their proprietary measure of overconfidence using CEOs' equity portfolio holdings.

CEO's earnings forecasts and actual earnings, scaled by beginning-of-year price.[10] Similar to the construction of *DELAYOPTIONS*, we then assign this value to years in which CEOs issue management earnings forecasts and years in which CEOs do not. CEOs that are not on the *Execucomp* database or have never provided forecasts are dropped from this analysis, which results in a much smaller sample size.

IV.   Audit Fees and CEO Overconfidence

4.1 Research design

We test the association between audit fees and CEO personality by estimating the following regressions for the audit fee sample:

$$LNAUDFEES = \beta_0 + \beta_1 CONFIDENT + \beta_2 TOTAL + \beta_3 BIG4 + \beta_4 LNASSETS +$$

$$\beta_5 BUS\ SEG + \beta_6 FGN + \beta_7 INV + \beta_8 REC + \beta_9 DEBT + \beta_{10} INCOME + \beta_{11} LOSS +$$

$$\beta_{12} AUD\ OPIN + \beta_{13} CLIENT + \beta_{14} LITRISK + \beta_{15} LNABSTACC + \beta_{16} LNABSBTD +$$

$$\beta_{17} ICD + \beta_{18} M\&A + \varepsilon \ (1)$$

LNAUDFEES is the log of audit fees and *CONFIDENT* represents our measures of CEO overconfidence (*CONF_CON*, *CONF_DIS*, and *FACTOR*). The definitions of the variables are provided in the Appendix. To control for potential serial and cross-sectional correlations among residuals, we cluster standard errors by CEO and include year indicator variables. We also include industry indicator variables to control for industry fixed effects.

We identify a set of control variables based on prior research on determinants of audit fees (Simunic 1980; Gul, Chen, and Tsui 2003; Hanlon et al. 2012). We include the log of total assets (*LNASSETS*), the number of business segments (*BUS SEG*), the ratio of foreign sales to total

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[10] We restrict the sample to point management earnings forecasts and retain the last forecast for forecasts with multiple revisions.

assets (*FGN*), the ratio of inventory to total assets (*INV*), the ratio of receivables to total assets (*REC*), and the ratio of debt to total assets (*DEBT*) to control for the complexity of the audit and the resources required for the audit. We also include operating income deflated by total assets (*INCOME*) and an indicator variable that takes the value of one when income is negative and zero otherwise (*LOSS*) to proxy for inherent risk. Audit Opinion (*AUD OPIN*) is an indicator variable that equals 1 if a firm receives a modified audit opinion and 0 otherwise, where a modified audit opinion is defined as anything other than a standard unqualified audit opinion coded as 1 by *Compustat*. *CLIENT* is a proxy for the importance of the client to the audit firm measured as the number of years that a firm has been a client for its auditor. We include an industry-based indicator variable (*LITRISK*) to proxy for litigation risk (Francis, Philbrick, and Schipper 1994). The log of the absolute value of total accruals (*LNABSTACC*) and the log of the absolute value of book-to-tax differences (*LNABSBTD*) are included to proxy for a firm's accounting quality. *ICD* is an indicator variable set equal to one for firms receiving a qualified opinion on their internal controls, and zero for all other observations. *M&A* is an indicator variable that takes the value of 1 if a firm engages in mergers and acquisitions, where sum of the deal values is greater than 5% of total assets, and zero for all other observations. We expect audit effort and fees to increase in the presence of *M&A*. Finally, we include the total number of articles for the entire sample period (*TOTAL*).[11]

Next, we investigate whether changes in CEO overconfidence that stem from a change in the CEO are associated with changes in audit fees. Because we define overconfidence as a stable individual characteristic, changes in overconfidence can only occur with CEO turnover. To the extent that firm characteristics are relatively stable in two adjacent years, a changes model helps

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[11] All of the control variables are winsorized at the 1st and 99th percentiles except for *TOTAL*, *BIG4*, *BUS SEG*, *LOSS*, *AUD OPIN*, *CLIENT*, *LITRISK*, *ICD*, and *M&A*.

mitigate potential concerns that our findings are attributed to unobserved heterogeneity in firm characteristics. All variables are defined as in the previous specification. Specifically, we estimate the following equation:

$$\Delta LNAUDFEES =$$

$$\beta_0 + \beta_1 \Delta CONFIDENT + \beta_2 \Delta TOTAL + \beta_3 \Delta BIG4 + \beta_4 \Delta LNASSETS + \beta_5 \Delta BUS\ SEG +$$

$$\beta_6 \Delta FGN + \beta_7 \Delta INV + \beta_8 \Delta REC + \beta_9 \Delta DEBT + \beta_{10} \Delta INCOME + \beta_{11} \Delta LOSS +$$

$$\beta_{12} \Delta AUD\ OPIN + \beta_{13} \Delta CLIENT + \beta_{14} LITRISK + \beta_{15} \Delta LNABSTACC + \beta_{16} \Delta LNABSBTD +$$

$$\beta_{17} \Delta ICD + \beta_{18} \Delta M\&A + \varepsilon \quad (2)$$

To control for potential inter-temporal and cross-sectional dependence among residuals, we cluster standard errors by CEO and include year indicator variables.

4.2 Empirical results

Table 1 presents descriptive statistics for the variables used in our analyses. The average *CONF_CON* is 0.017 with a median of zero, while the percentage of CEOs classified as overconfident is 26% using the discrete measure.[12] An average CEO receives approximately 67 press mentions during our sample period and 99% of the firms in our sample are audited by a Big 4 audit firm. Panel A of Table 2 displays the correlations for the audit fee sample. As expected, all three proxies of CEO overconfidence (*CONF_CON*, *CONF_DIS*, and *FACTOR*) are positively and significantly correlated with *LNAUDFEES*. Consistent with prior literature, *LNAUDFEES* is positively correlated with the variables that proxy for firm complexity, such as *LNASSETS*, *BUS SEG*, *FGN*, and *REC*. *LNAUDFEES* is also positively correlated with *LNABSTACC* and

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[12] Hirshleifer et al. (2011) find that 8% of the CEOs in their sample are classified as overconfident using a CEO-year press-based measure for an earlier sample period (1993-2003). However, this value would be much higher if a CEO who is identified as overconfident in any year remains so throughout the sample period.

LNABSBTD, two variables that proxy for accounting quality. Overall, the correlation analyses provide preliminary evidence that audit fees are positively associated with CEO overconfidence.

[Insert Tables 1 and 2]

Table 3 provides the estimation results of equation (1). As predicted, Model 1 reveals that the coefficient estimate on *CONF_CON* is positive and statistically significant (β_1=1.082, *p*-value=0.001). Model 2 finds that our discrete measure of CEO personality also exhibits a statistically significant positive coefficient (β_1=0.120, *p*-value=0.001). The coefficient on FACTOR is also positive and significant (β_1=0.057, *p*-value=0.022). Overall, these results are consistent with auditors charging lower audit fees for clients with CEOs that are less overconfident. To assess the economic significance of the association between audit fees and CEO personality, we examine increases in audit fees when we move from the first quartile to the third quartile of *CONF_CON*. We find that moving from the first quartile to the third quartile of the distribution of *CONF_CON* increases audit fees by $1.04 million.[13] The increase comprises 29% of the mean audit fees ($1.04 million/$3.58 million), which suggests that CEO overconfidence has an economically significant impact on audit fees.[14]

[Insert Table 3]

The estimation results of equation (2) are presented in Table 4. The findings are qualitatively consistent with those in Table 3. The coefficient estimates on *ΔCONF_CON* and *ΔCONF_DIS* are positive (β_1=0.152 for *ΔCONF_CON* and β_1=0.056 for *ΔCONF_DIS*) and the

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[13] The increase in fees is calculated as EXP (0.033 × 1.082) = $1.04 million.

[14] In supplemental analysis (untabulated) we partition our overconfidence measure into two separate measures. The first measure (*OVER_CON*) is equal to *CONF_CON* when *CONF_CON* is > 0 and *OVER_CON* = 0 otherwise. The second measure *(CONSERVATIVE_CON)* is equal to -1 * *CONF_CON* when *CONF_CON* is < 0 and *CONSERVATIVE_CON* = 0 otherwise. Interestingly, when we re-estimate equation (1) and examine these two components separately both are associated with audit fees in the predicted direction (β_1=1.349, p value =0.000 for *OVER_CON* and β_1=-0.814, p value = 0.111 for *CONSERVATIVE_CON*). This result suggests the observed association between our measure of overconfidence and audit fees is because firms with less overconfident CEOs are charged lower audit fees and firms with more overconfident CEOs are charged higher audit fees.

coefficient estimate on *ΔCONF_DIS* is significant (*p*-value=0.01). This is consistent with auditors increasing audit fees when a client hires a new CEO that exhibits greater overconfidence. Changing from a less overconfident CEO to a more overconfident CEO also appears to have economically significant impact on audit fees. Moving from a less overconfident CEO to a more overconfident CEO for a given firm increases audit fees by 6%.[15] However, inconsistent with expectations, the coefficient estimate on FACTOR is negative and insignificant. Taken as a whole, the findings of Table 3 and Table 4 support our hypothesis that audit fees are positively associated with the level of CEO overconfidence.

[Insert Table 4]

V.   Credit Ratings and CEO Overconfidence

5.1 Research design

To examine whether CEO overconfidence is associated with credit ratings, we estimate an ordered logistic regression for the credit rating sample as follows:

$$\Pr(RATINGS) = \beta_0 + \beta_1 CONFIDENT + \beta_2 TOTAL + \beta_3 DEBT + \beta_4 INCOME +$$

$$\beta_5 LOSS + \beta_6 LNINT\_COV + \beta_7 LNASSETS + \beta_8 CAP\_INTEN + \beta_9 CHAEQ + \beta_{10} RD +$$

$$\beta_{11} RET + \beta_{12} SDRET + \beta_{13} SDINCOME + \beta_{14} MB + \beta_{15} AQ + \beta_{16} TRANSP + \beta_{17} GINDEX +$$

$$\varepsilon \ (3)$$

Standard & Poor's assigns senior debt ratings ranging from AAA to D to debt issuers. We convert Standard & Poor's senior debt ratings from these letters into numbers ranging from 20 to 1 with larger numbers indicating a higher rating (*RATINGS*). Again, *CONFIDENT* alternates between our measures of CEO overconfidence (*CONF_CON*, *CONF_DIS*, and *FACTOR*), and is

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[15] The increase in fees is calculated as EXP (0.056) = 1.06.

increasing in CEO overconfidence. Variable definitions are provided in the Appendix. To control for potential inter-temporal and cross-sectional dependence among residuals, we cluster standard errors by CEO and include year indicator variables.

We select a battery of determinants that prior work shows are associated with credit ratings (e.g., Kaplan and Urwitz 1979; Ahmed et al. 2002; Ashbaugh-Skaife et al. 2006; Cheng and Subramanyam 2008). To proxy for a firm's financial risk, we include variables that capture firm characteristics: the ratio of debt to total assets (*DEBT*), the ratio of operating income to total assets (*INCOME*), an indicator variable that equals one when a firm reports negative income and zero otherwise (*LOSS*), the log of the interest coverage ratio (*LNINT_COV*), the log of total assets (*LNASSETS*), the capital intensity (*CAP_INTEN*), an indicator variable that takes the value of one when shareholder equity increases and zero otherwise (*CHAEQ*), the ratio of R&D to total assets (*RD*), buy-and-hold raw stock returns over the past three years (*RET*), the standard deviation of *RET* (*SDRET*), the standard deviation of *INCOME* (*SDINCOME*), and the ratio of market value of equity to book value of equity (*MB*). We include Dechow and Dichev's (2002) accrual quality measure (*AQ*) and a measure of transparency from Gu (2002) (*TRANSP*) to control for information risk. We also include a firm's corporate governance quality (*GINDEX*) as in Gompers, Ishii, and Metrick (2003). Finally, we include the total number of articles for the entire sample period (*TOTAL*).[16]

Next, we examine whether changes in credit ratings are associated with changes in the CEO's personality due to CEO turnover. Because our dependent variable, *RATINGS*, has high autocorrelation, we cluster standard errors by CEO to account for potential inter-temporal dependence among residuals when estimating equation (3). Additionally, estimating a changes

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[16] All of the control variables are winsorized at the 1st and 99th percentiles except for TOTAL, LOSS, CHAEQ, TRANSP, and GINDEX.

specification of equation (3) provides an alternative way of accounting for such a problem. All variables are defined as in the previous section. Specifically, we estimate a changes model as follows:

$\Pr(\Delta RATINGS)$

$$= \beta_0 + \beta_1 \Delta CONFIDENT + \beta_2 \Delta TOTAL + \beta_3 \Delta DEBT + \beta_4 \Delta INCOME + \beta_5 LOSS$$

$$+ \beta_6 \Delta LNINT_{COV} + \beta_7 \Delta LNASSETS + \beta_8 \Delta CAP_{INTEN} + \beta_9 CHAEQ + \beta_{10} \Delta RD$$

$$+ \beta_{11} \Delta RET + \beta_{12} \Delta SDRET + \beta_{13} \Delta SDINCOME + \beta_{14} \Delta MB + \beta_{15} \Delta AQ$$

$$+ \beta_{16} \Delta TRANSP + \beta_{17} \Delta GINDEX + \varepsilon \quad (4)$$

5.2 Empirical results

Descriptive statistics for the additional variables used to test H2 are provided in the bottom panel of Table 1. The average credit rating for our sample firm is 13, which is equivalent to a BBB+ rating on the S&P rating scale, while the average Gompers' governance score is 9.83. Panel B of Table 2 presents the correlations for the credit rating sample. The correlation between *RATINGS* and *CONF_CON* (*CONF_DIS*) is not distinguishable from zero. Contrary to our expectations, *RATINGS* is positively associated with *FACTOR*. We, however, note that univariate correlation results should be interpreted with caution since *LNASSETS* is strongly positively correlated with *RATINGS* and all three measures of CEO personality. Our primary research question is to examine whether firms' credit ratings are systematically related to CEO personality *after* controlling for other covariates, such as size and risk. As predicted, *RATINGS* is negatively correlated with *DEBT, LOSS, RET, SDRET*, and *SDINCOME*, whereas it is positively correlated with *INCOME, LNINT_COV, LNASSETS*, and *RD*. The results for the information risk

proxies suggest that *TRANSP* is positively correlated with *RATINGS*, while *AQ* is negatively correlated with *RATINGS*.

Table 5 displays the results of estimating equation (3). Results are consistent with our predictions. The coefficient estimate on *CONF_CON* is significantly negative (β_1=-1.148, p-value=.013). *CONF_DIS* and *FACTOR* also have negative and statistically significant coefficient estimates (β_1=-0.341, p-value=0.005; β_1=-0.200, p-value=0.010). We interpret these results as credit analysts assigning lower credit ratings for firms that have CEOs that are characterized as more overconfident.[17]

[Insert Table 5]

Table 6 reports the results of estimating equation (4). The results are qualitatively similar to those presented in Table 5. The coefficient estimate on $\Delta CONF\_CON$ remains significantly negative (β_1=-1.218, *p*-value=0.004). The coefficient estimate on $\Delta CONF\_DIS$ also stays significantly negative (β_1=-0.455, *p*-value=0.006). The coefficient on *FACTOR* is negative, but not significant (β_1=-0.069, *p*-value=0.318). The results presented in Table 6 are consistent with credit rating analysts downgrading credit ratings when a firm replaces a less overconfident CEO with one who is characterized as more overconfident.

[Insert Table 6]

Because it is difficult to assess the economic impact of CEO personality on credit ratings in an ordered logistic model with multiple categories, we estimate an alternative model that

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[17] Similar to our supplemental analysis of audit fees, we again partition CONF_CON into two separate measures and examine the association with credit ratings. The first measure (*OVER_CON*) is equal to *CONF_CON* when *CONF_CON* is > 0 and *OVER_CON* = 0 otherwise. The second measure *(CONSERVATIVE_CON)* is equal to -1 * *CONF_CON* when *CONF_CON* is < 0 and *CONSERVATIVE_CON* = 0 otherwise. When we re-estimate equation (3) and examine these two components separately, both are associated with credit ratings in the predicted direction (β_1=-1.198, p value =0.021 for *OVER_CON* and β_1=1.212, p value = 0.144 for *CONSERVATIVE_CON*). This finding suggests the observed association between our measure of overconfidence and credit ratings is a result of firms with less overconfident CEOs receiving higher credit ratings and firms with highly overconfident CEOs receiving lower ratings.

classifies observations into two categories, as in Ashbaugh-Skaife et al. (2006). Specifically, we create an indicator variable (*INVTGRADE*) that takes the value of one if a firm's credit rating is BBB or higher, and zero otherwise. We then estimate the binary logistic regression using *INVTGRADE* as a dependent variable. The specification is as follows:

$$
\begin{aligned}
\Pr(INVTGRADE) \\
= \beta_0 + \beta_1 CONFIDENT + \beta_2 TOTAL + \beta_3 DEBT + \beta_4 INCOME + \beta_5 LOSS \\
+ \beta_6 LNINT\_COV + \beta_7 LNASSETS + \beta_8 CAP\_INTEM + \beta_9 CHAEQ + \beta_{10} RD \\
+ \beta_{11} RET + \beta_{12} SDRET + \beta_{13} SDINCOME + \beta_{14} MB + \beta_{15} AQ + \beta_{16} TRANSP \\
+ \beta_{17} GINDEX + \varepsilon \ (5)
\end{aligned}
$$

The estimation results presented in Table 7 are similar to those in Table 5. The coefficient estimates on *CONF_CON* and *CONF_DIS* are negative and significant (β_1=-1.112, p-value=0.038; β_1=-0.358, p-value=0.065) while the coefficient estimate on *FACTOR* is also negative but insignificant (β_1=-0.047, p-value=0.372).

[Insert Table 7]

In order to assess the effect of CEO overconfidence on the likelihood of having an investment-grade credit rating relative to a speculative-grade credit rating, we calculate the changes in the probability of receiving an investment-grade credit rating when changing from a conservative CEO to an overconfident CEO. Results reveal that the likelihood of receiving an investment-grade credit rating decreases by 13.5%.[18] To provide the economic significance of this relative to other determinants of credit ratings, we assess the economic significance of *LOSS*, which is one of the primary variables used to proxy for a firm's default risk. Moving from *LOSS*=0 to *LOSS*=1 decreases the probability of receiving an investment-grade credit rating by 18.8%.[19] The probability changes of receiving an investment-grade credit rating due to changes in

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[18] All other variables except for indicator variables are held constant at their means.
[19] All other variables except for indicator variables are held constant at their means.

CEO personality is 72 percent of the probability changes due to the occurrence of a loss. Overall, we conclude that CEO overconfidence has an economically significant impact on the probability of receiving an investment-grade credit rating versus a speculative-grade credit rating.

Collectively, the findings reported in Table 5, Table 6, and Table 7 provide strong support for our hypothesis that credit ratings are negatively associated with CEO overconfidence.

VI.   Conclusion

A number of recent studies have documented an association between CEO personality and corporate decisions. In some cases, corporate decisions made by overconfident executives are likely to be costly to shareholders (e.g., overinvestment and fraud), while in other cases they benefit shareholders at the expense of debt holders (e.g., risky project selection). The tendency of CEOs with different personalities to make these decisions has important implications for other counterparties to the firm. This naturally leads to the question of whether these counterparties are able to identify CEO overconfidence and whether they adjust the way they contract with firms accordingly. We examine two important counterparties to the firm that are likely to be impacted by the decisions of an overconfident CEO. We find auditors charge higher fees when the CEO is more overconfident and that they increase audit fees when firms replace a less overconfident CEO with a more overconfident one. We also find credit rating agencies assign lower credit ratings to firms with overconfident CEOs and lower their credit ratings when firms replace a less overconfident CEO with a more overconfident CEO.

Our paper is subject to several limitations. First, because we focus on Fortune 500 firms, our sample size is necessarily small and not representative of the underlying population of firms with audit fees and credit ratings. Second, press portrayals of CEOs may be correlated with

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contemporaneous firm events. Thus, we attempt to address this concern by using a CEO-specific measure and alternative proxies. Finally, although our changes analysis provides us with significant (albeit weaker) results and reduces concerns about correlated omitted variables, we cannot completely eliminate the possibility that our findings are attributable to economic events that simultaneously lead to CEO turnover and an increase in audit fees or a decrease in credit ratings.

Subject to these caveats, our results provide evidence that counterparties are able to identify CEO personality and modify the way they contract with the firm accordingly. Our analysis contributes new insight into our understanding of the sophistication of both auditors and credit analysts and the determinants of both audit fees and credit ratings.

Appendix

Variable	Definitions
Overconfidence Proxies	
CONF_CON	Continuous CEO fixed confidence variable
CONF_DIS	Discrete CEO fixed confidence variable
FACTOR	The first factor obtained from a factor analysis of CONF_CON, DELAYOPTIONS, and BIAS, in which DELAYOPTION is the log of exercisable but unexercised option holdings and BIAS is the management earnings forecast bias
Variables in Audit Fee Regressions	
LNAUDFEES	Log of audit fees
TOTAL	Number of articles for each CEO for the entire sample period
BIG4	An indicator variable that takes 1 if a firm's auditor is a member of the BIG4, and 0 otherwise
LNASSETS	Log of total assets
BUS SEG	Square root of the number of business segments of a firm from Compustat's Segment file
FGN	Foreign sales (Compustat segment file) deflated by total sales
INV	Inventory deflated by average total assets
REC	Receivables deflated by average total assets
DEBT	Sum of short term and long term debt deflated by average total assets
INCOME	Operating income after depreciation deflated by average total assets
LOSS	An indicator variable that equals 1 if income before extraordinary items and discontinued operations is negative in the current or two previous years, and 0 otherwise
AUD OPIN	An indicator variable that equals 1 if a firm receives a modified audit opinion and 0 otherwise, where a modified audit opinion is defined as anything other than a standard unqualified audit opinion coded as 1 by Compustat
CLIENT	Square root of the number of years that a firm has been a client of its current auditor
LITRISK	An indicator variable that equals 1 if a firm belongs to a high litigation industry as defined in Francis et al. (1994)
LNABSTACC	Log of the absolute value of total accruals, where total accruals is the difference between earnings and cash flow from operations
LNABSBTD	Log of the absolute value of the spread between pre-tax book income and taxable income
ICD	An indicator variable that equals 1 if a firm receives a qualified opinion on its internal controls
M&A	An indicator variable that equals 1 if a firm engages in mergers and acquisitions (M&A), where sum of deal values of M&A is greater than 5% of total assets
Additional Variables in Credit Rating Regressions	
RATINGS	S&P's long-term issuer credit ratings that range from AAA (20) to D (1)
LNINT_COV	Log of interest coverage, computed as the ratio of operating income before depreciation to interest expense
CAP_INTEN	Gross PPE deflated by average total assets
CHAEQ	An indicator variable that equals 1 if change in shareholder equity is greater than zero, and 0 otherwise
RD	R&D deflated by average total assets
RET	Buy-and-hold raw stock return over the past 3 years

SDRET	Standard deviation of monthly stock returns over the past 3 years
SDINCOME	Standard deviation of INCOME over the past 5 years
MB	Market-to-book ratio
AQ	Negative one times the standard deviation of the firm-specific residuals from 5 years, where residuals are from the Dechow and Dichev (2002) model modified by McNichols (2002)
TRANSP	Negative one times the squared residuals from the following regression: RET = b0 + b1*NIBE+b2*LOSS+b3*NIBE*LOSS+b4*CHA_NIBE+e, where RET is market adjusted returns; NIBE is income before extraordinary items; LOSS is an indicator variable that equals 1 when NIBE is negative, and 0 otherwise; CHA_NIBE is change in NIBE
GINDEX	Shareholder rights governance score defined as in Gompers et al. (2003)

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Table 1

Descriptive Statistics

Variables	N	MEAN	MEDIAN	STDEV	1Q	3Q
Variables in Audit Fee Regressions						
LNAUDFEES	2833	1.276	1.281	1.157	0.558	1.932
CONF_CON	2833	0.017	0.000	0.062	0.000	0.033
CONF_DIS	2833	0.261	0.000	0.618	0.000	1.000
FACTOR	1858	0.000	-0.058	1.000	-0.607	0.502
TOTAL	2833	66.730	15.000	181.504	5.000	52.000
BIG4	2833	0.989	1.000	0.106	1.000	1.000
LNASSETS	2833	9.197	9.215	1.086	8.427	9.940
BUS SEG	2833	1.831	1.732	0.790	1.000	2.449
FGN	2833	0.220	0.151	0.232	0.000	0.408
INV	2833	0.126	0.084	0.137	0.024	0.174
REC	2833	0.143	0.117	0.114	0.061	0.186
DEBT	2833	0.291	0.274	0.177	0.165	0.398
INCOME	2833	0.107	0.095	0.077	0.058	0.152
LOSS	2833	0.246	0.000	0.431	0.000	0.000
AUD OPIN	2833	0.619	1.000	0.486	0.000	1.000
CLIENT	2833	13.561	11.000	10.071	5.000	20.000
LITRISK	2833	0.259	0.000	0.438	0.000	1.000
LNABSTACC	2833	4.883	4.935	1.418	4.048	5.820
LNABSBTD	2833	5.380	5.453	1.602	4.366	6.516
ICD	2833	0.023	0.000	0.151	0.000	0.000
M&A	2833	0.101	0.000	0.301	0.000	0.000
Additional Variables in Credit Rating Regressions						
RATINGS	2158	12.780	13.000	3.038	11.000	15.000
LNINT_COV	2158	2.169	2.104	1.037	1.474	2.761
CAP_INTEN	2158	0.625	0.598	0.362	0.343	0.877
CHAEQ	2158	0.463	0.000	0.499	0.000	1.000
RD	2158	0.016	0.000	0.030	0.000	0.019
RET	2158	0.414	0.385	0.534	0.113	0.673
SDRET	2158	0.097	0.087	0.049	0.063	0.116
SDINCOME	2158	0.028	0.019	0.026	0.012	0.034
MB	2158	3.403	2.563	3.928	1.645	4.062
AQ	2158	-0.080	-0.030	0.156	-0.061	-0.017
TRANSP	2158	-0.060	-0.017	0.114	-0.062	-0.003
GINDEX	2158	9.832	10.000	2.514	8.000	11.000

This table presents descriptive statistics for the variables used in our analyses. See Appendix for variable definitions. All variables are winsorized at the 1st and 99th percentiles except for CON_DIS, FACTOR, TOTAL, BIG4, BUS SEG, LOSS, AUD OPIN, CLIENT, LITRISK, ICD, M&A, RATINGS, CHAEQ, and, GINDEX.

Table 2

Panel A: Pearson Correlation Matrix for the Audit Fee Sample

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
1	LNAUDFEES	1.00	**0.10**	**0.16**	**0.09**	**0.20**	**0.08**	**0.40**	**0.23**	**0.33**	**-0.27**	**0.14**	-0.02	**-0.05**	**0.05**	**0.17**	**0.10**	**-0.12**	**0.22**	**0.33**	**0.14**	-0.03
2	CONF_CON		1.00	**0.70**	**0.80**	**0.04**	0.01	**0.19**	-0.02	**0.09**	**-0.07**	**-0.04**	0.02	0.01	0.03	0.01	**0.05**	**0.06**	**0.08**	**0.13**	0.02	**0.04**
3	CONF_DIS			1.00	**0.60**	**0.22**	0.01	**0.26**	**0.05**	**0.12**	**-0.11**	-0.02	0.00	0.00	0.03	0.03	**0.05**	**0.12**	**0.15**	**0.19**	0.00	**0.04**
4	FACTOR				1.00	**0.11**	**0.09**	**0.17**	-0.03	0.04	0.01	-0.04	-0.04	**0.32**	**-0.15**	**-0.06**	0.04	**0.12**	**0.07**	**0.16**	**-0.09**	**0.08**
5	TOTAL					1.00	0.03	**0.38**	**0.12**	**0.08**	**-0.15**	-0.02	**-0.10**	-0.02	0.00	0.02	**0.06**	**0.12**	**0.26**	**0.25**	0.02	0.00
6	BIG4						1.00	**0.11**	0.00	**0.06**	**-0.09**	0.01	**0.06**	-0.02	0.02	0.03	**0.04**	0.00	**0.06**	**0.11**	0.02	**-0.05**
7	LNASSETS							1.00	**0.21**	**0.13**	**-0.40**	**-0.21**	**0.11**	**-0.05**	-0.01	0.17	0.12	-0.04	0.53	0.64	0.02	0.03
8	BUS SEG								1.00	**0.09**	**-0.19**	**0.07**	-0.02	**-0.11**	0.00	0.03	0.02	**-0.18**	**0.12**	**0.15**	0.02	**0.07**
9	FGN									1.00	**-0.15**	**0.28**	**-0.21**	**0.06**	**0.09**	0.04	**0.22**	0.03	**0.09**	**0.18**	**0.08**	-0.01
10	INV										1.00	0.03	**-0.13**	**0.20**	**-0.11**	**-0.12**	-0.01	**0.27**	**-0.09**	**-0.32**	-0.01	-0.01
11	REC											1.00	**-0.13**	**0.05**	**-0.10**	**-0.05**	**0.10**	**-0.09**	-0.01	**-0.18**	**0.05**	**0.05**
12	DEBT												1.00	**-0.19**	**0.13**	**0.06**	**-0.10**	**-0.23**	0.01	**0.06**	0.03	**0.04**
13	INCOME													1.00	**-0.48**	**-0.16**	**0.08**	**0.15**	-0.02	**-0.07**	**-0.12**	**0.12**
14	LOSS														1.00	**0.08**	**-0.05**	-0.03	**0.05**	**0.16**	**0.13**	**-0.07**
15	AUD OPIN															1.00	**-0.08**	**-0.09**	0.04	**0.16**	**0.09**	-0.01
16	CLIENT																1.00	0.01	**0.04**	**0.07**	0.02	**-0.05**
17	LITRISK																	1.00	0.04	0.00	0.00	0.00
18	LNABSTACC																		1.00	**0.39**	0.01	0.00
19	LNABSBTD																			1.00	**0.07**	**0.05**
20	ICD																				1.00	-0.03
21	M&A																					1.00

Panel B: Pearson Correlation Matrix for the Credit Rating Sample

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1	RATINGS	1.00	0.00	0.03	**0.10**	**0.18**	**-0.29**	**0.45**	**-0.46**	**0.52**	**0.33**	0.02	0.03	**0.18**	**-0.12**	**-0.51**	**-0.17**	**0.29**	**-0.11**	**0.16**	**0.06**
2	CONF_CON		1.00	**0.51**	**0.64**	0.02	-0.01	**-0.04**	**0.07**	-0.03	**0.16**	-0.04	0.00	**0.11**	-0.04	**0.05**	-0.02	0.00	0.03	-0.01	-0.02
3	CONF_DIS			1.00	**0.64**	**0.20**	-0.02	-0.03	**0.05**	0.02	**0.27**	**-0.10**	-0.01	**0.20**	**-0.06**	0.01	0.02	**0.06**	-0.03	-0.02	-0.03
4	FACTOR				1.00	**0.10**	**-0.09**	**0.22**	-0.03	**0.17**	**0.23**	**-0.11**	0.00	**0.15**	**0.07**	-0.01	**0.07**	**0.16**	0.01	-0.03	**-0.14**
5	TOTAL					1.00	**-0.09**	-0.02	-0.01	**0.07**	**0.35**	**-0.12**	**-0.06**	**0.15**	**-0.08**	-0.02	**0.05**	**0.04**	**-0.23**	-0.02	**-0.15**
6	DEBT						1.00	**-0.25**	**0.15**	**-0.70**	**0.06**	**0.16**	0.01	**-0.28**	**-0.10**	**0.14**	**-0.18**	**-0.08**	**0.10**	-0.01	0.00
7	INCOME							1.00	**-0.45**	**0.70**	**-0.10**	**-0.07**	**0.07**	**0.14**	**0.26**	**-0.26**	0.03	**0.46**	**-0.07**	**0.13**	0.03
8	LOSS								1.00	**-0.39**	-0.04	0.03	**-0.05**	**0.09**	**-0.16**	**0.48**	**0.30**	**-0.18**	0.01	**-0.24**	**-0.08**
9	LNINT_COV									1.00	-0.02	**-0.09**	0.05	**0.30**	**0.18**	**-0.26**	**0.10**	**0.31**	**-0.11**	0.08	-0.01
10	LNASSETS										1.00	**0.14**	-0.05	**0.09**	**-0.13**	**-0.24**	**-0.07**	-0.02	**-0.06**	0.05	**-0.19**
11	CAP_INTEN											1.00	0.00	**-0.19**	-0.01	**-0.07**	-0.02	**-0.07**	**0.15**	**0.06**	**0.05**
12	CHAEQ												1.00	0.04	**0.11**	**-0.06**	-0.04	0.04	-0.01	**0.06**	-0.03
13	RD													1.00	-0.02	**0.09**	**0.26**	**0.20**	**-0.10**	**-0.14**	-0.01
14	RET														1.00	**0.08**	0.02	**0.11**	-0.01	**0.08**	-0.03
15	SDRET															1.00	**0.36**	**-0.14**	**0.08**	**-0.35**	**-0.11**
16	SDINCOME																1.00	-0.01	-0.03	**-0.17**	**-0.08**
17	MB																	1.00	**-0.04**	**0.05**	-0.04
18	AQ																		1.00	-0.01	**0.08**
19	TRANSP																			1.00	**0.05**
20	GINDEX																				1.00

This table presents Pearson correlations for the variables used in our analyses. Panel A (B) reports Pearson correlations for the variables in the audit fee (credit rating) sample. Bold numbers are significant at the 0.05 level. See Appendix for variable definitions.

Table 3

Regressions of Audit Fees on CEO Overconfidence

$$LNAUDFEES = \beta_0 + \beta_1 CONFIDENT + \beta_2 TOTAL + \beta_3 BIG4 + \beta_4 LNASSETS + \beta_5 BUS\ SEG$$
$$+ \beta_6 FGN + \beta_7 INV + \beta_8 REC + \beta_9 DEBT + \beta_{10} INCOME + \beta_{11} LOSS + \beta_{12} AUD\ OPIN$$
$$+ \beta_{13} CLIENT + \beta_{14} LITRISK + \beta_{15} LNABSTACC + \beta_{16} LNABSBTD + \beta_{17} ICD$$
$$+ \beta_{18} M\&A + \varepsilon\ (1)$$

	Predicted	Model 1		Model 2		Model 3	
	Sign	Coefficient	*p*-value	Coefficient	*p*-value	Coefficient	*p*-value
INTERCEPT	?	-1.886***	0.002	-1.897***	0.002	-2.921***	<.0001
CONF_CON	+	**1.082***	**0.001**				
CONF_DIS	+			**0.120***	**0.001**		
FACTOR	+					**0.057**	**0.022**
TOTAL	?	0.000*	0.095	0.000	0.156	0.000	0.397
BIG4	+	0.180	0.292	0.201	0.272	0.304	0.232
LNASSETS	+	0.272***	<.0001	0.274***	<.0001	0.396***	<.0001
BUS SEG	+	0.103***	0.001	0.097***	0.002	0.075**	0.049
FGN	+	0.571***	0.000	0.567***	0.000	0.871***	<.0001
INV	+	-0.796	0.944	-0.813	0.948	-0.179	0.625
REC	+	0.716*	0.068	0.702*	0.073	0.404	0.214
DEBT	+	0.381*	0.076	0.373*	0.080	0.862**	0.031
INCOME	?	-0.116	0.813	-0.095	0.847	-0.308	0.573
LOSS	+	0.121**	0.027	0.123**	0.025	0.093*	0.059
AUD OPIN	+	0.082**	0.022	0.077**	0.028	0.058	0.107
CLIENT	+	-0.001	0.656	-0.001	0.670	-0.004	0.923
LITRISK	+	-0.146	0.849	-0.166	0.881	-0.092	0.768
LNABSTACC	+	0.014	0.171	0.012	0.200	0.014	0.142
LNABSBTD	+	0.044***	0.008	0.044***	0.008	0.035**	0.042
ICD	+	0.317***	<.0001	0.331***	<.0001	0.200**	0.020
M&A	+	-0.205	1.000	-0.204	1.000	-0.167	0.984
R-squared		0.4713		0.4717		0.6113	
obs.		2833		2833		1858	

This table provides the results of regressing audit fees on CEO overconfidence for the audit fee sample. All variables are defined in the Appendix. Standard errors are clustered by CEO. Year and industry indicator variables are included. ***, **, * indicate significance at the 0.01, 0.05, and 0.10 level, respectively (*p*-values are based on one-tailed tests for signed predictions, two-tailed otherwise).

Table 4

Regressions of Changes in Audit Fees on Changes in CEO Overconfidence

$$\Delta LNAUDFEES = \ \beta_0 + \beta_1 \Delta CONFIDENT + \beta_2 \Delta TOTAL + \beta_3 \Delta BIG4 + \beta_4 \Delta LNASSETS + \beta_5 \Delta BUS\ SEG$$
$$+ \beta_6 \Delta FGN + \beta_7 \Delta INV + \beta_8 \Delta REC + \beta_9 \Delta DEBT + \beta_{10} \Delta INCOME + \beta_{11} \Delta LOSS$$
$$+ \beta_{12} \Delta AUD\ OPIN + \beta_{13} \Delta CLIENT + \beta_{14} LITRISK + \beta_{15} \Delta LNABSTACC$$
$$+ \beta_{16} \Delta LNABSBTD + \beta_{17} \Delta ICD + \beta_{18} \Delta M\&A + \varepsilon \ (2)$$

	Predicted Sign	Model 1 Coefficient	Model 1 p-value	Model 2 Coefficient	Model 2 p-value	Model 3 Coefficient	Model 3 p-value
INTERCEPT	?	0.162***	<.0001	0.164***	<.0001	0.168***	<.0001
ΔCONF_CON	+	**0.152**	**0.174**				
ΔCONF_DIS	+			**0.056***	**0.010**		
ΔFACTOR	+					**-0.001**	**0.510**
ΔTOTAL	?	0.000	0.498	0.000	0.579	0.000	0.927
ΔBIG4	+	0.055	0.323	0.054	0.324	0.258*	0.078
ΔLNASSETS	+	0.219**	0.032	0.219**	0.033	0.224*	0.091
ΔBUS SEG	+	-0.025	0.803	-0.027	0.814	0.007	0.414
ΔFGN	+	0.085	0.268	0.087	0.263	0.191	0.132
ΔINV	+	-0.030	0.518	-0.034	0.520	0.548	0.266
ΔREC	+	-0.766	0.856	-0.754	0.853	-0.253	0.675
ΔDEBT	+	0.015	0.478	0.014	0.480	0.054	0.452
ΔINCOME	?	-0.144	0.599	-0.147	0.591	-0.380	0.325
ΔLOSS	+	0.129***	0.009	0.130***	0.009	0.011	0.402
ΔAUD OPIN	+	-0.003	0.561	-0.004	0.570	-0.009	0.646
ΔCLIENT	+	-0.004	0.874	-0.004	0.874	-0.002	0.667
LITRISK	+	0.006	0.411	0.007	0.390	-0.043	0.947
ΔLNABSTACC	+	-0.001	0.544	-0.001	0.557	0.004	0.266
ΔLNABSBTD	+	0.008	0.167	0.008	0.161	0.002	0.421
ΔICD	+	0.183***	<.0001	0.181***	<.0001	0.204***	0.000
ΔM&A	+	-0.018	0.644	-0.018	0.645	0.008	0.408
R-squared		0.0919		0.0925		0.1120	
obs.		2343		2343		1541	

This table provides the results of regressing changes in audit fees on changes in CEO overconfidence for the audit fee sample. All variables are defined in the Appendix. Standard errors are clustered by CEO. Year and industry indicator variables are included. ***, **, * indicate significance at the 0.01, 0.05, and 0.10 level, respectively (p-values are based on one-tailed tests for signed predictions, two-tailed otherwise).

Table 5
Ordered Logistic Regressions of Credit Ratings on CEO Overconfidence

$$Pr\,(RATINGS) = \beta_0 + \beta_1 CONFIDENT + \beta_2 TOTAL + \beta_3 DEBT + \beta_4 INCOME + \beta_5 LOSS$$
$$+\,\beta_6 LNINT\_COV + \beta_7 LNASSETS + \beta_8 CAP\_INTEN + \beta_9 CHAEQ + \beta_{10} RD + \beta_{11} RET$$
$$+\,\beta_{12} SDRET + \beta_{13} SDINCOME + \beta_{14} MB + \beta_{15} AQ + \beta_{16} TRANSP + \beta_{17} GINDEX$$
$$+\,\varepsilon \;\;(3)$$

	Predicted Sign	Model 1 Coefficient	Model 1 p-value	Model 2 Coefficient	Model 2 p-value	Model 3 Coefficient	Model 3 p-value
CONF_CON	-	**-1.148****	**0.013**				
CONF_DIS	-			**-0.341*****	**0.005**		
FACTOR	-					**-0.200****	**0.010**
TOTAL	?	0.001	0.422	0.001	0.273	0.000	0.969
DEBT	-	-1.297**	0.029	-1.236**	0.037	-1.507**	0.041
INCOME	+	5.925***	0.001	5.803***	0.001	6.855***	0.002
LOSS	-	-0.728***	<.0001	-0.750***	<.0001	-0.797***	0.000
LNINT_COV	+	0.860***	<.0001	0.874***	<.0001	0.858***	<.0001
LNASSETS	+	0.918***	<.0001	0.951***	<.0001	0.984***	<.0001
CAP_INTEN	+	0.024	0.454	-0.021	0.541	0.175	0.251
CHAEQ	+	0.059	0.214	0.064	0.197	0.073	0.202
RD	?	8.302***	0.003	8.924***	0.002	10.599***	0.003
RET	?	-0.777***	<.0001	-0.786***	<.0001	-1.072***	<.0001
SDRET	-	-28.852***	<.0001	-28.879***	<.0001	-29.398***	<.0001
SDINCOME	-	-6.276**	0.022	-6.003**	0.025	-4.364	0.122
MB	?	0.057***	0.001	0.059***	0.001	0.082***	0.000
AQ	+	-1.156	0.993	-1.126	0.992	-1.060	0.963
TRANSP	+	0.611*	0.093	0.594*	0.099	0.608	0.168
GINDEX	?	0.074**	0.018	0.077**	0.014	0.065*	0.071
obs.		2158		2158		1512	

This table provides the results of regressing credit ratings on CEO overconfidence for the credit rating sample. All variables are defined in the Appendix. Standard errors are clustered by CEO. Year indicator variables are included. ***, **, * indicate significance at the 0.01, 0.05, and 0.10 level, respectively (*p*-values are based on one-tailed tests for signed predictions, two-tailed otherwise).

Table 6

Ordered Logistic Regressions of Changes in Credit Ratings on Changes in CEO Overconfidence

$\text{Pr}(\Delta RATINGS)$
$$= \beta_0 + \beta_1 \Delta CONFIDENT + \beta_2 \Delta TOTAL + \beta_3 \Delta DEBT + \beta_4 \Delta INCOME + \beta_5 LOSS$$
$$+ \beta_6 \Delta LNINT\_COV + \beta_7 \Delta LNASSETS + \beta_8 \Delta CAP\_INTEN + \beta_9 CHAEQ + \beta_{10} \Delta RD$$
$$+ \beta_{11} \Delta RET + \beta_{12} \Delta SDRET + \beta_{13} \Delta SDINCOME + \beta_{14} \Delta MB + \beta_{15} \Delta AQ + \beta_{16} \Delta TRANSP$$
$$+ \beta_{17} \Delta GINDEX + \varepsilon \quad (4)$$

	Predicted	Model 1		Model 2		Model 3	
	Sign	Coefficient	*p*-value	Coefficient	*p*-value	Coefficient	*p*-value
ΔCONF_CON	-	**-1.218***	**0.004**				
ΔCONF_DIS	-			**-0.455***	**0.006**		
ΔFACTOR	-					**-0.069**	**0.318**
ΔTOTAL	?	-0.001	0.302	0.000	0.472	-0.001	0.593
ΔDEBT	-	-4.805***	<.0001	-4.812***	<.0001	-4.877***	<.0001
ΔINCOME	+	-2.455	0.862	-2.282	0.844	-1.874	0.701
LOSS	-	-0.629***	<.0001	-0.615***	<.0001	-0.554***	0.002
ΔLNINT_COV	+	0.954***	<.0001	0.946***	<.0001	1.049***	<.0001
ΔLNASSETS	+	1.456***	0.000	1.462***	0.000	1.796***	0.000
ΔCAP_INTEN	+	0.900	0.144	0.886	0.148	2.526**	0.012
CHAEQ	+	0.002	0.493	0.000	0.499	0.026	0.424
ΔRD	?	1.890	0.769	1.761	0.784	4.834	0.463
ΔRET	?	0.024	0.870	0.015	0.920	-0.048	0.788
ΔSDRET	-	-21.638***	<.0001	-21.494***	<.0001	-20.889***	<.0001
ΔSDINCOME	-	-5.848*	0.083	-6.023*	0.075	-3.953	0.251
ΔMB	?	-0.008	0.587	-0.007	0.666	-0.016	0.438
ΔAQ	+	-0.087	0.550	-0.107	0.561	0.081	0.458
ΔTRANSP	+	-0.512	0.885	-0.538	0.895	-0.228	0.655
ΔGINDEX	?	0.024	0.846	0.025	0.841	0.093	0.526
obs.		1789		1789		1239	

This table provides results of regressing changes in credit ratings on changes in CEO overconfidence for the credit rating sample. All variables are defined in the Appendix. Standard errors are clustered by CEO. Year indicator variables are included. ***, **, * indicate significance at the 0.01, 0.05, and 0.10 level, respectively (*p*-values are based on one-tailed tests for signed predictions, two-tailed otherwise).

Table 7

Binary Logistic Regressions of Credit Ratings on CEO Overconfidence

Pr $(INVTGRADE)$

$$= \beta_0 + \beta_1 CONFIDENT + \beta_2 TOTAL + \beta_3 DEBT + \beta_4 INCOME + \beta_5 LOSS$$
$$+ \beta_6 LNINT\_COV + \beta_7 LNASSETS + \beta_8 CAP\_INTEM + \beta_9 CHAEQ + \beta_{10} RD + \beta_{11} RET$$
$$+ \beta_{12} SDRET + \beta_{13} SDINCOME + \beta_{14} MB + \beta_{15} AQ + \beta_{16} TRANSP + \beta_{17} GINDEX$$
$$+ \varepsilon \ (5)$$

	Predicted Sign	Model 1 Coefficient	p-value	Model 2 Coefficient	p-value	Model 3 Coefficient	p-value
INTERCEPT	?	-9.932***	<.0001	-10.066***	<.0001	-10.935***	<.0001
CONF_CON	**-**	**-1.112****	**0.038**				
CONF_DIS	**-**			**-0.358***	**0.065**		
FACTOR	**-**					**-0.047**	**0.372**
TOTAL	?	-0.001*	0.092	-0.001	0.232	-0.002**	0.031
DEBT	-	-2.585***	0.009	-2.586***	0.008	-3.956***	0.005
INCOME	+	3.114	0.166	3.003	0.172	2.943	0.229
LOSS	-	-0.846***	0.001	-0.846***	0.001	-0.900***	0.009
LNINT_COV	+	0.956***	0.000	0.955***	0.000	0.995***	0.003
LNASSETS	+	1.180***	<.0001	1.206***	<.0001	1.391***	<.0001
CAP_INTEN	+	0.107	0.384	0.075	0.419	0.902**	0.023
CHAEQ	+	-0.237	0.944	-0.247	0.951	-0.313	0.930
RD	?	3.439	0.424	4.081	0.355	6.315	0.356
RET	?	-0.657***	<.0001	-0.658***	<.0001	-0.881***	<.0001
SDRET	-	-30.408***	<.0001	-30.423***	<.0001	-32.030***	<.0001
SDINCOME	-	-7.775*	0.087	-7.573*	0.088	-11.142*	0.073
MB	?	0.029*	0.089	0.030*	0.079	0.028	0.217
AQ	+	0.284	0.369	0.355	0.339	0.903	0.183
TRANSP	+	-0.837	0.829	-0.852	0.832	-0.603	0.717
GINDEX	?	0.160***	0.003	0.158***	0.004	0.142**	0.050
obs.		2158		2158		1512	

This table provides results of regressing investment grade ratings on CEO overconfidence for the credit rating sample. All variables are defined in the Appendix. Standard errors are clustered by CEO. Year indicator variables are included. ***, **, * indicate significance at the 0.01, 0.05, and 0.10 level, respectively (p-values are based on one-tailed tests for signed predictions, two-tailed otherwise).