Investor Reaction to Higher Earnings Management Incentives of Overoptimistic CEOs

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Abstract

We examine whether investors recognize and rationally impound into the share price the *possible* earnings management of overoptimistic CEOs at the time the management forecast is issued, rather than the perceived (*actual*) earnings management at the announcement of realized earnings. We first confirm that investors underreact to management earnings forecasts issued by overoptimistic managers. Next we find that the market reacts more positively to the earnings announcements of overoptimistic CEOs when realized earnings are slightly above or below forecasted earnings compared to those of non-optimistic managers. This confirms our expectations that investors react negatively to the higher earnings management incentives of overoptimistic managers when the forecast is issued and not to actual signs of earnings management when earnings are announced.

Keywords: overoptimism, market reaction, earnings management, management earnings forecast, earnings announcement

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1. Introduction

We examine whether investors recognize and rationally impound into the share price the *possible* earnings management of overoptimistic CEOs at the time the management forecast is issued, rather than to the perceived (*actual*) earnings management at the announcement of realized earnings. Our question is motivated by the following streams of literature: (1) Hribar and Yang (2011) find that forecasts issued by overoptimistic managers are more optimistic than forecasts issued by the average CEO; (2) Trueman (1986) and Kasznik (1999) argue that forecasts of overoptimistic managers become an earnings threshold that managers try to meet or beat, and Schrand and Zechman (2011) posit that more optimistic forecasts issued by overoptimistic managers give additional incentives to manage earnings to meet or beat the forecast; (3) cognitive biases in managerial decisions are in general recognized by the market and impounded into the share price (e.g., Malmendier and Tate, 2008; Hillary and Hsu, 2011); and (4) investors recognize earnings management around earnings thresholds, and in the period after 2001 they view small positive earnings surprises as implicit evidence of earnings management, punishing all firms that meet or just beat earnings thresholds, regardless of whether earnings management actually took place (e.g., Bartov et al., 2002; Kasznik and McNichols, 2002; Skinner and Sloan, 2002; Keung et al., 2010). Based on these findings, we expect investors to recognize not only managerial overoptimism but also the higher earnings management incentives of overoptimistic CEOs and to discount the management forecasts of these CEOs at the earliest time earnings information is disclosed by the firm: the management forecast date.

To investigate this, we examine the market reaction to earnings announcements of overoptimistic managers at the earnings announcement date. We do this because the underreaction to forecasts issued by overoptimistic managers could also be explained by the lower credibility of biased forecasts. Our argument of underreaction due to the cognitive bias combined with the expectation of earnings management by overoptimistic managers can, however, be validated based on differential market reactions at the earnings announcement date. If investors react to earnings management by overoptimistic CEOs at the earnings announcement date only, the market reaction to earnings of overoptimistic CEOs is not different from that of an average firm. However, the market reaction to the

earnings forecasts of overoptimistic CEOs will be different if increased earnings management incentives of overoptimistic managers are already incorporated into the share price at the forecast date. We predict that while the non-optimistic firm is punished for small positive forecast errors at the earnings announcement date, the market will not react to small positive forecast errors of overoptimistic managers, because earnings management incentives have already been impounded into the share price at the forecast date. If, however, subsequent earnings realizations by overoptimistic CEOs do not correspond with the market's expectations, that is, overoptimistic CEOs do not seem to have managed earnings, a correction of the price takes place at the earnings announcement date. The market will hence react positively to small negative forecast errors from overoptimistic managers to correct for the unrealized earnings management.

Our measure of overoptimism is an indicator variable based on the percentage of the intrinsic value of unexercised exercisable options to the value of total equity holdings of the CEO at the beginning of the year. This measure is conceptually based on that first introduced by Malmendier and Tate (2005) and since then validated in many other empirical studies on cognitive biases (e.g., Li et al., 2010; Campbell et al., 2011; Hribar and Yang, 2011). We use propensity score matching to generate a control sample for our overoptimistic firm-year observations.

We confirm that investors underreact to management forecasts of overoptimistic managers when the forecast is issued. In our main analysis we find that the market reacts more positively to the earnings announcements of overoptimistic CEOs in the small forecast error range compared to those of non-optimistic managers. This means that investors react negatively to the higher earnings management incentives of overoptimistic managers when the forecast is issued and do not react to perceived earnings management of overoptimistic CEOs. In contrast, investors react more positively to the perceived lack of earnings management by overoptimistic CEOs compared to non-optimistic managers when earnings are announced.

Our results are important for two reasons. First, we show that investors are not fooled by overoptimistic forecasts because we confirm that the forecasts of overoptimistic managers are discounted by the market. By issuing higher management forecasts, firms managed by overoptimistic CEOs do not enjoy positive abnormal returns compared to firms of non-overoptimistic managers, at

the forecast date. Second, we show that after 2001 investor attitudes to earnings management are so negative that all firms managed by overoptimistic CEOs are punished with higher cost of capital as early as the management forecast date, i.e., the market reaction is driven by expectations of earnings management when the management forecast is issued rather than actual earnings management when earnings are announced.

Our study contributes to the literature in a number of ways. We show that a managerial cognitive bias, specifically CEO overoptimism, is an additional factor in explaining market reaction to earnings management following the issuance of management forecasts, because the market recognizes the higher earnings management incentives of overoptimistic managers and reacts to them early.

We contribute to the literature on cognitive biases, especially those examining overoptimism and overconfidence, by separating overoptimism from overconfidence in an empirical setting. In the management forecasting context, forecast accuracy proxies for overconfidence. We examine consequences of CEO overoptimism by not only considering the size of the forecast error but also its sign. In addition, while prior research focused on the market reaction to overconfident forecasts at the announcement of the forecast (Hilary and Hsu, 2011), we investigate whether there is an incremental market reaction to accounting information disclosed by overoptimistic managers at the earnings announcement date. We show that the market recognizes cognitively biased management forecasts and incorporates these biases into the share price, and also add to capital market research by examining market reaction to management forecasts and earnings announcements in a combined fashion.

We contribute to the earnings management literature by examining whether the market is fooled by earnings management incentives. More specifically we contribute to the literature on earnings management around thresholds. We show that beyond the three classic earnings thresholds, analyst forecasts, prior year earnings and zero earnings, examined in earnings management literature (e.g., Degeorge et al., 1999), management forecasts are also considered an earnings benchmark both by managers and investors.

The paper proceeds as follows. Section 2 provides an overview of prior literature. Section 3 discusses our theory and develops our hypothesis. Section 4 introduces sample selection procedures and our empirical design. Section 5 presents our results and Section 6 concludes.

2. Literature Review

Overoptimism and Overconfidence

Economic models traditionally treat humans as rational agents: humans are assumed to make optimal decisions. But psychology literature has long stated that human cognitive biases are significant and that the economic assumption of full rationality is not a true characterization of humans. Simon (1955) was the first to suggest that full rationality may not be a true description of human cognitive processes, arguing that there are constraints to human decision making that result in bounded rationality. Therefore humans make systematic biases in their reasoning, judgment, and decision making. Psychology literature also concludes that senior corporate managers are even more prone to decision-making biases (e.g., Kahneman and Lovallo, 1993) due to the context of their decision making: decisions are diverse and infrequent, feedback is noisy, the manager is not specialized in the decisions and is often sheltered from market pressure and competition (Camerer and Malmendier, 2007).

Recently, great progress has been made in economics, finance, and accounting research in examining the economic effects of cognitive biases (e.g., Malmendier and Tate, 2005 and 2008; Billett and Qian, 2008; Hilary and Hsu, 2011; Hribar and Yang, 2011). With regard to management decision making, the focus has been on the cognitive biases of overoptimism and overconfidence.

Overoptimism and overconfidence are defined with regard to predictions of the future (Ben-David et al., 2010). The theoretical construct of overoptimism is defined as the overestimation of the mean of future random events or risky processes, while overconfidence is an underestimation of the variance of future random events. Overconfidence – the miscalibration of beliefs or predictions – arises either from overestimating one's ability to predict future events, resulting in overweighting private signals compared to public ones, or from underestimating the variance or volatility of future

random events, resulting in the estimation of narrow confidence intervals or narrow subjective probability distributions of forecasts. In the psychology literature there is an as yet unresolved controversy about whether optimism and pessimism represent the same construct and are the two end-points of a unidimensional scale, or they are distinct constructs and are empirically differentiable dimensions (Carver et al., 2010).

Malmendier and Tate (2005 and 2008) developed the first measures of overconfidence. In a recent paper however, Malmendier et al. (2010) clarify that the CEOs they called overconfident are actually overoptimistic, because they "overestimate the means of their firms' future cash flows" (Malmendier et al., 2010:2). Although it is based on Malmendier and Tate's 'overconfidence' measure, Campbell et al. (2011:695) call their empirical measure 'optimism', and explain it as "overestimating the firm's productivity shock mean, on the chosen investment level". In contrast, Billet and Qian (2008), and Hilary and Hsu (2011) examine dynamic overconfidence, clearly separating it from overoptimism.

Cognitive Biases Affect Managerial Decisions

Prior research confirms that overoptimism and overconfidence are common traits of managers and that these cognitive biases affect their real economic decisions (e.g., Roll, 1986; Malmendier and Tate, 2005; Ben-David et al., 2010). Roll (1986) examines the motives for mergers and acquisitions, and offers an alternative hypothesis – managerial hubris – to explain prior empirical results. The paper argues and finds that cognitively biased managers overpay for target companies. Camerer and Lovallo (1999) use an experimental setting to show that optimistic biases of entrepreneurs affect the decision to enter a competitive market and suggest that this optimism explains the high rate of business failures observed. Using a theoretical model, Heaton (2002) also shows that overoptimism affects managerial decisions about the financing of investment projects. Overoptimistic managers may reject positive net present value (NPV) projects that require external financing, as they believe that the market undervalues their firm. Alternatively, they may invest in negative NPV projects, because they overvalue them. Ben-David et al. (2010) examine the effect of overconfidence and overoptimism on the investment behavior of CFOs. Using their survey-based measure, the authors distinguish between

overconfidence and overoptimism. They find that CFOs' cognitive biases affect capital-budgeting decisions: corporate investment levels increase with both overconfidence and overoptimism. Malmendier and Tate (2005) also conclude that 'overconfidence' affects corporate investment decisions: 'overconfidence' results in a higher cash-flow sensitivity of managers, distorting investment decisions. Because 'overconfident' CEOs overestimate project returns but believe that the market undervalues their firm, they overinvest if funds are available internally and underinvest if external funds are required. Finally, using a dynamic measure of overconfidence, Billett and Qian (2008) conclude that overconfidence leads to managers making more acquisitions.

In addition to investment and acquisition decisions, it has been shown that cognitive biases also affect management forecasting behavior (e.g., Hilary and Hsu, 2011; Hribar and Yang, 2011). Using a dynamic definition of overconfidence, Hilary and Hsu (2011) examine whether managers become overconfident in their future earnings forecasts. They find that the subsequent earnings forecasts of overconfident managers become less accurate. Hribar and Yang (2011) show that cognitive biases affect managerial forecasting behavior because the characteristics of cognitively biased forecasts differ. The authors find that 'overconfident'[1] managers are more likely to issue earnings forecasts, to issue forecasts with higher precision – proportionately more point than range forecasts and narrower range forecasts –, and that their forecasts are higher on average resulting in a higher probability of negative forecast errors.

Market Reaction to Biased Forecasts

Prior literature shows that cognitive biases not only affect managerial behavior, but that investors recognize the cognitive biases of managers and correct for the effect of cognitively biased corporate decisions, such as project termination or mergers and acquisition decisions (e.g., Statman and Sepe, 1989; Malmendier and Tate, 2008; Billett and Qian, 2008).

[1] Although Hribar and Yang (2011) call their construct 'overconfidence', they acknowledge the fact that they actually examine CEO overoptimism.

Accounting research has established that the market reacts to management earnings forecasts (Patell, 1976; Penman, 1980), specifically to the earnings news in management forecasts.[2] Since then it has also been shown that in their reaction to management forecasts investors behave rationally: depending on firm size, forecast horizon, forecast news, and forecast credibility, the market recognizes and does not react to the predictable bias when the forecasts are issued (Choi and Ziebart, 2004; Rogers and Stocken, 2005; Hutton and Stocken, 2007; Ng et al., 2010).

Although cognitive biases and cognitively biased decisions are generally recognized and discounted by the market, the paper of Hilary and Hsu (2011) is the only one so far to examine the market reaction to cognitively biased management forecasts. The authors find that the market reaction to overconfident forecasts at the time the forecast is issued is lower: the market discounts the earnings/forecast news.

3. Theory and Hypothesis Development

Hribar and Yang (2011) show that the forecasts issued by overoptimistic managers are more optimistic than forecasts issued by the average manager. We posit that managers' forecasts act as an earnings threshold that managers try to meet or beat (Trueman, 1986; Kasznik, 1999) and that more optimistic forecasts issued by overoptimistic managers give additional incentives to manage earnings to meet or beat the forecast (Schrand and Zechman, 2011).

The literature on earnings management around thresholds suggests that firms manage their earnings to meet or beat three earnings benchmarks: zero earnings, prior year's earnings and analyst forecasts (Burgstahler and Dichev, 1997; Degeorge et al., 1999). Although the literature on earnings management around thresholds does not explicitly consider management forecasts, Trueman (1986) and Kasznik (1999) show that it can be costly for managers and firms to miss their own forecasts because of loss of reputation, threat of litigation, or negative price movements. Kasznik (1999) shows that firms make attempts to meet their forecasts through the use of income-increasing discretionary

[2] Patell (1976) concludes that it is either the information content of the management forecast, or the issuance of the voluntary disclosure, or both, that markets react to.

accruals, and that the level of earnings management is increasing in the expected costs of missing their forecast. Therefore it is reasonable to argue that managers' own forecasts act as a benchmark and managers have incentives to meet or beat their own earnings forecasts.

The literature suggests that overoptimistic managers have higher incentives to manage earnings compared to non-overoptimistic managers. Schrand and Zechman (2011) examine two distinct explanations for observed earnings management cases.[3] Beyond the explanation of intentional misstatements for personal gain by the manager, the authors also propose overoptimism of managers as a source of earnings management. They explain that some misreporting cases start with optimistic accounting judgment: an optimistic manager who has optimistic earnings expectations generates more positive accruals during an accounting period. If the optimistic expectations are not realized, this can later lead to intentional misstatements because the optimistic manager will be more willing to manage earnings. The authors argue that the willingness to misstate earnings may arise either because the manager optimistically believes that the reversal of accruals in the following accounting period will be hidden by good performance, or because he optimistically discounts the probability of detection of earnings management.

If investors recognize overoptimism and its consequences, namely increased earnings management incentives, they will rationally incorporate these into the share price at the forecast date. The market reaction to earnings forecasts with increased earnings management incentives is determined by whether investors recognize earnings management around thresholds and the market's attitude to earnings management. Literature has shown that investors recognize earnings management around thresholds (e.g., Bartov et al., 2002; Kasznik and McNichols, 2002; Skinner and Sloan, 2002; Keung et al., 2010): investors react differently to earnings just below and just above earnings thresholds at the earnings announcement date. Prior to 2001, firms had incentives to manage earnings to meet or beat the earnings benchmarks, because firms meeting and beating the benchmarks were rewarded, while those missing earnings benchmarks were punished by the market (e.g., Bartov et al., 2002; Kasznik and McNichols, 2002; Skinner and Sloan, 2002). But after 2001, investors' attitude to

[3] The sample is made up of firms subject to SEC Accounting and Auditing Enforcement Releases (AAERs).

perceived earnings management has changed: firms collectively incur a cost for playing the numbers game around earnings thresholds. Investors view small positive earnings surprises as implicit evidence of earnings management, even after controlling for the sign of estimated discretionary accruals and punish all firms that meet or just beat earnings thresholds, regardless of whether earnings management actually took place (Keung et al., 2010).

Based on the above we argue that CEO overoptimism leads to more optimistic forecasts, and that because CEOs' own forecasts act as an earnings benchmark, with more optimistic forecasts overoptimistic CEOs have additional incentives to manage their earnings. Rational investors, recognizing overoptimistic managers and the additional earnings management incentives of overoptimistic managers, impound it into the share price when the earnings forecast is issued. If subsequent earnings realizations fit the market's expectations, there is no additional market reaction at the earnings announcement date: the market will not react to small positive forecast errors of overoptimistic managers at the earnings announcement date (see Figure 1). If, however, subsequent earnings realizations by overoptimistic CEOs do not fit the market's expectations, a correction of price takes place at the earnings announcement date. The market will react positively to small negative forecast errors from overoptimistic managers to correct for the unrealized earnings management.

[Insert Figure 1 about here]

Based on Keung et al. (2010), in the period following 2001 we expect the market to (1) react negatively to small positive forecast errors of the average firm, because the market reacts negatively to signs of unexpected earnings management at the earnings announcement date; (2) not react or react positively to small negative forecast errors of the average firm, because the market does not react to small negative earnings realizations or appreciates the lack of earnings management by these firms.

While the average firm is expected to be punished for small positive forecast errors, as the market views it as a sign of earnings management, the small positive forecast errors of overoptimistic managers will be ignored by the market because these were expected and have already been

incorporated into the share price at the forecast date. In turn, the small negative forecast errors of the average firm are expected to be either ignored (or slightly appreciated) by the market, but the market reaction to small negative forecast errors of overoptimistic managers will be positive. In sum, the market reaction to small positive and small negative forecast errors is expected to be more positive for overoptimistic CEOs in comparison to the average firm. Therefore, we posit the following hypothesis:

H: The market reaction to small positive and small negative forecast errors of overoptimistic CEOs at the earnings announcement date is more positive compared to non-overoptimistic managers.

4. Sample and Empirical Design

Sample

We use the First Call Company Issued Guidance (FCCIG) database to obtain a sample of annual US management earnings forecasts of earnings per common share (EPS), issued for the fiscal years 2002 to 2006.

We use EPS forecasts because earnings forecasts, as a major source of voluntary financial accounting information, are the most common type of forecasts that firms provide, hence they constitute the majority of forecasts in FCCIG. We use annual earnings forecasts because fiscal year-ends are the most important reporting units (Oyer, 1998) and therefore incentives to manage earnings might be higher for annual earnings. For each fiscal year-end we include the first forecast because longer term forecasts are found to be more optimistic (Hirst et al., 2008).

In line with the arguments of Rogers and Stocken (2005), who limit their sample to a period when the legal environment affecting management forecasting behavior is unchanged, we limit our sample to after the end of 2001, when the passing of the Sarbanes-Oxley Act has changed investor attitudes to earnings management. We exclude observations from fiscal years 2007 and beyond, because of the financial crisis.

Management earnings forecasts of the FCCIG database are classified by type or specificity: point, range, open-ended, confirming or qualitative forecasts. We use forecasts where a point forecast can be estimated because Rogers and Stocken (2005) state that markets can make better use of forecasts if those can be compared to realized earnings unambiguously. If the forecast is a point forecast we use the forecast value explicitly provided by the firm. If the forecast is a range (closed-interval) forecast with no further qualification by management we use the midpoint of the range (i.e., the average of the two endpoints) provided by the firm. Prior research suggests that investor earnings expectations are formed based on the midpoint of a range forecast (e.g., Baginski et al., 1993; Hirst et al., 1999). If however, statements by management relating to the range forecasts included in the FCCIG database indicate that earnings per share would be at the low (high) end of the range we use the low (high) end of the range as the value for the forecast in line with Hutton and Stocken (2007). In addition to point and range forecasts we also use open-ended (open interval, maximum and minimum) and non-point confirming forecasts, similarly to e.g., Baginski et al. (1993) and Hutton and Stocken (2007). If the forecast is an open-ended forecast or open-ended confirming forecast we use the endpoint (upper or lower bound) given by the firm. If the open-ended forecast is determined in comparison to 0, we use 0 in line with Baginski et al. (1993) and Hutton and Stocken (2007). Qualitative forecasts are excluded.

Of the initial sample of 27,832 annual EPS forecasts we drop observations with missing forecasts and no identifiable numerical forecast (308 observations). In line with Rogers and Stocken (2005) and Hutton and Stocken (2007), we drop forecasts issued on or after the fiscal year-end to exclude earnings pre-announcements or earnings warnings and forecasts that might have erroneous forecast dates, e.g. forecast dates recorded as being after the data entry date (847 observations). We keep the first forecast per firm (drop 19,244 observations).

We exclude observations with insufficient data on First Call Actuals, First Call Estimates, Compustat, CRSP, and ExecuComp databases needed to compute our variables. After merging the different databases for a sample period of 2002 to 2006, a final sample of 1,059 firms and 3,171 firm-year observations remain. The sample development procedures are summarized in Table 1.

[Insert Table 1 about here]

Table 2 describes the distributional properties of the full sample. The number of management earnings forecasts in our sample increases in the first years of the sample period (see Panel A of Table 2), as Hutton and Stocken (2007) explain this is likely to be due to the introduction of Regulation Fair Disclosure on October 23, 2000, as a result of which managers are more likely to issue forecasts publicly. The number of forecasts issued by overoptimistic CEOs continues to increase towards the last years of our sample period in sharp contrast to those issued by non-optimistic CEOs. 14 percent of forecasts included in our sample are point forecasts, over 80 percent are range forecasts and less than 5 percent are open-ended (see Panel B of Table 2). The proportion of point forecasts is slightly higher for overoptimistic CEOs, in line with the findings of Hribar and Yang (2011) that forecasts issued by overoptimistic CEOs are more specific. The distribution of management forecasts across industries shows that more than ten percent are issued by companies from the Business Services and Retail sector (see Panel C of Table 2). The distribution of forecasts issued by overoptimistic and non-optimistic managers across industries are very similar.

[Insert Table 2 about here]

As shown in Table 3, the firms in our full sample are a subset of much larger (Total Assets, Common Equity, Market Value), more profitable (Net Income) and less likely to make a loss (Loss) than the average firm in the Compustat universe over our sample period. This is caused by the characteristics of the databases we use to develop our sample: both the ExecuComp and First Call databases contain information about larger companies.

[Insert Table 3 about here]

Empirical Design

Stage 1 – Management Forecast Date

Our theory requires us to first confirm that markets recognize and discount forecasts issued by overoptimistic CEOs when the forecast is issued.

We use propensity score matching (PSM) to develop a good control sample for our overoptimistic observations on which to test our hypothesis. Using this method we can generate a "'pseudo' random sample" (Lawrence et al., 2011:263) in which the overoptimism and non-optimism characteristic is randomly distributed across treated and non-treated observations, such that differences in observable characteristics between the two groups are reduced and the difference in treatment effect, market reaction, will reflect the difference in CEO optimism only. PSM is appealing in cases, such as ours, where there are many confounding variables, a relatively few treated observations, but a large pool of potential controls, because in these cases a matched sample allows for better control of covariates. In addition, PSM can produce unbiased estimates of treatment effects, where the equivalence of treatment and control groups are immediately obvious (Rosenbaum and Rubin, 1983).

We use a logit model to estimate the propensity score, where our treatment variable is CEO overoptimism. In the estimation we include all observable variables that would be included in the empirical model to estimate the difference in market reaction, the outcome variable (Rosenbaum and Rubin, 1983; Armstrong et al., 2010). We then (1) match overoptimistic with non-overoptimistic observations one-on-one, without replacement, using common support, with the smallest propensity score differences, (2) examine the covariate balance between the treatment and control samples, and (3) compare the outcome variable, the market reaction to the forecasts of overoptimistic and non-optimistic managers.

The logit model to estimate the propensity score takes the following form (firm and time subscripts are suppressed):

$$OPT = \alpha_0 + \alpha_1 FNG + \alpha_2 FNB + \text{Control variables} + \varepsilon \quad (1)$$

The variables are defined as follows:

Overoptimism (*OPT*): Our overoptimism variable is based on the Malmendier and Tate (2005) measure of 'overconfidence' as modified by Li et al. (2010). The Malmendier and Tate (2005) measure, based on the options holding behavior of CEOs, designates CEOs as overoptimistic if their wealth is overexposed to the idiosyncratic risk of their firm. Li et al. (2010) explain that as Malmendier and Tate (2005) use the length of the period that CEOs wait to exercise their options, which is proprietary data, they instead proxy for the proportion of unexercised exercisable options held by the CEO, using end of year holdings, which is publicly available. Li et al. (2010) use the measure as a control variable, measured as the percentage of the intrinsic value of the unexercised exercisable options to the value of the total equity holdings of the CEO, which is the sum of the value of unexercised exercisable options, unexercisable options, and shares of stock.[4] Schrand and Zechman (2011) and Hribar and Yang (2011) use overoptimism as their variable of interest, and calculate it as a simplified version of the Li et al. (2010) measure. Schrand and Zechman (2011) use an indicator variable, where the natural log of unexercised in-the-money (i.e. exercisable) options of the CEO is higher than the 3-digit industry mean, while Hribar and Yang (2011) use the natural log of unexercised exercisable options. In addition, they both include a control variable, the log of options and stock holdings of the CEO, arguing that the delay in the exercising of the options could be affected by the CEOs total equity holdings. The Li et al. (2010) approach and its modifications, compared to that of Malmendier and Tate (2005), use non-proprietary data and allows the overoptimism measure to vary over time, i.e., they allow the CEO overoptimism variable to be reevaluated in every measurement period.

We adjust our variable in two ways. First, we apply the Li et al. (2010) measure but for convenience turn it into an indicator variable. We use 67 percent as the cutoff, above which CEOs are classified as overoptimistic, based on Malmendier and Tate (2005). Second, because we examine market reaction, we cannot assume that the market learns from contemporaneous activities and

[4] Estimated Value of In-the-Money Unexercised Exercisable Options / [Estimated Value of In-the-Money Unexercised Exercisable Options + Estimated Value Of In-the-Money Unexercised Unexercisable Options + Shares Owned – Options Excluded * Price Close - Annual – Fiscal]).

immediately acts on this knowledge (especially, that the measure is based on year-end equity holdings, whereas we also consider managerial forecasts that predate the year-end by construction). Therefore, we use a lagged overoptimism variable. Our measure of overoptimism, denoted ***OPT***, is an indicator variable that is equal to 1, i.e., CEOs are defined as overoptimistic, if the percentage of unexercised exercisable options to total holdings of the CEO in the previous fiscal year is equal to or higher than 67%, and is 0 otherwise.

In terms of the optimism-pessimism controversy, we do not take a position and consider optimism and its extreme high form only. In this treatment we follow most of the empirical business literature on cognitive biases. To our knowledge the only empirical paper to consider both 'high optimism' and 'low optimism' (including pessimistic CEOs) is Campbell et al. (2011).

Forecast News, Good and Bad (*FNG* and *FNB*): Forecast news is the difference between the management earnings forecast and the market's earnings expectation for the firm. We proxy the market's earnings expectation by the median analyst earnings per share forecast prevailing on the day of the management forecast, and deduct it from the first annual management EPS forecast issued by the firm for a given fiscal year. Forecast news is scaled by the stock price two days before the forecast date. Prior research suggests that markets react differently to good and bad news forecasts with bad news forecasts triggering a larger market response (e.g., Jennings 1987; Skinner 1994; Williams 1996; Hutton et al., 2003; Choi and Ziebart, 2004; Hutton and Stocken, 2007). Therefore we split the forecast news variable into good news and bad news forecasts. Good news forecast, denoted ***FNG***, equals forecast news, when the management forecast is above or equal to the current consensus median analyst forecast, and is 0 otherwise. Bad news forecast, denoted ***FNB***, is equal to the forecast news when the management forecast is below the current consensus median analyst forecast, and is 0 otherwise.

Control variables: : Several variables are identified in previous studies that are expected to affect management forecasting behavior, forecast accuracy, forecast bias or the market reaction to management forecasts. The following variables are included in Model (1) to control for cross-sectional differences in forecast response coefficients.

The market reaction to the forecast news is influenced by the difficulty of forecasting earnings. Baginski et al. (1993) argue that managers reveal their uncertainty about earnings by issuing less specific forecasts. To proxy for the level of uncertainty revealed by the manager in the form of the forecast, denoted ***SPEC***, we use a categorical variable that equals 0 for point forecasts, 1 for range forecasts, and 2 for open-ended forecasts (Baginski et al., 1993).

Firm characteristics also influence forecasting difficulty and hence the market reaction to the forecast. Prior research has shown that it is more difficult to forecast earnings if the firm reports a loss, is in distress, or performs poorly. As shown by Hayn (1995) and Basu (1997) it is more difficult to forecast a firm's earnings when the firm is unprofitable. To recognize this asymmetry, we include the indicator variable ***LOSS***. *LOSS* equals 1 either if the previous year's earnings are negative or the current year expected earnings of the firm, proxied by the consensus analysts' forecast, is negative, and 0 otherwise (Choi and Ziebart, 2004).

Prior research shows that firms that perform poorly are more likely to issue optimistic earnings forecasts (Hribar and Yang, 2011). To control for firm performance we include return on assets, denoted ***ROA***, which is measured as net income divided by total assets.

Forecasting earnings might be more difficult if the firm's earnings are less persistent or more volatile. As Hutton and Stocken (2007) explain, forecast accuracy (or forecast bias) may reflect the characteristics of the firm's earnings generation process, which markets react to. Therefore we control for the firm's earnings volatility. Earnings volatility, denoted ***EVOL***, is measured as the variance of earnings for the prior five years (Choi and Ziebart, 2004).

Prior research shows that forecast errors decline, specifically forecasts become less optimistic as the time to the fiscal year-end decreases (e.g., Choi and Ziebart, 2004; Roger and Stocken, 2005; Hutton and Stocken, 2007; Choi et al., 2010; Hribar and Yang, 2011) because with later forecasts management faces less earnings uncertainty. We include the length of forecast horizon, denoted ***HORIZON***, defined as the number of days between the forecast date and the firm's fiscal year-end (Rogers and Stocken, 2005).

Prior research finds that firm size affects forecasting behavior (Baginski and Hassell, 1997; Bamber and Cheon 1998; Rogers and Stocken, 2005): larger firms provide more accurate forecasts

(Waymire 1986; Lang and Lundholm 1993, 1996; Botosan and Plumlee, 2002), and smaller firms issue more optimistic forecasts (Hribar and Yang, 2011). We proxy for firm size, using the variable ***SIZE***, by including the natural logarithm of the fiscal year's beginning market value of common equity (Choi et al., 2010; Hribar and Yang, 2011).

Prior research suggests that the number of analysts following the firm is associated with forecast precision (Lang and Lundholm, 1996; Baginski and Hassel, 1997; Choi and Ziebart, 2004; Choi et al., 2010; Hribar and Yang, 2011) because with more analysts more private information is available for investors and less private information search is necessary. We include analyst following, denoted ***NANA***, measured as the number of analysts following the firm on the day of the management forecast.

Prior research shows a relationship between growth opportunities, proxied by the market to book ratio, and management forecasting behavior (Bamber and Cheon, 1998; Hribar and Yang, 2011) and the market reaction to the management forecast (Skinner and Sloan, 2002). We include growth opportunities, denoted ***MB***, calculated as the ratio of market to book value of the firm's common equity at the beginning of the fiscal year (e.g., Choi et al., 2010).

Finally, we control for industry fixed effects based on the Fama and French (1997) 48 industry classification and time-series trends in forecasts (e.g., Choi and Ziebart, 2004; Rogers and Stocken, 2005; Hutton and Stocken, 2007). All continuous variables are winsorized at the 0.5 and 99.5 percent levels. Standard errors are heteroskedasticity robust.

Outcome variable: Our theory requires us to confirm the differential market reaction to management forecasts issued by overoptimistic compared to non-optimistic CEOs at the forecast date. Hence, the outcome variable for Stage 1 is the market response to a management forecast, or **Event Return at the Management Earnings Forecast Date**, denoted $\boldsymbol{FCAR}_{-2,+2}$. It is defined as the cumulative daily return less the size-decile-matched CRSP Value-Weighted Index return over the five-day event window centered on the day of the management forecast, i.e., from two days before the forecast announcement date (day –2) to two days after the announcement date (day +2). We report

results using size-adjusted returns, where we calculate the size-decile[5] return based on the ranking of the firm in June prior to the fiscal year of the management forecast.

Stage 2 – Earnings Announcement Date

After confirming that markets discount forecasts issued by overoptimistic CEOs, our main research question is whether rational investors impound into the share price the additional earnings management incentives of overoptimistic managers when the earnings forecast is issued by the cognitively biased manager. We examine our hypothesis on the matched sample generated using the PSM method in Stage 1.

Our hypothesis predicts differential market reaction at the earnings announcement date to management forecast errors close to zero. More specifically, we predict that the market reacts more positively to the forecast errors of overoptimistic CEOs in small forecast error ranges compared to non-optimistic CEOs. We incorporate this in our empirical model in two ways (firm and time subscripts are suppressed):

$$ECAR_{-2,+2} = \beta_0 + \beta_1 \, OPT + \text{Control variables} + \varepsilon \quad (2a)$$

$$ECAR_{-2,+2} = \gamma_0 + \gamma_1 \, OPT + \gamma_2 \, SFE + \gamma_3 \, OPT \times SFE + \text{Control variables} + \varepsilon \quad (2b)$$

Regression (2a) is tested in the small forecast error range, while regression (2b) is tested on the full matched sample. The variables are defined as follows:

Overoptimism (*OPT*): the overoptimism indicator variable as defined earlier.

Event Return at the Earnings Announcement Date ($ECAR_{-2,+2}$): The market response to a management earnings forecast, or event return, denoted $\boldsymbol{ECAR_{-2,+2}}$, is the cumulative daily return less the size-decile-matched CRSP Value-Weighted Index return over the five-day event window centered on the day of the earnings announcement, i.e., from two days before the earnings announcement date

[5] The equal weighted cut-off points for the size portfolios are obtained from Professor Kenneth French's website: http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html

(day –2) to two days after the announcement date (day +2). We report results using size-adjusted returns, where we calculate the size-decile[6] return based on the rankings of the firm in June prior to the fiscal year of the firm.

Small Forecast Error (*SFE*): The management forecast error equals the realized earnings, actual EPS, less the first annual management EPS forecast. Keung et al. (2010) find their negative market reaction at a forecast error of 1¢. However, because we use a matched sample, we only have a small number of observations in the -1¢ – +1¢ forecast error range and potential lack of power. Therefore, in addition to the 1¢ range, we also test our regressions in the 2¢ forecast error range. The small forecast error, denoted ***SFE***, is then defined as an indicator variable equal to 1 if the management forecast error is less than or equal to $0.01(0.02) and more than or equal to $-0.01(-0.02), and is 0 otherwise.

Control variables: Several variables are identified in prior studies that are expected to affect the earnings response coefficient (e.g., Easton and Zmijewski, 1989; Collins and Kothari, 1989; Hayn, 1995; DeFond and Park, 2001; Bartov et al., 2002; Skinner and Sloan, 2002). Some of these variables (*NANA, SIZE, MB, EVOL, IND, YEAR*, defined above) are included in regression (1) to estimate the propensity score and generate our matched sample and are therefore controlled for by construction. We include the following additional variables in regression (2) to control for cross-sectional differences in the earnings response coefficient in line with Rogers and Stocken (2005), Hutton and Stocken (2007) and Keung et al. (2010): negative earnings indicator, denoted ***NEG***, 1 if year-end earnings are negative, 0 otherwise, and accruals, denoted ***ACC***, beginning of year accruals[7] scaled by average total assets. In addition we include earnings news to control for the news in the earnings announcement. Earnings news is the difference between the earnings realization and the market's earnings expectation for the firm. We proxy the market's earnings expectation by the median analyst earnings per share forecast prevailing on the day of the earnings announcement, and deduct it from realized EPS. Earnings news is scaled by the stock price two days before the earnings announcement

[6] The equal weighted cut-off points for the size portfolios are obtained from Professor Kenneth French's website: http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html

[7] As defined by Hutton and Stocken (2007), the difference of Compustat items 123 and 308, i.e. the difference between *Income Before Extraordinary Items (Cash Flow)* and *Operating Activities - Net Cash Flow.*

date. Similarly to the definition of the news variable at the management earnings forecast date (*FNG, FNB*), we split the earnings news variable into good news and bad news. The good news variable, denoted ***ENG***, equals earnings news, when the actual EPS is above or equal to the current consensus median analyst forecast, and is 0 otherwise. The bad news variable, denoted ***ENB***, is equal to the earnings news when the actual EPS is below the current consensus median analyst forecast, and is 0 otherwise. All continuous variables are winsorized at the 0.5 and 99.5 percent levels. Standard errors are heteroskedasticity robust.

To confirm our hypothesis, we expect a positive sign on β_1, the coefficient of the overoptimism variable, in regression (2a), and a positive sign on γ_3, the coefficient of the interaction term, in regression (2b).

5. Results

Stage 1 – Management Forecast Date

In the full sample untabulated correlations show that the overoptimism variable is weakly ($\rho<5\%$), but significantly (at the 5% level) correlated with *FNB, LOSS, ROA*, and *NANA*, but there are no multicollinearity problems in the full sample.

The logit model we use to estimate the propensity score is run on the full sample (3,149 firm-years) with all variables of interest and control variables explained above (χ^2 = 190.82, p-value <0.0000). We use the estimated propensity score to match overoptimistic with non-overoptimistic observations one-on-one, without replacement and using common support. Compared to the 456 overoptimistic observations we have a rich dataset of non-optimistic firm-years, and we are able to match 455 observations, losing only one overoptimistic observation, resulting in a matched sample of 910 firm-years. The matching appears effective in forming a balanced sample of overoptimistic and non-optimistic observations, as (1) all the variables included in the model are insignificantly different at the 10% level between the overoptimistic and matched non-optimistic observations in the matched sample, and (2) only 5 of the 455 matched pairs have a propensity score difference of 1% or higher.

The success of the matching exercise can also be seen in Table 4, where differences in means are significant at the 10% level for 4 of the main variables of interest between the two groups of observations in the full sample, but none are significant in the matched sample.

[Insert Table 4 about here]

The market reaction to the management earnings forecast in the event window around the forecast (*FCAR*) is negative for overoptimistic managers (-0.858%) and is positive for non-overoptimistic managers (+0.217%) in the matched sample, and the difference is significant at 1% (t = –3.28, see Table 4). The difference in the mean abnormal return of firms of overoptimistic and non-overoptimistic managers in the five-day window around the forecast announcement, of 1.073%, is also economically significant. This means that we confirm our expectation that at the forecast date the market discounts the earnings forecasts issued by overoptimistic managers compared to non-optimistic forecasts.

Stage 2 – Earnings Announcement Date

Table 5 shows that the matched sample observations do not differ significantly between the overoptimistic and non-optimistic groups in terms of the control variables used in our empirical tests at the earnings announcement date. Although *NEG* is significantly correlated with both *ENG* (0.17, p<0.0000) and *ENB* (-0.23, p<0.0000) and *ACC* with *ENG* (-0.16, p<0.0000), the correlation coefficients are low and there is no multicollinearity problem in our matched sample.

[Insert Table 5 about here]

Table 6 reports the results of regressions (2a) and (2b) in the 1¢ and 2¢ management forecast error ranges. When examining the market reaction in the small forecast error ranges (Regression (2a)), as hypothesized we find that the sign on the coefficient of the overoptimism variable is positive and significant at the 5% level in both the 1¢ (β_1 = +1.71, p = 0.050, one-tailed) and 2¢ (β_1 = +2.24, p =

0.037, one-tailed) ranges. This means that the market reaction (cumulative abnormal return in the 5-day window centered on the earnings announcement) to forecast errors of overoptimistic managers in the 1¢ and 2¢ ranges is 1.7% and 2.2% higher, respectively, compared to those of non-optimistic managers, which is an economically significant result.

When examining the market reaction in the full matched sample, and therefore including an interaction term of overoptimism with the small forecast error indicator (Regression (2b)), the sign on the interaction term is significant at the 5% level in the 2¢ forecast error range (γ_3 = +1.94, p = 0.025, one-tailed), and is significant at the 10% level in the 1¢ range (γ_3 =+1.93, p = 0.048, one-tailed). The loss of significance can be explained by the loss of power caused by the low number of observations in the small forecast error range when reducing the range (N = 90 and N = 57, in the 2¢ and 1¢ range, respectively). The economic significance of the results is comparable with that from Regression (2a): the market reaction to forecast errors of overoptimistic managers compared to those of non-optimistic managers in the 1¢ and 2¢ ranges is 1.9% higher. The coefficient on the small forecast error indicator variable is negative and weakly significant in both forecast error ranges, showing that the market on average reacts negatively to small forecast errors.

[Insert Table 6 about here]

These results confirm our hypothesis that the market reacts more positively to the earnings announcements of overoptimistic CEOs in the small forecast error range compared to those of non-optimistic managers. Our findings mean that investors react negatively to the higher earnings management incentives of overoptimistic managers when the management forecast is issued, but when earnings are announced they do not react to perceived earnings management of overoptimistic CEOs and react more positively to the perceived lack of earnings management by overoptimistic CEOs compared to non-optimistic managers. Our results are significant despite the fact that our overoptimism variable is likely to be a weak proxy, and that the earnings benchmark of the manager's own forecast is likely to be a weaker earnings management target than the classic benchmarks used in prior literature.

Additional Analyses

Overoptimism – Alternative Explanation

We consider inside information as an alternative explanation for CEOs holding onto their vested options, and hence our overoptimism measure. Malmendier and Tate (2005) argue that there are two main differences between overoptimism and inside information: persistence and performance. First, we examine persistence in two tests. Malmendier and Tate (2005) argue that while good information is transitory, a cognitive bias is persistent, therefore overoptimism can be differentiated from inside information. Although our overoptimism variable is a one-period measure, its persistence is high: in our matched sample, the correlation between the lagged and current overoptimism measure is 0.553 ($p < 0.0000$), while the coefficient of the current overoptimism measure regressed on the lagged one is 0.572 ($p < 0.0000$). Malmendier and Tate (2005) use an overoptimism measure that describes, what they call, a habitual tendency of CEOs. They set their measure as fixed for the whole sample period based on CEOs' options-holding behavior displayed on only two occasions. To test the robustness of our results based on an overoptimism measure characterized as fixed, we redefine the CEOs in our sample as overoptimistic, if during our sample period the proportion of their unexercised exercisable options was over the cutoff (67%) at any *one* year-end. In our untabulated robustness test we identify 1,472 firm-years as overoptimistic, and develop a matched sample of 2,944 observations. In Stage 1, we confirm the lower market reaction to the management forecasts of overoptimistic CEOs, although with weaker significance ($t = –1.41$). In Stage 2, regression (2a), the coefficient on our overoptimism measure is weakly significant ($\beta_1 = +0.804$, $p = 0.062$, one-tailed) in the 1¢ range, and is insignificant in the 2¢ range. In regression (2b) the interaction term of overoptimism and small forecast error is significant in the 2¢ range ($\gamma_3 = +1.109$, $p = 0.021$, one-tailed) and very weakly significant in the 1¢ range ($\gamma_3 = +0.795$, $p = 0.121$, one-tailed). In sum, using a very liberally defined overoptimism variable to describe the cognitive bias as a fixed trait, our results are qualitatively similar to our main findings. We conclude that our overoptimism variable measures CEOs' cognitive bias rather than their inside information because it describes a persistent rather than transitory behavior.

Second, we consider overoptimism and inside information in terms of firm performance. If the CEO holds on to high proportions of unexercised exercisable stock options because of inside information rather than overoptimism, the performance of their firm's stock should be better than CEOs' who diversify, i.e. who hold proportionally less vested options. We test the difference in performance by developing buy-and-hold portfolios from our matched sample firms and comparing abnormal returns of diversified and undiversified CEOs. We consider three holding periods following the measurement of our overoptimism variable: 3, 6 and 12 months from the beginning of the fiscal year, the point in time when we measure overoptimism. Table 7 shows the results of our robustness tests. The differences in abnormal returns are not significant in the 3- and 6-month periods between overoptimistic and non-optimistic firms. The difference in the 12-month period is weakly significant ($p = 0.076$, one-tailed), but the abnormal return is higher for non-optimistic firms. We therefore conclude that the options holding behavior of CEOs we define as overoptimistic cannot be explained with having better information than CEOs we define as non-optimistic. In sum, our overoptimism variable does measure a cognitive bias.

[Insert Table 7 about here]

Overoptimism – Sensitivity to Cutoff Point

Our overoptimism measure is an indicator variable, where classification into the overoptimistic and non-optimistic category is set at 67% percentage of vested options to total equity holdings of the CEO. To test the sensitivity of our results to the definition of the overoptimism variable, we redo the analysis at cutoff levels of 50%, 55%, 60%, 70% and 75%. Our untabulated results show that, as expected, the number of overoptimistic observations increases(decreases) as the cutoff percentage decreases(increases). In Stage 1, the market reaction is consistently smaller for overoptimistic observations, although the significance of the difference is progressively smaller at all alternative cutoff levels. In Stage 2, the coefficients of interest have the expected sign, but their significance is considerably lower than in the main regressions. We conclude that our results are sensitive to the variable definition. While lower cut-off points probably include too many CEOs who

are not truly overoptimistic, thereby diluting the results, at higher cut-off points overoptimistic CEOs are probably identified with greater precision, but the decrease in sample size prevents significant findings. Overall therefore a 67% cutoff point in the definition of the overoptimism variable seems reasonable.

Propensity Score Matching

In Stage 1 of the main analysis we use propensity score matching. To test the robustness of our results to the precision of the match, we rerun tests where we exclude the five matched pairs (out of 455) with a propensity score difference higher than 1%. In untabulated results, neither the difference in market reaction at the management earnings forecast (FCAR) in Stage 1, nor the coefficients and their significance in Stage 2 regressions change significantly. In sum, our results are not sensitive to the precision of the match.

Alternative event window specification

In the main analysis, event windows are defined as 5 days (–2 to +2) around the announcements of management earnings forecasts and earnings. To test the sensitivity of our results to window-specification, we consider two alternative designs. A 3-day window centered on the forecast announcement date and earnings announcement date, one day prior (day –1) to one day after (day +1) the announcement dates, results in slightly less significant, but substantially unchanged results (untabulated). In Stage 1, the difference in market reaction at the management earnings forecast (FCAR) is smaller (0.655%) and slightly less significant (t = –3.19). In Stage 2, Regression (2a) the coefficients on the overoptimism variable are considerably lower but their significance changes only slightly (1¢: β_1 = +1.44, p = 0.040; 2¢: β_1 = +1.10, p = 0.049, one-tailed), in Regression (2b) the coefficients on the variable of interest (the interaction term of overoptimism and the small forecast error indicator) are also considerably lower with slightly lower significance (1¢: γ_3 = +1.22, p = 0.064; 2¢: γ_3 = +1.21, p = 0.028, one-tailed).

A 3-day window measured from the management forecast announcement date and earnings announcement date (day 0) to two days after the announcement dates (day +2) also result in slightly

less significant, but substantially unchanged results. In Stage 1, the difference in market reaction at the management earnings forecast (FCAR) is slightly smaller (0.626%) and less significant (t = –3.06). In Stage 2, Regression (2a) the coefficients on the overoptimism variable are lower and they are less significant (1¢: β_1 = +1.22, p = 0.073; 2¢: β_1 = +0.89, p = 0.085, one-tailed), while in Regression (2b) the coefficients on the variable of interest (the interaction term of overoptimism and the small forecast error indicator) are slightly lower, their significance decreases but are both still significant (1¢: γ_3 = +1.04, p = 0.094; 2¢: γ_3 = +1.00, p = 0.053, one-tailed). In sum, alternative event window specifications do not change our inferences.

6. Conclusion

We examine whether investors recognize and rationally impound into the share price the *possible* earnings management of overoptimistic CEOs at the time the management forecast is issued, rather than the perceived (*actual*) earnings management at the announcement of realized earnings. We argue that because managers' own forecasts also become an earnings threshold, the more optimistic forecasts of overoptimistic managers give additional incentives to these managers to meet or beat their forecasts. We expect that investors, recognizing CEO overoptimism, also recognize the higher earnings management incentives of overoptimistic CEOs and impound these incentives into the share price by discounting the overoptimistic management forecasts compared to non-optimistic managers' when the forecast is issued.

Because the underreaction by investors to overoptimistic management forecasts has an alternative explanation (namely that investors discount forecasts because they are cognitively biased but not for higher earnings management incentives) confirming the underreaction to forecasts issued by overoptimistic CEOs does not answer our research question. We rely on market reaction at the earnings announcement date to validate our hypothesis, because we expect a differential market reaction to earnings announcements of overoptimistic managers compared to non-optimistic managers. Rational investors react to new information when earnings are announced, therefore if earnings management incentives have already been impounded into the share price when the

management forecast is issued, there is no market reaction to perceived earnings management (small positive forecast errors) and there is positive correction of the share price to perceived lack of earnings management (small negative forecast errors). If however investors have not incorporated higher earnings management incentives into the share price when the management forecast is issued, the market reaction to earnings announcements will be similar across the two groups of managers.

We hypothesize and find that the market reacts more positively to the earnings announcements of overoptimistic CEOs in the small forecast error range compared to those of non-optimistic managers at the earnings announcement. Our findings indicate that investors react negatively to the higher earnings management incentives of overoptimistic managers when the management forecast is issued and do not react to perceived earnings management of overoptimistic CEOs, but react more positively to the perceived lack of earnings management by overoptimistic CEOs compared to non-optimistic managers when earnings are announced.

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Figure 1 – Hypothesis Development: Market Reaction to the Earnings Announcement

	Management Forecast Error			
	Large negative MEF>>EPS	**Small negative MEF>EPS**	**Small positive MEF<=EPS**	**Large positive MEF<<EPS**
Overoptimistic CEOs	**?/-**	**+**	**0**	**?/+**
Non-optimistic CEOs	**--**	**+/0**	**-**	**++**
Difference	**?/+**	**+**	**+**	**?/+**

Management Forecast Error (MFE) is the management forecast error that equals realized earnings (actual EPS from FC Actuals) less the first annual management EPS forecast (from FCCIG). *Management Earnings Forecast (MEF)* is the first annual EPS forecast issued by the firm. *Overoptimistic CEO* is one whose wealth is overexposed to the idiosyncratic risk of their firm, in this paper overoptimism is measured as a lagged indicator variable, equal to 1, if the intrinsic value of the unexercised exercisable options to the value of the total equity holdings of the CEO is equal to or higher than 67%, 0 otherwise. *Large Positive Forecast Error* is the MFE if MEF is higher than EPS by more than a few dollar cents, i.e. MFE is very positive (in this paper above 2¢). *Large Negative Forecast Error* is the MFE if MEF is lower than EPS by more than a few dollar cents, i.e. MFE is very negative (in this paper below -2¢). *Small Positive Forecast Error* is the MFE if MEF is equal to or higher than EPS by a few dollar cents, i.e. MFE is 0 or slightly positive (in this paper between 2¢ and 0c). *Small Negative Forecast Error* is the MFE if MEF is less than EPS by a few dollar cents, i.e. MFE is slightly negative (in this paper between 0c and -2¢).

Table 1 – Sample Selection

	# Forecasts	# Firm
FCCIG dataset of annual EPS forecasts, for fiscal years 2002 to 2006	27,832	2,741
Missing or non-numerical forecast	(308)	(30)
	27,524	2,711
Earnings pre-announcements, earnings warnings, erroneous forecast dates	(847)	(79)
	26,677	2,632
Duplicate forecasts for same fiscal year-end (keeping the first forecast)	(19,244)	-
	7,433	2,632
Insufficient data	(4,262)	(1,573)
Full sample	**3,171**	**1,059**

Table 2 – Distributional Properties of Full Sample

Panel A – Number of Forecasts per Fiscal Year and CEO Optimism

Fiscal year	Overoptimistic		Non-optimistic		Full sample	
	N	%	N	%	N	%
2002	64	14.04	503	18.53	567	17.88
2003	92	20.18	523	19.26	615	19.39
2004	73	16.01	598	22.03	671	21.16
2005	101	22.15	556	20.48	657	20.72
2006	126	27.63	535	19.71	661	20.85
Total	456	100.00	2,715	100.00	3,171	100.00
% of full sample	14.38		85.62		100.00	

Panel B – Distribution of Forecast Type and CEO Optimism

Forecast specificity	Overoptimistic		Non-optimistic		Full sample	
	N	%	N	%	N	%
Point	70	15.35	375	13.81	445	14.03
Range	366	80.26	2,211	81.44	2,577	81.27
Open-ended	20	4.39	129	4.75	149	4.70
Total	456	100.00	2,715	100.00	3,171	100.00

Overoptimistic CEO is one whose wealth is overexposed to the idiosyncratic risk of their firm. In this paper overoptimism is measured as a lagged indicator variable, equal to 1, if the intrinsic value of the unexercised exercisable options to the value of the total equity holdings of the CEO is equal to or higher than 67%, 0 otherwise.

Table 2 (continued) – Distributional Properties of Full Sample

Panel C – Number of Forecasts per Industry (Fama-French 48) and CEO Optimism						
Industry	**Overoptimistic**		**Non-optimistic**		**Full sample**	
	N	%	N	%	N	%
Agric	1	0.22	14	0.52	15	0.47
Food	14	3.07	66	2.43	80	2.52
Soda	0	0.00	12	0.44	12	0.38
Beer	1	0.22	17	0.63	18	0.57
Smoke	1	0.22	12	0.44	13	0.41
Toys	1	0.22	17	0.63	18	0.57
Fun	3	0.66	6	0.22	9	0.28
Books	4	0.88	31	1.14	35	1.10
Hshld	6	1.32	75	2.76	81	2.55
Clths	10	2.19	66	2.43	76	2.40
Hlth	12	2.63	69	2.54	81	2.55
MedEq	39	8.55	98	3.61	137	4.32
Drugs	27	5.92	143	5.27	170	5.36
Chems	6	1.32	73	2.69	79	2.49
Rubbr	1	0.22	14	0.52	15	0.47
Txtls	0	0.00	5	0.18	5	0.16
BldMt	2	0.44	36	1.33	38	1.20
Cnstr	14	3.07	60	2.21	74	2.33
Steel	2	0.44	12	0.44	14	0.44
FabPr	2	0.44	8	0.29	10	0.32
Mach	13	2.85	117	4.31	130	4.10
ElcEq	8	1.75	35	1.29	43	1.36
Autos	3	0.66	33	1.22	36	1.14
Aero	11	2.41	19	0.70	30	0.95
Ships	0	0.00	4	0.15	4	0.13
Guns	2	0.44	10	0.37	12	0.38
Gold	0	0.00	1	0.04	1	0.03
Mines	3	0.66	9	0.33	12	0.38
Coal	1	0.22	5	0.18	6	0.19
Oil	5	1.10	49	1.80	54	1.70
Util	15	3.29	252	9.28	267	8.42
Telcm	5	1.10	34	1.25	39	1.23
PerSv	17	3.73	44	1.62	61	1.92
BusSv	63	13.82	340	12.52	403	12.71
Comps	11	2.41	86	3.17	97	3.06
Chips	13	2.85	86	3.17	99	3.12
LabEq	20	4.39	56	2.06	76	2.40
Paper	2	0.44	38	1.40	40	1.26
Boxes	1	0.22	15	0.55	16	0.50
Trans	1	0.22	46	1.69	47	1.48
Whlsl	7	1.54	97	3.57	104	3.28
Rtail	69	15.13	253	9.32	322	10.15
Meals	21	4.61	81	2.98	102	3.22
Banks	6	1.32	44	1.62	50	1.58
Insur	8	1.75	71	2.62	79	2.49
Fin	3	0.66	36	1.33	39	1.23
Other	2	0.44	20	0.74	22	0.69
Total	456	100.00	2,715	100.00	3,171	100.00

Table 3 - Comparison of Compustat Firms and Full Sample[a]

	Compustat Firms			Full Sample			Difference of Mean
Variable[b]	**N**	**Mean**	**Std. Dev.**	**N**	**Mean**	**Std. Dev.**	**t-test[c]**
Total Assets	16,583	2263.116	19985.040	3,171	9455.873	43141.170	-14.74***
Common Equity	16,063	415.219	2235.938	3,171	2746.676	7348.291	-33.18***
Market Value	13,092	789.877	3555.698	3,124	8839.697	26206.710	-33.87***
Net Income	16,546	25.130	639.785	3,171	398.544	1379.177	-23.90***
Loss	17,675	0.427	0.495	3,171	0.087	0.281	37.61***

[a] Compustat firms are all firms from Compustat North America with fiscal years 2002-2006; the full sample is as developed in Table 1.

[b] As reported in Compustat: Total Assets: at; Common Equity: ceq; Market Value: mkvalt; Net Income: ni; Loss: indicator variable if reported net income is negative.

[c] Student t-test, significance is based on two-tailed p-values.

Table 4 - Descriptive Statistics of Key Variables for Full and Matched Sample

Stage 1 – Management Earnings Forecasts

	Full Sample[a]							Matched Sample[a]						
	Overoptimistic			Non-optimistic			Difference of Mean	Overoptimistic			Non-optimistic			Difference of Mean
Variable	N	Mean	Std. Dev.	N	Mean	Std. Dev.	t-test[b]	N	Mean	Std. Dev.	N	Mean	Std. Dev.	t-test[b]
FNG	456	0.010	0.017	2,715	0.010	0.018	-0.45	455	0.010	0.017	455	0.010	0.017	-0.52
FNB	456	-0.003	0.013	2,715	-0.006	0.038	1.72*	455	-0.003	0.013	455	-0.002	0.006	-1.22
LOSS	456	0.070	0.256	2,715	0.105	0.307	-2.31**	455	0.070	0.256	455	0.059	0.237	0.67
ROA	456	0.069	0.082	2,715	0.056	0.074	3.43***	455	0.069	0.082	455	0.069	0.067	-0.16
SIZE	456	7.494	1.455	2,715	7.743	1.478	-3.34***	455	7.492	1.456	455	7.426	1.380	0.70
MB	456	3.308	8.177	2,715	3.303	19.008	0.01	455	3.308	8.186	455	2.744	7.628	1.07
EVOL	456	1.972	7.427	2,715	1.853	6.703	0.34	455	1.975	7.435	455	2.589	11.117	-0.98
NANA	456	9.434	6.382	2,715	9.130	6.232	0.96	455	9.418	6.379	455	9.398	6.406	0.05
HORIZON	456	343.463	102.729	2,715	337.649	109.334	1.06	455	343.374	102.825	455	339.877	103.658	0.51
SPEC	456	0.890	0.431	2,715	0.909	0.421	-0.89	455	0.890	0.431	455	0.903	0.403	-0.48
FCAR	456	-0.856	4.626	2,715	-0.267	5.064	-2.33**	455	-0.858	4.631	455	0.217	5.216	-3.28***

[a] Full sample is 3,171 observations, developed in the sample selection process (see Table 1). Matched sample is developed using propensity score matching, explained in Section 4, Empirical Design, Stage 1.

[b] Student t-test, significance is based on two-tailed p-values.

Overoptimistic CEO is one whose wealth is overexposed to the idiosyncratic risk of their firm. In this paper overoptimism is measured as a lagged indicator variable, equal to 1, if the intrinsic value of the unexercised exercisable options to the value of the total equity holdings of the CEO is equal to or higher than 67%, 0 otherwise.

FNG and *FNB*: Good and Bad Forecast News (FN), forecast news equals the MEF less the market's earnings expectation for the firm (proxied by the median analyst EPS forecast prevailing on the day of the MEF), scaled by the stock price two days before the MEF; FNG(FNB) is equal to FN when the MEF is above or equal to (below) the current consensus median analyst forecast. *LOSS* equals 1 either if the previous year's earnings are negative or the current year expected earnings of the firm, proxied by the consensus analysts' forecast, is negative, and 0 otherwise. *ROA* is net income divided by total assets. *SIZE* is the natural logarithm of the fiscal year's beginning market value of common equity. *MB* is the ratio of market to book value of the firm's common equity at the beginning of the fiscal year. *EVOL* is the variance of earnings for the prior five years. *NANA* is the number of analysts following the firm on the day of the MEF. *HORIZON* is the number of days between the MEF date and the firm's fiscal year-end. *SPEC* is a categorical variable that equals 0 for point forecasts, 1 for range forecasts, and 2 for open-ended forecasts. *FCAR* is the cumulative daily return less the size-decile-matched CRSP Value-Weighted Index return over the five-day event window centered on the day of the MEF.

Table 5 - Descriptive Statistics of Key Variables for Matched Sample[a]

Stage 2 – Earnings Announcement Date

	Overoptimistic			Non-optimistic			Difference of Mean
Variable	**N**	**Mean**	**Std. Dev.**	**N**	**Mean**	**Std. Dev.**	**t-test[b]**
NEG	455	0.079	0.270	455	0.062	0.241	1.04
ACC	455	-0.064	0.195	455	-0.052	0.061	-1.24
ENG	455	0.001	0.003	455	0.001	0.002	0.57
ENB	455	-0.001	0.009	455	-0.001	0.005	-0.64
ECAR	455	-0.044	3.980	455	-0.019	4.281	-0.09

[a] Matched sample is developed using propensity score matching, explained in Section 4, Empirical Design, Stage 1.

[b] Student t-test, significance is based on two-tailed p-values.

Overoptimistic CEO is one whose wealth is overexposed to the idiosyncratic risk of their firm. In this paper overoptimism is measured as a lagged indicator variable, equal to 1, if the intrinsic value of the unexercised exercisable options to the value of the total equity holdings of the CEO is equal to or higher than 67%, 0 otherwise.

NEG is 1 if year-end earnings are negative, 0 otherwise. *ACC* is the beginning of year accruals scaled by average total assets. *ENG* and *ENB*: Earnings news (EN) equals realized EPS less the market's earnings expectation for the firm (proxied by the median analyst earnings per share forecast prevailing on the day of the earnings announcement), scaled by the stock price two days before the earnings announcement date; ENG(FNB) is equal to EN when the actual EPS is above or equal to (below) the current consensus median analyst forecast. *ECAR* is the cumulative daily return less the size-decile-matched CRSP Value-Weighted Index return over the five-day event window centered on the day of the earnings announcement.

Table 6 – Event Return Results

Stage 2 – Earnings Announcement Date

Event return regression results based on the following models:

$$ECAR_{-2,+2} = \beta_0 + \beta_1 OPT + \text{Control variables} + \varepsilon \quad (2a)$$

$$ECAR_{-2,+2} = \gamma_0 + \gamma_1 OPT + \gamma_2 SFE + \gamma_3 OPT \times SFE + \text{Control variables} + \varepsilon \quad (2b)$$

Variable	Predicted Sign	Regression (2a)		Regression (2b)	
		1¢ range	2¢ range	1¢ range	2¢ range
OPT	+	2.239**	1.708**	-0.146	-0.214
		(0.037)	(0.050)	(0.606)	(0.456)
SFE	0/-			-1.212*	-1.150**
				(0.057)	(0.048)
OPT x SFE	+			1.930*	1.942**
				(0.056)	(0.025)
NEG		-5.930***	1.444	-0.044	-0.043
		(0.001)	(0.570)	(0.923)	(0.926)
ACC		-9.277	1.448	0.437	0.441
		(0.172)	(0.864)	(0.496)	(0.492)
ENG		-105.750	15.256	20.799	21.894
		(0.693)	(0.963)	(0.669)	(0.654)
ENB		-2,637.179	-577.111	1.381	1.165
		(0.125)	(0.679)	(0.869)	(0.889)
Constant		-2.086**	-1.196	0.068	0.093
		(0.032)	(0.173)	(0.755)	(0.674)
Observations		57	90	910	910
R^2		0.174	0.048	0.004	0.005
F-test		.	0.896	0.549	0.692

Robust p-values reported in parentheses.

*, **, *** Significant at 10%, 5%, 1% levels, respectively, based on one-tailed tests where the sign of the coefficient is predicted, and two-tailed t-tests otherwise.

ECAR is the cumulative daily return less the size-decile-matched CRSP Value-Weighted Index return over the five-day event window centered on the day of the earnings announcement. *OPT* is a lagged indicator variable, equal to 1, if the intrinsic value of the unexercised exercisable options to the value of the total equity holdings of the CEO is equal to or higher than 67%, 0 otherwise. *SFE* is an indicator variable equal to 1 if the management forecast error (realized EPS less the first annual management EPS forecast) is less than or equal to 1¢ and 2¢ and more than or equal to -1¢ and -2¢, and is 0 otherwise. *NEG* is 1 if year-end earnings are negative, 0 otherwise. *ACC* is the beginning of year accruals scaled by average total assets. *ENG* and *ENB*: Earnings news (EN) equals realized EPS less the market's earnings expectation for the firm (proxied by the median analyst earnings per share forecast prevailing on the day of the earnings announcement), scaled by the stock price two days before the earnings announcement date; ENG(ENB) is equal to EN when the actual EPS is above or equal to (below) the current consensus median analyst forecast.

Table 7 – Buy-and-Hold Returns[a] on Matched Sample

	Optimistic			Non-optimistic			Difference of Mean
Period[b]	**N**	**Mean**	**Std. Dev.**	**N**	**Mean**	**Std. Dev.**	**t-test[c]**
3 months	455	0.025	0.166	455	0.029	0.155	-0.33
6 months	455	0.038	0.259	455	0.047	0.247	-0.49
12 months	455	0.032	0.318	455	0.062	0.303	-1.44

[a] Buy-and-hold returns are calculated as the difference between firm buy-and-hold returns less the size-decile-matched CRSP Value-Weighted Index buy-and-hold returns over the holding period.

[b] Buy-and-hold periods start at the beginning of the fiscal year: the number of months represent the first 3/6/12 months of the fiscal year.

[c] Student t-test, significance is based on two-tailed p-values.