Managers' Self-Serving Attribution Bias and Corporate Financial Policies

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Abstract

The self-serving attribution bias ("SAB") refers to individuals taking responsibility for good outcomes and blaming others for bad outcomes. Consistent with the existence of managerial SAB, I find that managers tend to use more first-person pronouns (relative to second- and third-person pronouns) in the Management Discussions and Analysis Section of the 10-K filings when firm performance is better. A consequence of SAB is overconfidence (i.e., overestimating the mean and underestimating the variance of future cash flows). Consistent with this argument, managers with more SAB are more likely to issue forward-looking statements and make earnings forecasts, the tone (e.g., positive versus negative) of their forward-looking discussions has smaller variation, and their earnings forecasts tend to be overly optimistic. Firms whose managers have more SAB have higher investment-cash flow sensitivity and experience more negative market reactions around acquisition announcements. These firms also tend to have higher leverage, rely more on long-term debt financing, are more likely to repurchase stocks, and are less likely to issue dividends. Collectively, the evidence suggests that managers have self-serving attribution bias and this bias has implications for corporate policies.

"Solid execution of our strategies and the absence of significant catastrophes contributed to our outstanding results in 2006. Around the world and across all of our business segments we are capitalizing on growth opportunities, using our business diversity and matrix management structure to respond quickly to customer needs."

American International Group, Inc. 2006 Annual Report

"AIG reported that the continued severe credit market deterioration, particularly in mortgage-backed securities, and charges related to ongoing restructuring activities, contributed to a record net loss for the fourth quarter of $61.7 billion, or $22.95 per diluted share, compared to a 2007 fourth quarter net loss of $5.3 billion, or $2.08 per diluted share."

American International Group, Inc. 2008 Annual Report

1. Introduction

A central part of behavioral economics deals with economic agents' overconfidence and its economic consequences.[1] One key mechanism through which people become overconfident is the existence of self-serving attribution bias (SAB), which refers to individuals taking responsibility for successful outcomes but blaming circumstances or other persons for unsuccessful outcomes (Gervais and Odean 2001, Barber and Odean 2002, Malmendier and Tate 2005, 2008, Billett and Qian 2008).

While there is pervasive evidence that individuals exhibit SAB in lab experiments or surveys, little direct evidence based on empirical data exists on whether corporate executives have SAB and whether managerial SAB has economic consequences. This paper attempts to provide such evidence. To test for possible management SAB, I examine the language in the Management Discussion and Analysis (MD&A) section of firms' 10-K filings. Under the regulations of the Securities and Exchange Commission,

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[1] Malmendier and Tate (2005) define overconfidence as the underestimate of variance and/or overestimate of mean, while Baker et al. (2007) label the underestimate of variance as overconfidence and the overestimate of mean as optimism. I follow Malmendier and Tate in this paper.

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firms are required to provide a narrative explanation of firm operations in the MD&A. The MD&A is mandatory and subject to auditor's examination and thus provides an ideal setting with minimum selection bias to test for management SAB. Examining the language in the MD&A is also consistent with the approach used extensively in the social psychology literature, which generally studies the language patterns of the experimental subjects to identify SAB (Miller and Ross 1975).

I use the percentage of first-person pronouns relative to that of second- and third-person pronouns in the MD&A to measure managers' tendency to self-reference. Examining more than 30,000 MD&As filed between 1994 and 2007 by U.S. public firms, I find that consistent with managers having self-serving attribution bias, their self-referencing tendency is positively associated with firm performance as measured using stock returns during the fiscal year.

However, this result might be explained by unobserved management characteristics. Firms might perform better because managers are more capable and more capable people perhaps like to use more self-referencing words. Managers may also feel more confident when firm performance is better and more confident people may like to use more first-person pronouns. To mitigate these concerns, I first examine firms whose performance is close to the average firm in the same industry. The contribution of managers' ability to these firms' performance is relatively small. However, I find that managers' self-referencing tendency still positively relates to firm performance for these firms.

I then explore factors that should correlate with the degree of SAB. Prior research in psychology has identified individuals' cognitive limitations, including selective attention and informational accessibility in memory, as one of the main explanations for SAB

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(Miller and Ross 1975). Therefore, the noisier the performance feedback, the more severe people's self-serving attribution bias is. Cognitive theories also predict that SAB is an increasing function of the ex ante expectation for success (Campbell and Sedikides 1999, Shepperd et al. 2008) because when outcomes disconfirm (confirm) a positive expectation, people tend (not) to initiate a search for the cause of the failure. Consistent with these predictions, I find that managerial SAB increases with firm size, the number of business segments, and past performance.

To further mitigate the concerns about omitted variables, I explore within-MD&A sentence-level variation. I examine the attribution process reflected in the sentences that contain causative words (e.g., "because"). The sentence-level analysis can control for any unobserved firm-year specific factor by allowing *interaction*s of firm and year fixed effects in the regression. I find that *within* an MD&A, managers use more self-referencing pronouns in the causative sentences with more positive tone. This evidence shows that unobserved firm-year specific factors (such as management ability or confidence) are unlikely to explain the association between performance and managers' self-referencing tendency.

Next, I link management SAB to management overconfidence. If SAB is one mechanism through which managers become overconfident, then the degree of SAB is expected to positively relate to the extent of overconfidence, i.e., underestimating the variance and overestimating the mean of future cash flows. I classify managers as having SAB if the MD&A sections contain abnormally high percentage of self-referencing. I find that managers with SAB are more likely to issue forward-looking statements in MD&As and make earnings forecasts. Use a Bayesian machine learning algorithm to

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measure the positive/negative tone of the forward-looking sentences in MD&As, I find that the tone of these sentences made by managers with SAB tends to be more homogeneous, indicating that they possess a more precise belief about their firms' future cash flows. The earnings forecasts made by managers with SAB are also overly optimistic. Collectively, these results suggest that SAB leads to overconfidence.

Finally, I examine the implications of managerial SAB for investment and financing policies. Prior research documents that overconfident managers tend to overinvest, make poor acquisitions, rely more on debt financing, are more likely to repurchase stock, and are less likely to issue dividends (Malmendier and Tate 2005, 2008, Ben-David et al. 2007, Billet and Qian 2008, Malmendier et al. 2010). If SAB leads to overconfidence, similar behavior is expected for managers with SAB. The empirical results are consistent with this prediction. I find that firms whose managers have SAB have higher investment-cash flow sensitivity, more negative market reactions to acquisition announcements, higher leverage, higher proportion of long-term debt, higher probability of repurchasing stocks, and lower probability of issuing dividends.

The results in this paper provide direct support for the existence of managerial self-serving attribution bias and show that the individual SAB documented extensively in lab experiments and surveys in the psychology literature (Miller and Ross 1975, Sedkides et al. 1998) is also observed in corporate managers. This study also contributes to the growing behavioral corporate finance literature (see Baker et al. 2007 for a review) by showing that self-serving attribution bias is a cognitive reason for management overconfidence. Furthermore, using textual analysis to measure managers' behavioral bias provides a methodology for future research on management SAB.

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The rest of the paper proceeds as follows. Section 2 describes the data and empirical measures. Section 3 presents the empirical evidence. Section 4 discusses the implications of the empirical results and Section 5 concludes.

2. Data and empirical measure of managers' self-references

I construct my sample based on the intersection of firm/years available on the EDGAR filings database maintained by the Securities and Exchange Commission (SEC) and the Compustat annual file for years 1994-2007. These databases are manually joined based on Compustat GVKEY and the SEC's Central Index Key. Firms without matches are dropped from the sample. For each firm-year observation I download the corresponding 10-K filing. Filings with less than 3,000 words or 100 lines are dropped. In addition, I exclude firms without CRSP data to compute stock returns. I extract the MD&A section of the 10-K filings following the process employed in Li (2010). I require that each MD&A contain a minimum of five hundred words to ensure that the empirical measures derived from it are not due to random noise. These procedures result in a sample of 38,953 firm-year observations. Depending on the specific empirical tests and control variables, the sample size varies.

I use the Linguistic Inquiry and Word Count (LIWC) package to compute the self-referencing measure. LIWC is a text analysis software program designed by psychologists James W. Pennebaker, Roger J. Booth, and Martha E. Francis; the program is able to calculate the degree to which people use different categories of words across a

wide array of texts.[2] The default LIWC dictionary consists of 2,300 words and word stems with each word or word stem defining one or more word categories.

I compute managers' self-referencing tendency as the percentage of self-referential pronouns relative to the pronouns that refer to other parties in the MD&A:

$$Self = We - Other,$$

where *We* is the percentage of first-person pronouns (20 words in the LIWC dictionary such as "I," "We," and "Our"), and *Other* is the sum of the percentages of second-person pronouns (14 words in the dictionary such as "You" and "Your") and third-person pronouns (22 words in the dictionary such as "She," "Their," and "Them").

Table 1 shows the descriptive statistics of these measures and other variables used in the empirical tests. The mean values of *We* and *Other* are 1.27 percent and 0.12 percent, respectively. For comparison, Panel B of Table 1 presents the mean of these two variables for other text sources documented in Pennebaker et al. (2001, Table 3). On average, "emotion writing" has 3.5 percent self-referring pronouns and 2.1 percent other-referring pronouns; books have 0.5 percent self-referring pronouns and 1.3 percent other-referring pronouns. Therefore, the frequency of first-person pronouns of MD&A text is between "emotion writing" and "books." However, the frequency of second- and third-person pronouns is much lower in the MD&A setting. This is likely because managers seldom use words like "you" or "they" in the MD&A; rather, they tend to use generic words such as "the economy" to discuss external factors. The empirical results in this paper are based on *Self*; however, all empirical inferences remain the same if *We* is used to measure managers' self-referring tendency.

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[2] More details about the software can be found at http://www.liwc.net/ and http://homepage.psy.utexas.edu/homepage/Faculty/Pennebaker/Home2000/Words.html.

The change in managers' self-referencing tendency, *ΔSelf*, is calculated as the year-to-year change in *Self*. Table 1 shows that there is substantial variation in *ΔSelf*: the standard deviation of *ΔSelf* is 0.86 and the inter-quarter range is 0.19, which are significant compared with the mean value of *Self* (1.15).

3. Empirical results

3.1 Managers' self-referencing tendency and firm performance

Table 2 presents the regression results of *ΔSelf* on firm performance and other control variables. Examining *ΔSelf*, rather than *Self*, offers several advantages. First, it helps filter out time-invariant factors that might drive both firm performance and managers' self-referencing tendency. Second, a change specification can remove the stale information because prior literature has shown that there is substantial boilerplate in MD&A that does not change over time (Brown and Tucker 2010). I measure firm performance using the twelve-month stock returns during the fiscal year. Year and industry fixed effects are included in the regressions. Since a firm's auditor is involved in the preparation of the firm's 10-K filing, auditor fixed effects are also included.

Column (1) in Table 2 presents the univariate regression of *ΔSelf* on the stock returns (*Ret*). The t-statistics are calculated based on standard errors that are clustered at the year level. The positive coefficient on *Ret* (0.11 with a t-statistic of 4.40) suggests that managers have self-serving attribution bias. The economic magnitude of the coefficient is significant. For instance, the inter-quartile range of *Ret* is 0.61, implying that an inter-quarter change in *Ret* impacts the dependent variable (*ΔSelf*) by 0.07 (calculated as 0.61 * 0.11), which is about one-third of the inter-quartile range of *ΔSelf* (Table 1).

In column (2), I control for several firm characteristics, including Tobin's Q, log of book value of assets, and firm age. Q is the market value of the assets divided by the book value at the end of the fiscal year. Firm age is the average number of years since a firm shows up in CRSP monthly stock return file. The coefficient on *Ret* remains positive (0.09) and statistically significant (t-statistic = 4.98).

However, unobserved time-varying management ability might explain the positive association between performance and managers' self-referencing tendency. A firm might perform better because its managers are more capable compared with last year. If this is true, then to the extent that more capable people tend to use more self-referencing words, a positive association between performance and the frequency of self-referencing words in MD&As is observed. Another possible explanation is that when firm performance is better, managers tend to be more confident and more confident people may like to use more self-referencing words.

To mitigate these concerns, I examine two sub-samples. The first sample is a set of firms whose performance is within a relatively small range of that of the average firm in the same industry. The second sample consists of firms with small idiosyncratic stock return volatility, i.e., the stock returns of these firms can be explained mostly by the market and industry returns. The performance of firms in these two sub-samples closely mimics that of the market and hence the contribution of managers' ability to performance is relatively small. If there is evidence of SAB for these two sub-samples, then it is less likely that the result is driven by the unobserved management ability.

Column (3) in Table 2 presents the results for firm-years whose stock returns are between the 25th percentile and the 75th percentile of the returns of the firms in the same

two-digit SIC industry in the same year. To make sure that the industry definition is meaningful, I require that each industry has at least ten firms in the sample for a given year. The results indicate that *Ret* is still positively and significantly associated with *ΔSelf*. In fact, the coefficient on *Ret* (0.14 with a t-statistic of 3.08) is larger that in column (2). In column (4), the empirical tests are conducted using firm-years whose stock returns are within the +/- 5% range of the median return of firms in the same industry. Again the results show that there is positive relation between firm performance and the frequency of self-referencing words. Column (5) shows the results based on firms in the bottom quartile of idiosyncratic return volatility, which is calculated as the standard deviation of the residuals from the firm-specific regression of monthly stock returns on the CRSP value-weighted market index returns and the two-digit SIC industry returns using data from the fiscal year. The results based on this subsample are similar to those in columns (1) and (2): the coefficient on *Ret* is 0.08 with a t-statistic of 2.36.

3.2 Cross-sectional variations in the self-serving attribution bias

Examining cross-sectional variations based on the theoretical determinants of SAB provides another approach to mitigate the concerns about omitted variables. The social psychology literature argues that people have SAB because of their limited cognitive ability due to selective attention, information availability, or accessibility in memory (Miller and Ross 1975). Individuals often stop well short of examining all possible explanations for an outcome, accepting instead the first logical explanation that comes to mind, a search strategy that is satisfying and requires the least amount of effort (Simon 1956, Kunda 1990, Pyszczynski and Greenberg 1987). To the extent that a noisier

performance feedback is more likely to lead to selective information gathering, SAB is expected to be more severe in a noisier information environment.

Another prediction of the cognitive explanations for SAB is that people's ex ante expectations for success is positively associated with the ex post attribution process (Campbell and Sedikides 1999). This is because when outcomes confirm a positive expectation, people do not search for an explanation for why the outcome occurred (rather, they generally fall back on the explanation that gives rise to the positive expectation; when outcomes disconfirm a positive expectation, people initiate a search for the cause of the failure.

Based on these cognitive explanations for SAB, I explore three factors as cross-sectional determinants of SAB. First, larger firms are more complex and their performance feedback is likely to be noisier. In addition, managers of larger firms are likely to be more successful in the past and therefore have higher expectations about their performance. This reasoning suggests that managers of larger firms have more significant SAB. I measure firm size using *Size*, log of the market value of equity at the end of a fiscal year. Second, I expect that managerial SAB increases with the number of business segment (*Num_seg*, log of the number of business segment reported in Compustat), a proxy for the complexity of a firm's information environment. Third, I expect managerial SAB to increase with a firm's past success, measured using a dummy variable *Success* that equals 1 if a firm's stock return is above industry median in both of the last two years and 0 otherwise.

Columns (1) to (3) in Table 3 show that larger firms, firms with more business segments, and more successful firms are indeed more likely to have management SAB, as

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indicated by the positive and significant coefficients on the interactions of *Size*, *Num_seg*, and *Success* with *Ret*. In column (4), the three factors are included together in the regression and the results show that all three interaction terms are still positive and statistically significant. Overall, the evidence supports the predictions of the cognitive explanations that management SAB is an increasing function of information noisiness and expectation for success.

3.3 Managers' self-referencing tendency in causative sentences

Another way to mitigate the concern about omitted firm-year specific factors is to examine the sentences in the MD&As. I focus on sentences in MD&As that contain causative words, such as "because" and "hence" ("causative sentences"). By definition, managers use these sentences to explain something. If managers have SAB, then they are more likely to use self-referencing words in causative sentences which have positive tone, i.e., when they express something positive, the managers are more likely to attribute it to themselves. A significant advantage of the sentence-level analysis is that it allows the interactions of firm and year fixed effects in the regressions to control for firm-year specific factors.

To implement this test, I first extract all the sentences in the MD&As that contain at least one of the 49 causative words based on LIWC. This procedure yields about 3.5 million causative sentences. Following Li (2010), I measure the tone of the causative sentences using a Naïve Bayesian machine learning algorithm (Manning and Schutze 1999).[3] For every sentence, the Naïve Bayesian algorithm predicts the probability of the

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[3] To implement the Naïve Bayesian learning algorithm, I first manually categorize 30,000 sentences of randomly-selected statements extracted from corporate MD&As into three different tones (e.g., positive,

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sentence having positive, neutral, or negative tone. I define a dummy variable *Positive_tone* for each sentence, which equals one if the probability of the sentence having positive tone is the highest among the three categories as predicted by the Naïve Bayesian algorithm and zero otherwise.

I then regress *Self*, the percentage of the first-person pronouns minus the percentages of second- and third-person pronouns of the sentence, on *Positive_tone* and control variables. In column (1) of Table 4, firm, year, and auditor fixed effects are included, the coefficients on *Positive_tone* is 0.32 (t-statistic clustered at year level = 4.78). In column (2), the interactions of firm and year fixed effects are included in the regression; since there are about 8,000 firm fixed effects and 13 year fixed effects, this translates into more than 10,000 (unreported) fixed effect coefficients in the regression. The results in column (2) show that in the causative sentences with positive tone, managers are more likely to use self-referencing words compared with those with negative tone in the same MD&A (the coefficient on *Positive_tone* is 0.37 with a t-statistic clustered at year level of 4.68). The coefficients in column (2) are estimated based on variations within a specific MD&A. Therefore, any firm-year specific factors, such as the self-confidence of managers, do not explain the finding in this column. In columns (3) and (4), the same empirical tests as those in columns (1) and (2) are conducted using firms with at least 8 years of data in the sample and the results are similar.

In summary, this evidence based on the causative sentences suggests that the unobserved firm-year specific variables (such as management ability or confidence) are

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neutral, and negative tone). These manually-coded sentences are then used as training data in a Naïve Bayesian machine learning algorithm to classify the tone of other forward-looking statements. Details of the implementation follow Li (2010).

unlikely to explain the positive association between firm performance and managers' self-referencing tendency.

3.4 Self-serving attribution bias and managerial overconfidence

Next, I examine the link between management SAB and overconfidence. SAB is a key factor that fosters overconfidence. Even if individuals start out without overconfidence, the attribution bias can lead them to become overconfident, as demonstrated in Gervais and Odean (2001). Linking management SAB to managers' overconfidence also lends further support to the argument that the positive relation between firm performance and managers' self-referencing tendency documented in Tables 2 to 4 captures managers' self-serving attribution bias.

I estimate managerial SAB as the abnormal level of self-referencing using the following regression by pooling all firm-years together:

$$Self_{it} = \alpha + \beta \, \mathrm{Re} t_{it} + \varepsilon_{it}.$$

The residual $\hat{\varepsilon}_{it}$ is then calculated as $\hat{\varepsilon}_{it} = Self_{it} - (\hat{\alpha} + \hat{\beta} \, \mathrm{Re} t_{it})$, where $\hat{\alpha}$ and $\hat{\beta}$ are the estimated intercept and slope in the regression. $\hat{\varepsilon}_{it}$ captures the amount of managerial self-referencing that is not explained by the average level of self-serving attribution bias and firm performance. To capture managers' SAB, I construct a dummy variable SAB_{it} that equals 1 if ε_{it} is greater than the median value of my sample firm-years and 0 otherwise.

Overconfidence implies overestimating the mean and underestimating the variance of future cash flows (Malmendier and Tate 2005). I link SAB to overconfidence using two settings that reflect managers' belief about future cash flows: the forward-looking

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statements in the MD&As and earnings forecasts. First, I examine the association

between SAB and manager's tendency to issue forward-looking statements and provide

earnings forecasts. If managers underestimate the variance of future cash flows, they are

more likely to issue forward-looking statements and earnings forecasts.[4] To test this

implication, I extract all the forward-looking statements from the MD&As using the

algorithm in Li (2010). I also obtain the forecasts of next quarter's earnings per share

made by managers from the Thomson Reuters First Call Company Issued Guidelines

database.

Table 1 Panel A shows that the mean value of *NFLS*, the number of forward-looking

sentences in MD&As, is 228. In the empirical analysis, I focus on its log value,

Ln(NFLS), because of the skewness in the variable, but the empirical inferences based on

the raw values remain the same. The mean value of *Forecast*, a dummy variable which

equals one if a manager issues forecasts of next quarter's earnings afrter the 10-K filing

date, is 0.11.

Column (1) in Table 5 presents the regression results of *Ln(NFLS)* on *SAB* with firm

size, Q, firm age, current earnings, stock return volatility, and year and industry fixed

effects as control variables. Managers with more SAB appear to make more forward-

looking statements in their MD&As, as indicated by the positive and significant

coefficient on *SAB* (0.049 with a t-statistic of 7.91). Given that the standard deviation of

Ln(NFLS) is 0.73 (Table 1), the result suggests that *SAB* explains about 7 percent of the

variation in *Ln(NFLS)*. The results are also robust to including firm fixed effects instead

of industry fixed effects (column (2)).

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[4] The earnings forecasts by managers have significant implications for stock prices (Patell 1976, Penman 1980, Nagar et al. 2003, Hutton and Stocken 2007) and providing good earnings forecasts by managers can potentially reduce the cost of capital (Coller and Yohn 1997).

Columns (3) and (4) estimate the logistic regression of *Forecast* on *SAB* and control variables. The coefficient on *SAB* is 0.103 (z-statistic = 2.87) in column (3), indicating that managers' self-serving attribution bias is positively associated with the likelihood of managers issuing earnings forecasts. Unreported results show that the marginal effect of *SAB* is about 1 percent. Given that on average about 11 percent of managers make earnings forecasts, this effect is economically significant. A similar result obtains in column (4) when firm fixed effects are included.

I then directly examine the mean and variance of managers' expectation about future cash flows. I calculate earnings forecast error, *FERR*, as earnings per share forecasts minus actual earnings per share divided by book value of assets per share. A positive *FERR* indicates that managers overestimate the mean of future cash flows. Column (5) in Table 5 shows the regression result of *FERR* on *SAB* with year and industry fixed effects included. The coefficient on *SAB* is 0.052 with a t-statistic of 3.15. This suggests that managers with self-serving attribution bias have overly optimistic estimates of future cash flows. Since the standard deviation of *FERR* is 0.55 (Table 1), the result suggests that SAB can account for about 10 percent of the standard deviation of *FERR*. The results in column (6) are similar after controlling for firm fixed effects.

To measure the variance of managers' belief about future performance, I compute the variation in the tone of the forward-looking statements in MD&As. For each MD&A with at least three forward-looking statements, I calculate the index of qualitative variation (Healy 2008) as:

$$IQV_{it} = 3 \times [1 - (P_{it1}^2 + P_{it0}^2 + P_{it,-1}^2)]/2,$$

where IQV_{it} is the index of qualitative variation for firm i in year t and P_{it1} (P_{it0}, $P_{it,-1}$) is the percentage of sentences with positive (neutral, negative) tone. The index measures the dispersion of the distribution of a qualitative variable; it is bounded between 0 and 1 and is increasing in the dispersion. If one category dominates (e.g., all sentences are positive and there is no variation in tone), then the index has a value of zero. If each category is represented equally, then the index equals 1.

The mean value of *IQV* is 0.81 (Table 1), suggesting that the tone of the forward-looking statements within an MD&A has substantial variations. Column (7) in Table 5 shows that *SAB* is negatively associated with *IQV* (the coefficient on *SAB* is -0.003 with a t-statistic of -1.92), suggesting that managers with more SAB tend to issue forward-looking statements in the MD&A that are more homogeneous in tone. In columns (8), firm fixed effects are included and the coefficient on *SAB* is -0.007 (t=-4.32). Given that the standard deviation of *IQV* is 0.14 (Table 1), this result suggests that managerial self-attribution bias can explain about 5 percent of the standard deviation of *IQV*.

3.5 Self-serving attribution bias and investment-cash flow sensitivity

Overconfident managers systematically overestimate the return to their investment projects or underestimate the variance of future cash flows and hence use lower discount rate in valuation (Malmendier and Tate 2005; Ben-David et al. 2007). With sufficient internal funds for investment, these managers overinvest relative to the first-best. Without sufficient internal funds, however, they are reluctant to raise capital through external financing because they perceive the stock of their company to be undervalued by the

market and hence reduce the investment. If self-serving attribution bias leads to overconfidence, a positive association between SAB and overinvestment is expected.

I estimate the relation between SAB and the investment cash-flow sensitivity in Table 6, where the sensitivity of investment to cash flows is a proxy for overinvestment (Fazzari et al. 1988). The dependent variable is the amount of capital expenditure scaled by the beginning value of Property, Plant, and Equipment. The independent variables include cash flows and its interaction with SAB and other control variables. Column (1) presents the baseline results without any control variable. The coefficient on the interaction of *SAB* with cash flow is positive (0.223) and statistically significant. The result is robust to clustering the standard errors by firm, including the interactions of industry fixed effects and cash flows, including the interactions of year fixed effects and cash flows, and including firm fixed effects (columns 2 to 6). The evidence shows that managers who demonstrate a higher level of SAB tend to overinvest. The economic magnitude is comparable to that documented in Malmendier and Tate (2005). For instance, Malmendier and Tate (2005) document that overconfident CEOs are associated with an investment-cash flow sensitivity higher by 0.2339 (column V in Table 5 of their paper). In column (5) the coefficient on *SAB * CF* is 0.225, suggesting that the investment-cash flow sensitivity is higher by 0.225 when managers have SAB.

3.6 Self-serving attribution bias and acquisition announcement returns

Overconfident managers tend to overestimate their ability to obtain synergies from a merger and as a result they overpay for target companies and undertake value-destroying mergers (Malmendier and Tate 2008, Billett and Qian 2008). To the extent that self-

serving attribution bias is a factor that leads to overconfidence, I test whether managers with SAB are more likely to make value-destroying acquisitions.

I use the SDC Platinum database to identify all completed acquisitions by my sample firms of private, public, and subsidiary targets. Following Moeller, Schlingemann, and Stulz (2004) I select M&A deals that satisfy the following criteria: (1) the target firm has to be a U.S. firm; (2) the deal value is at least $1million; (3) the percentage stake that the acquirer seeks in the deal is at least 50%; and (4) the deal is completed. This procedure yields a sample of 7,712 acquisitions. *CAR[-1,1], t*he cumulative abnormal return in the three days around the deal announcement date, is then calculated where day 0 is the deal announcement date.

Table 7 presents the regression results of *CAR[-1,1]* on *SAB* and other control variables with different specifications. Firms with managers who have SAB experience significantly more negative reactions to merger announcements. For instance, column (3) indicates that the announcement return to mergers done by managers with SAB is lower by 0.5 percent, after common firm and deal characteristics and year and firm fixed effects are controlled for. While this effect is slightly smaller than the effect documented by Malmendier and Tate (2008), who find that mergers done by overconfident managers experience a market reaction lower by 0.8 percent, it is still substantial.

In summary, the evidence based on the investment-cash flow sensitivity and the acquisition announcement return suggests that managers with SAB are more likely to overinvest and invest sub-optimally.

3.7 Self-serving attribution bias and corporate financing decisions

Malmendier et al. (2010) and Ben-David et al. (2007) show that because overconfident managers view equity financing as costly, they tend to use higher leverage, rely more on long-term debt, are more likely to repurchase shares, and are less likely to issue dividends. In this section, I examine whether managers with SAB make similar financing decisions.

Column (1) in Table 8 shows that management SAB is positively associated with a firm's leverage (defined as the book value of debt divided by the sum of book value of debt and market value of equity) after year and industry fixed effects and other control variables are included in the regression. When managers have SAB, the leverage is higher by 0.038. Given that the standard deviation of firm leverage is 0.26 (Table 1), this shows that SAB explains more than 10 percent of the standard deviation of firm leverage. The effect is smaller but still economically and statistically significant when firm fixed effects are controlled for in column (2).

Columns (3) and (4) focus on the percentage of long-term debt (relative to the total amount of debt). Ben-David et al. (2007) show a positive and significant relation between management overconfidence and the percentage of long-term debt. Consistent with the association between SAB and overconfidence, results in columns (3) and (4) show that managers with SAB also tend to rely on more long-term debt financing.

Columns (5) and (6) report the logistic regressions of *Repurchase*, a dummy variable that equals 1 if purchase of common and preferred stock by a firm in a given year is greater than 1 percent of equity and zero otherwise, on SAB and other control variables. The coefficient on *SAB* is 0.069 in column (5) with year and industry fixed effects included and 0.082 in column (6) when year and firm fixed effects are controlled for. In

both cases, the effect is statistically significant. Unreported marginal effect calculation

shows that a manager with SAB is 1.5 percent more likely to repurchase stocks.

Column (7) shows a negative relation between *SAB* and *Dividends*, a dummy variable

that equals 1 if a firm declares dividends in a year and zero otherwise, in a logistic

regression setting. Since dividend policy tends to be sticky, firm fixed effects cannot be

included in the analysis. The coefficient on *SAB* is -0.076 (z-statistic=-2.24). Unreported

result shows that the marginal effect of *SAB* is -1 percent, indicating that the probability

of a firm issuing dividends when the managers have SAB is lower by 1 percent.

Overall, the financing policies by mangers with SAB are consistent with the

hypothesis that these managers view equity as undervalued and as a result prefer debt

financing, repurchase stocks more often, and avoid paying dividends.

4. Discussions

4.1 Existence of management self-serving attribution bias

The behavioral finance literature shows that irrational market participants can stay in

the market for a long time without being forced out by rational agents (De Long et al.

1991, Odean 1998, Daniel et al. 1998, Gervais and Odean 2001). The literature also

examines the implications and consequences of overconfident participants (Malmendier

and Tate 2005, 2008, Malmendier et al. 2010, Ben-David et al. 2007).

A key assumption in the overconfidence models is the economic agents' self-serving

attribution bias. For instance, Gervais and Odean (2001) model a trader's overconfidence

in a dynamic learning model where the trader learns about her ability over time. A key

ingredient of this model is the trader's self-serving attribution bias modeled as her overweighing past performance success.

Given the role of the self-serving attribution bias in the overconfidence literature, it is important to empirically test for the existence of such bias. While there is a substantial literature documenting individuals' SAB, the evidence is mainly from lab experiments or surveys by psychologists (Larwood and Whittaket 1977, Russo and Schoemaker 1992, Shepperd et al. 2008). One exception is Choi and Lou (2008) who measure the self-serving attribution bias of investors indirectly using past performance volatility. In the management literature, researchers use the frequency of first person singular pronouns relative to first person plural pronouns as an indication of "narcissism" and study its implications for firm practices (Chatterjee and Hambrick 2007). Compared with the prior studies, this paper provides direct evidence on the self-serving attribution bias of corporate managers.

4.2 Causes of SAB and implications for the management overconfidence literature

The social psychology literature has proposed two broad streams of explanations for SAB: cognitive and motivational. As discussed in Section 3.2, the cognitive explanation argues that it is the limited information-processing capacity of individuals that drives the SAB (Miller and Ross 1975).

On the other hand, the motivational approach argues that people make internal attributions for success and external attributions for failure to maintain their self-esteem and feel good about themselves (Zuckerman 1979). Two distinct motives are proposed: self-enhancement and self-presentation. The self-enhancing motivations help individuals

protect self-esteem by creating causal explanations that serve to make themselves feel better. The self-presentation motivation refers to the drive to convey a desired image to others (Schlenker 1980), i.e., although people may not believe the content of a self-serving utterance, they may nevertheless offer it to others in order to create a favorable impression.

The psychology literature has had a long debate on which of the two explanations is the main factor that leads to the self-serving attribution bias. Miller and Ross (1975) review the literature and point out that cognitive reasons could be sufficient in explaining SAB. However, more recent research in social psychology has accumulated substantial evidence that motivational reasons might be the dominant factor that drives SAB (Sedikides et al. 1998, Sheppard et al. 2008).

Whether cognitive or motivational factors drive the SAB of market participants has significant implications for the overconfidence research in behavioral economics. If managers have SAB primarily to seek additional (self-enhancing or self-presenting) motivations, then the SAB seems less likely to lead to overconfidence with real decision consequences. However, the cognitive explanation is a more plausible factor with real-consequence implications because a key difference between the cognitive and motivational explanations is that economic agents with cognitive limitations s are less likely to realize that they have the bias.

The empirical results in this paper show that the cognitive explanations are at least partially responsible for corporate managers' self-serving attribution bias and this bias is associated with financial policies. Therefore, the results lend support to the management overconfidence literature by strengthening its cognitive foundation.

5. Conclusion

I find significant evidence that managers tend to use first-person pronouns in MD&As more often when firm performance is better. This tendency increases with a firm's information environment complexity and past success. Within specific MD&As, managers tend to use more self-referencing pronouns when the sentence has positive tone. This evidence suggests that managers have self-serving attribution bias. Management SAB leads to overconfidence: I find that when managers have more SAB, they are more likely to include forward-looking statements in the MD&As and issue earnings forecasts; their forward-looking statements are more homogeneous in tone and their earnings forecasts tend to be overly optimistic. Also, firms whose managers have SAB tend to overinvest in that they have higher investment-cash flow sensitivity and more negative stock returns around merger announcements. Finally, these firms tend to have higher leverage, use more long-term debt, are more likely to repurchase stock, and are less likely to issue dividends. Collectively, evidence in this paper supports the existence of management self-serving attribution bias and suggests that it is important to model this bias and the resulting management overconfidence in economic analysis.

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Table 1 Descriptive statistics

Panel A: Variables for the empirical tests

Variable	Obs	Mean	Std.	P25	Median	P75
We	38953	1.27	1.73	0.02	0.12	2.78
Other	38953	0.12	0.10	0.06	0.10	0.17
Self	38953	1.15	1.70	-0.06	0.04	2.65
ΔSelf	38953	0.15	0.86	-0.08	0.00	0.11
Ret	38953	0.19	0.97	-0.24	0.06	0.38
Size	38877	5.53	1.99	4.13	5.44	6.85
Ln(assets)	38953	5.83	2.02	4.35	5.77	7.15
Q	38786	1.93	1.63	1.05	1.33	2.09
Firmage	38945	0.15	0.11	0.08	0.12	0.19
RETVOL	37765	0.50	0.12	0.08	0.12	0.19
NFLS	37773	228	187	106	179	290
Ln(NFLS)	37773	5.17	0.73	4.66	5.19	5.67
Forecast	37773	0.11	0.32	-	-	-
FERR	4268	0.04	0.55	-0.24	-0.04	0.29
IQV	37773	0.81	0.14	0.75	0.84	0.91
Leverage	30445	0.24	0.26	0.02	0.19	0.38
LTD	25814	0.72	0.33	0.56	0.87	0.98
Repurchase	30583	0.30	0.46	-	-	-
Dividends	30583	0.32	0.47	-	-	-

Notes: This table shows the descriptive statistics of the variables examined in the empirical tests. *We* is the percentage of first-person pronouns in the MD&A. *Other* is the percentage of second- and third-person pronouns in the MD&A. *Self* is *We* minus *Other*. *ΔSelf* is the year-to-year change in *Self*. *Ret* is the annual stock return during the fiscal year. *Size* is the logarithm of the market value of equity (Compustat annual item 25 * item 199). *Ln(Asstes)* is the logarithm of the book value of assets (item 6). *Q* is the market value (item 6 * item 199 + item 181) divided by the book value of the assets (item 6). *Firmage* is the average number of years since a firm shows up in CRSP monthly stock return file. *RETVOL* is the standard deviation of the monthly stock returns during the fiscal year. *NFLS* is the number of forward-looking statements in MD&As; *Ln(NFLS)* is the logarithm of *NFLS*. *Forecast* is a dummy variable that equals 1 if the manager of a firm makes forecasts of next quarter's earnings per share after the 10-K filing date and 0 otherwise. *FERR* is the earnings per share forecast minus the actual earnings per share scaled by the book value of assets per share. *IQV* is the index of qualitative variation of the tone of the forward-looking statements in MD&A. *Leverage* is the book value of total debt (long-term plus short-term) divided by the sum of the book value of total debt and the market value of equity at the end of the fiscal year. *LTD* is the percentage of long-term debt in total debt (item 9 / (item 9 + item 34)). *Repurchase* is a dummy variable that equals 1 if purchase of common and preferred stock (item 115 / (item 6 – item 181)) is greater than 1% of equity, and zero otherwise. *Dividends* is a dummy variable that equals 1 if a firm declares dividends in the fiscal year (i.e., item 21 > 0) and zero otherwise.

Panel B: Mean values of first-person pronouns and second- and third-person pronouns in typical text domains

	Emotion writing	Control writing	Books	Talking
We	3.49	3.22	0.49	1.68
Other	1.13	0.50	1.27	1.65

Notes: This table shows the percentages of first-personal pronouns (*We*) and second- and third-personal pronouns (*Other*) of the text in the research articles surveyed by Pennebaker et al. (2001, Table 3). Emotion writing studies require participants to write about their emotions and thoughts about personally relevant topics; Control Writing involves writing about non-emotional topics, such as plans for the day or descriptions of ordinary objects or events; Books refers to a semi-random sample of pages from the 30 best-selling fiction books of 1995; Talking files come from transcripts collected from individuals who are talking in non-experimental settings (i.e., correlational studies).

Table 2 Regression of managers' self-referencing tendency on firm performance

Variable	Full sample (1) ΔSelf	Full sample (2) ΔSelf	Sub-sample (3) ΔSelf	Sub-sample (4) ΔSelf	Sub-sample (5) ΔSelf
Ret	0.11***	0.09***	0.14***	0.25*	0.08**
	(4.40)	(4.98)	(3.08)	(2.14)	(2.36)
Q		0.03**	0.02*	0.03	0.00
		(2.16)	(2.15)	(1.34)	(0.34)
Ln(assets)		0.01*	0.01	0.00	0.01**
		(1.78)	(1.71)	(0.42)	(2.86)
Firmage		-0.00	-0.00	-0.00	-0.00
		(-0.68)	(-1.52)	(-0.77)	(-0.33)
Year fixed effects	Yes	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes	Yes
Auditor fixed effects	Yes	Yes	Yes	Yes	Yes
Standard error	cluster by year	cluster by year	cluster by year	cluster by year	cluster by year
Observations	35558	35430	18981	5001	9719
R-squared	0.04	0.05	0.03	0.04	0.02

Notes: All variables are as defined in Table 1 Panel A. In coding the auditor fixed effects, all non-big-eight auditors are grouped together. T-statistics is shown in parentheses. The sub-sample in column (3) includes firms whose stock returns are between 25 and 75 percentiles of the returns of firms in the same 2-digit SIC industry. The sub-sample in column (4) includes firms whose stock returns are within the 5 percent range of the median returns of firms in the same 2-digit SIC industry in the same year. The sub-sample in column (5) includes firms whose idiosyncratic stock returns are in the bottom quartile of all firms in my sample.

Table 3 Managers' self-serving attribution bias as a function of firm size, number of business segment, and past success

Variable	(1) ΔSelf	(2) ΔSelf	(3) ΔSelf	(4) ΔSelf
Ret	0.08***	0.05	0.00	-0.09**
	(3.78)	(1.23)	(0.10)	(-2.79)
Size		0.01		0.00
		(1.33)		(0.92)
Ret * Size		0.01*		0.02***
		(2.06)		(3.89)
Num_seg			-0.02	-0.02
			(-0.86)	(-0.98)
Ret * Num_seg			0.07**	0.06***
			(2.86)	(3.10)
Success	-0.02			-0.02
	(-1.37)			(-1.11)
Ret * Success	0.05***			0.04*
	(3.52)			(1.93)
Q	0.02*	0.02*	0.02	0.01
	(1.83)	(1.96)	(1.68)	(1.11)
Firmage	-0.02	0.00	0.00	-0.01
	(-0.65)	(0.12)	(0.16)	(-0.59)
Year fixed effects	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes
Auditor fixed effects	Yes	Yes	Yes	Yes
Standard error	cluster by year	cluster by year	cluster by year	cluster by year
Observations	31006	35329	20103	18227
R-squared	0.05	0.05	0.04	0.04

Notes: *Size* is the logarithm of the market value of equity (Compustat annual item 25 * item 199). *Num_seg* is the logarithm of the number of business segments from Compustat. *Success* is a dummy variable that equals 1 if a firm's stock return is above industry median in the last two years and 0 otherwise. All the other variables are as defined in Table 1 Panel A. T-statistics is shown in parentheses.

Table 4 Association between tone and self-referencing tendency of the causation sentences in MD&As

Variable	(1) Self	(2) Self	(3) Self	(4) Self
Positive_tone	0.32***	0.37***	0.33***	0.37***
	(4.78)	(4.68)	(5.39)	(5.18)
MDA_length	-0.37***		-0.35***	
	(-10.78)		(-14.82)	
Size	0.18***		0.20***	
	(8.51)		(6.58)	
Q	-0.02		-0.05*	
	(-1.16)		(-1.98)	
Firmage	-0.01		-0.01	
	(-1.66)		(-1.99)*	
Year fixed effects	Yes	No	Yes	No
Firm fixed effects	Yes	No	Yes	No
Auditor fixed effects	Yes	No	Yes	No
Firm fixed effects * year fixed effects	No	Yes	No	Yes
Standard error	cluster by year	cluster by year	cluster by year	cluster by year
Observations	3165111	3562110	1659908	1855964
R-squared	0.30	0.40	0.26	0.38

Notes: The sample used in the regressions consists of all the sentences that contain at least one "causative" words defined by LIWC, such as "because," "effect," and "hence." In columns (3) and (4), the sample requires a firm to have at least 8 years of MD&A. *Positive_tone* is a dummy variable that equals one if the probability of a sentence being positive predicted by the Naïve Bayesian algorithm is the highest among the three categories (positive, neutral, and negative), and zero otherwise. *MDA_length* is the logarithm of the number of words in an MDS&A. All the other variables are as defined in Table 1 Panel A. T-statistics is shown in parentheses.

Table 5 Managers' self-serving attribution bias and managerial forward-looking statements and earnings forecasts

Variable	(1) Ln(NFLS)	(2) Ln(NFLS)	(3) Forecast	(4) Forecast	(5) FERR	(6) FERR	(7) IQV	(8) IQV
SAB	0.049***	0.025***	0.103***	0.101**	0.052***	0.038*	-0.003*	-0.007***
	(7.91)	(4.42)	(2.87)	(2.07)	(3.15)	(1.73)	(-1.92)	(-4.32)
Size	0.130***	0.017**	0.398***	0.501***	0.022***	-0.017	-0.007***	-0.009***
	(68.36)	(2.51)	(38.58)	(8.66)	(3.42)	(-0.58)	(-16.61)	(-5.52)
Q	-0.016***	-0.002	-0.016**	0.010	0.010***	0.013**	-0.002***	-0.000
	(-9.10)	(-1.42)	(-2.38)	(1.00)	(4.27)	(1.98)	(-5.09)	(-0.67)
Firmage	0.001***	-0.006	-0.011***	0.040**	-0.001**	-0.026***	0.000***	-0.000
	(2.94)	(-1.58)	(-8.22)	(2.21)	(-2.53)	(-2.59)	(7.17)	(-0.07)
Earn	-0.230***	-0.149***	1.223***	0.829**	-0.258***	0.310*	0.021***	0.001
	(-16.11)	(-5.54)	(11.03)	(2.28)	(-2.95)	(1.77)	(6.44)	(0.25)
RETVOL	0.466***	0.133***	-0.267	-2.047***	-0.042	-0.283	-0.079***	-0.034***
	(12.30)	(3.30)	(-1.40)	(-4.33)	(-0.29)	(-1.25)	(-9.57)	(-3.34)
Year effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry effects	Yes	No	Yes	No	Yes	No	Yes	No
Firm effects	No	Yes	No	Yes	No	Yes	No	Yes
Standard error	robust	cluster by firm	robust	cluster by firm	robust	cluster by firm	robust	cluster by firm
Observations	37389	25367	37332	10015	4227	4227	37389	25367
R-squared	0.36	0.71	-	-	0.09	0.55	0.07	0.45

Notes: *SAB* is a dummy variable that equals 1 if ε_{it} is above the median and 0 otherwise, where ε_{it} is the residual from the pooled regression of *Self* on *Ret*. All other variables are as defined in the Notes to Table 1 Panel A. T-statistics is shown in parentheses for columns (1), (2), (5), (6), (7) and (8). Z-statistics is shown in parentheses for columns (3) and (4).

Table 6 Managers' self-serving attribution bias and corporate investment-cash flow sensitivity

Variable	(1) CAPX	(2) CAPX	(3) CAPX	(4) CAPX	(5) CAPX	(6) CAPX
CF	-0.174**	-0.099	-0.132	-0.033	-0.033	0.172
	(-2.12)	(-0.40)	(-0.46)	(-0.00)	(-0.00)	(0.58)
Q	0.118***	0.115***	0.116***	0.112***	0.112***	0.128**
	(3.88)	(3.40)	(3.42)	(3.63)	(3.30)	(2.17)
CF * Q	-0.018	-0.018	-0.022	-0.025	-0.025	-0.020
	(-1.44)	(-1.43)	(-1.52)	(-1.52)	(-1.32)	(-0.96)
SAB	-0.236**	-0.224**	-0.221**	-0.202**	-0.202*	-0.122
	(-2.24)	(-2.13)	(-2.12)	(-2.10)	(-1.73)	(-1.60)
SAB * CF	0.223**	0.225**	0.224**	0.225**	0.225*	0.148*
	(2.08)	(2.01)	(2.06)	(2.11)	(1.72)	(1.70)
Size		-0.070	-0.076	-0.069	-0.069	0.004
		(-1.45)	(-1.47)	(-1.46)	(-1.08)	(0.03)
Size * CF		0.016	0.030	0.048	0.048	-0.019
		(0.47)	(0.70)	(1.00)	(0.73)	(-0.91)
Earn		0.739*	0.690*	0.442	0.442	1.142
		(1.78)	(1.72)	(1.16)	(1.03)	(1.32)
Earn * CF		0.145	0.128	0.016	0.016	0.042
		(1.33)	(1.25)	(0.13)	(0.12)	(0.27)
Firmage		-0.003	-0.004*	-0.003	-0.003	0.026
		(-1.45)	(-1.91)	(-1.36)	(-1.36)	(0.82)
Firmage * CF		0.004	0.005	0.002	0.002	0.006
		(1.11)	(1.32)	(0.66)	(0.60)	(1.03)
RETVOL		1.397***	1.361***	0.975***	0.975***	1.268
		(2.72)	(2.75)	(2.83)	(2.88)	(1.64)
RETVOL * CF		-0.858	-1.020*	-1.040*	-1.040	-1.213
		(-1.54)	(-1.69)	(-1.71)	(-1.59)	(-1.43)
Year effects	Yes	Yes	Yes	Yes	Yes	Yes
Industry effects	Yes	Yes	Yes	Yes	Yes	No
Year effects * CF	No	No	Yes	Yes	Yes	No
Industry effects * CF	No	No	No	Yes	Yes	No
Firm effects	No	No	No	No	No	Yes
Standard error	robust	robust	robust	robust	cluster by firm	cluster by firm
Observations	28740	28711	28711	28711	28711	19580
R-squared	0.01	0.01	0.01	0.03	0.03	0.17

Notes: The dependent variable is *CAPX*, the capital expenditure (Compustat annual item 128) divided by the amount of property, plant, and equipment at the beginning of the year (item 8). *CF* is earnings before extraordinary items (item 18) plus depreciation (item 14) and is normalized by the amount of property, plant, and equipments at the beginning of the year (item 8). *SAB* is a dummy variable that equals 1 if ε_{it} is above the median and 0 otherwise, where ε_{it} is the residual from the pooled regression of *Self* on *Ret*. All other variables are as defined in Table 1 Panel A. T-statistics is shown in parentheses.

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Table 7 Managers' self-serving attribution bias and acquisition announcement returns

Variable	(1) CAR[-1,1]	(2) CAR[-1,1]	(3) CAR[-1,1]
SAB	-0.006***	-0.006**	-0.005**
	(-3.42)	(-2.50)	(-2.00)
Size		-0.002**	0.000
		(-2.54)	(0.14)
Q		-0.001	0.000
		(-1.25)	(0.01)
Firmage		0.000	0.000
		(1.12)	(0.32)
Earn		0.018*	0.011
		(1.80)	(0.54)
RETVOL		0.064**	0.041
		(2.14)	(1.27)
Cash		0.005**	0.004
		(2.13)	(1.08)
Deal_size		-0.002*	-0.003***
		(-1.95)	(-2.93)
Diversify		-0.000	-0.006
		(-0.11)	(-1.42)
Year fixed effects	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	No
Firm fixed effects	No	No	Yes
Standard error	robust	cluster by firm	cluster by firm
Observations	7712	7615	7615
R-squared	0.03	0.04	0.64

Notes: The dependent variable is *CAR[-1,1]*, the cumulative abnormal return measured over the window [-1,1] where day 0 is the deal announcement date. The daily abnormal return is calculated as raw returns subtract the CRSP value-weighted daily index returns. *SAB* is a dummy variable that equals 1 if ε_{it} is above the median and 0 otherwise, where ε_{it} is the residual from the pooled regression of *Self* on *Ret*. *Cash* is the percentage of cash payment in the deal. *Deal_size* is the log of the value of the transaction scaled by the market value of equity of the acquirer. *Diversify* is a dummy variable that equals 1 if the target and the acquirer do not have the same 2-digit SIC code and 0 otherwise. All other variables are as defined in Table 1 Panel A. T-statistics is shown in parentheses

Table 8 Managers' self-serving attribution bias and corporate financing policies

Variable	(1) Leverage	(2) Leverage	(3) LTD	(4) LTD	(5) Repurchase	(6) Repurchase	(7) Dividends
SAB	0.038***	0.015***	0.012***	0.007*	0.069**	0.082**	-0.076**
	(15.68)	(9.23)	(2.90)	(1.86)	(2.47)	(2.22)	(-2.24)
Size	-0.027***	-0.093***	0.034***	0.025***	0.169***	-0.119***	0.339***
	(-29.17)	(-32.78)	(25.40)	(5.54)	(18.44)	(-2.85)	(12.89)
Q	-0.016***	0.002***	-0.011***	-0.002	0.019**	-0.002	-0.272***
	(-12.33)	(2.96)	(-5.66)	(-1.05)	(2.45)	(-0.15)	(-6.63)
Firmage	0.001***	0.001	-0.001***	0.002	0.008***	-0.023	0.046***
	(9.66)	(0.27)	(-6.03)	(1.17)	(7.73)	(-1.23)	(11.49)
Earn	0.036***	0.027***	0.096***	0.039	0.395***	-0.169	4.566***
	(6.90)	(3.21)	(8.96)	(1.41)	(3.86)	(-1.13)	(11.43)
RETVOL	0.020	0.039***	-0.212***	-0.069**	-2.546***	-1.610***	-12.000***
	(1.34)	(2.92)	(-8.04)	(-2.17)	(-10.30)	(-4.73)	(-16.65)
PPE(-1)	0.000***	0.000***	-0.000***	0.000	0.000***	0.000	0.000
	(8.63)	(3.66)	(-15.21)	(0.00)	(2.90)	(0.22)	(0.89)
RET(-1)	-0.005***	-0.006***	0.003	-0.000	-0.146***	-0.064***	-0.165***
	(-3.35)	(-5.07)	(1.09)	(-0.17)	(-6.55)	(-2.92)	(-5.65)
Year effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry effects	Yes	No	Yes	No	Yes	No	Yes
Firm effects	No	Yes	No	Yes	No	Yes	No
Standard error	robust	cluster by firm	robust	cluster by firm	robust	cluster by firm	cluster by firm
Observations	27310	19314	23077	16415	27375	27375	27347
R-squared	0.32	0.83	0.16	0.58	-	-	-

Notes: *SAB* is a dummy variable that equals 1 if ε_{it} is above the median and 0 otherwise, where ε_{it} is the residual from the pooled regression of *Self* on *Ret*. *PPE(-1)* is the amount of property, plant, and equipments at the end of last year. *RET(-1)* is the stock returns from last fiscal year. All other variables are as defined in the Notes to Table 1 Panel A. T-statistics is shown in parentheses for columns (1) to (4). Z-statistics is shown in parentheses for columns (5) to (7).