

# CEO Overconfidence and Agency Cost of Debt

: Evidence from Voluntary Turnovers

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## Abstract

In the presence of outstanding risky debt, agency theory predicts that overconfident CEOs tend to underinvest less in growth firms and overinvest more in value firms relative to rational CEOs. We test this hypothesis in the context of CEO turnover. We do not find any significant announcement effect of voluntary turnover of an overconfident CEO in a growth firm. The announcement of voluntary turnover of an overconfident CEO in a value firm results in negative abnormal returns to stockholders and bondholders. This does not support the overinvestment hypothesis. We interpret our finding to be consistent with Campbell et al (2011) in that such CEOs display a degree of overconfidence in the value enhancing region and do not exceed the optimum overconfidence level.

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## 1. Introduction

Recent research has shown that in the presence of rational investors and absence of informational asymmetry and agency problems, the behavioral traits of CEOs such as overoptimism or overconfidence causes distortions in investment policy from first best (Heaton (2002), Malmendier and Tate (2005)). Overconfident managers are more likely to issue optimistically biased forecasts because they overestimate their ability to affect their financial results and/or underestimate the probability of unfavorable outcomes. These biases are shown to increase the sensitivity of investment to cash flow particularly in financially constrained firms (Malmendier and Tate (2008)). The investment decision of a biased CEO in the presence of shareholder-bondholder conflicts, however, does not unequivocally result in a loss in firm value. Specifically, theoretical predictions in Hackberth (2009) suggest that in the presence of outstanding risky debt and future growth options, overconfident CEOs tend to reduce the underinvestment problem. This study examines the announcement date reaction of shareholders and bondholders in the context of CEO turnover.

We abstract from a biased manager's perceived mispricing of security issues and develop a simple model that illustrates the interaction between CEO bias (hereafter referred to as managerial overconfidence) and agency cost of debt. Consider a firm with limited internal funds, a debt overhang, and an opportunity for an investment in a growth opportunity. Rational managers acting in the interest of shareholders sometimes pass up positive NPV projects if the outstanding debt captures some of the benefits from the project without incurring the investment

cost (Myers (1977)). Overconfident managers tend to overestimate the expected cash flows from a project and decide to invest in a growth opportunity that otherwise might have been rejected by a rational manager. In such circumstances, an overconfident manager's investment decision mitigates the underinvestment problem and benefits the bondholders.

In a value firm with relatively fewer growth opportunities, rational managers may engage in asset-substitution or risk-shifting in the presence of outstanding debt and tend to overinvest (Jensen and Meckling (1986)). Since an overconfident manager overestimates the expected cash flows from a project, he or she tends to incorrectly perceive negative NPV projects as profitable and invest in such projects even though such projects may have been rejected by a rational manager. In this situation, overconfidence exacerbates of the overinvestment problem and reduces the value of all claimholders.

Given the above argument, stakeholders in a growth firm would not react favorably if an overconfident manager leaves the firm due to the possible loss in firm value that might result from a greater level of underinvestment in the future. On the contrary, stakeholders in a value firm would react favorably on the announcement of an overconfident manager's departure due to possible reduction in overinvestment. This research empirically tests the above prediction by examining bondholder' and stockholders' reactions around CEO turnover events.

We construct the CEO turnover sample from EXECUCOMP, which provides the date on CEO departures. Our data period extends from 1992 – 2011. The CEO overconfidence measures are based on Campbell et al. (2011). We interface these observations with the FISD database and for the firms common in both samples, we use Bessembinder et.al (2008) to calculate bond abnormal returns for three months following the CEO turnover event. After calculating the bond abnormal returns we calculate the cumulative abnormal stock returns using Event Study Metrics.

We find that the of the 458 bond observations, 400 were voluntary and 58 were forced turnovers. Among the 719 stock observations, 649 were voluntary and 79 were forced turnovers. Given the small sample of forced turnovers, we could not classify these further in terms of overconfidence levels and firm types. The summary statics of the bond sample reveals that firms managed by overconfident CEOs have a relatively higher average sales turnover of \$16.7 billion compared to rational CEOs who manage firms with average sales of \$14.5 billion. The average market value of assets to book value of assets (Q) is 1.327, return on assets (ROA) is 14.1% and higher credit rating for firms managed by overconfident CEOs relative to a value of 1.039 and 10.7%, respectively, for rational CEOs. This suggests that overconfidence is a positive trait in CEOs. Of the 157 overconfident CEOs in our sample, only 19 were forced to leave a firm. The remaining 138 overconfident CEOs left their firm voluntarily. The summary statistics for the stock observations also indicates that firms managed by overconfident CEOs have a higher Q, lower leverage, higher ROA, and higher sales relative to rational CEOs. Hence, it appears that the overconfident CEOs in our sample engage in *value enhancing* activities and not *value destroying* activities.

In the cross-sectional regression of abnormal returns on CEO overconfidence and other appropriate control variables, we find that announcement reaction among bondholders and stockholders in a growth firm do not experience loss in value due to a voluntary turnover of overconfident CEOs. Hence, we reject the hypothesis that overconfident CEOs in growth firms underinvest less relative to rational CEOs and that their departure would result in a loss in firm value. We find that announcements of voluntary turnovers of relatively more overconfident CEOs in value firms are met with a statistically significant negative reaction among bondholders and stockholders. The negative reaction indicates a loss in the value of stakeholders' claims,

implying overconfident CEOs do not engage in value destroying activities. Based on this observation, we reject the notion that overconfident CEOs increase the overinvestment problem in value firms.

Our results support the literature on the existence of an interior optimum degree of CEO overconfidence (Campbell et al (2011), Goel and Thakor (2008)). CEOs who exhibit overconfidence traits that do not exceed the optimal level are those who engage in value enhancing activities. It is reasonable to expect that such CEOs will not be asked to leave a firm, despite their overconfidence. If a CEO with such a level of overconfidence leaves a firm voluntarily, and the replacement type is not known at the time of turnover, the stakeholders are faced with a higher level of uncertainty. The chances of a relatively diffident CEO is diffident relative to the departing CEO increases the underinvestment problem. On the other hand, if the replacement CEO is excessively overconfident then the stakeholders face an overinvestment problem. Our empirical results do not find a relation between CEO overconfidence and debt related agency costs. Our results, however, suggest that CEOs in our sample have moderate levels of overconfidence that is value enhancing.

The rest of the paper is organized as follows. Section 2 presents the relevant literature on CEO overconfidence and how this trait relates to agency costs arising from bondholder-stockholder conflicts. Section 3 develops a simple model to illustrate the impact of overconfidence and debt induced agency costs due to underinvestment and overinvestment and presents two testable hypotheses. Section 4 contains the main results of this paper. Section 5 concludes the paper.

## 2. Relevant literature

A distortion in corporate investment policy occurs when a manager passes up positive NPV projects (underinvestment) or invests in negative NPV projects (overinvestment). Such distortions result in a loss in firm value and adversely affect the shareholders and bondholders. Rational managers, acting in the interest of shareholders, exhibit incentives to underinvest (Myers (1977) or overinvest (Jensen and Meckling (1986)) in the presence of outstanding risky debt. The literature on contract design has shown that call and convertible features and other covenant restrictions are mechanisms to ameliorate such incentives and reduce agency cost of debt (Barnea, Haugen and Senbet (1980, 1985), Kalay (1982), Smith and Warner (1979)). Recent literature has shown that distortions in investment policy can occur independent of leverage if managers exhibit overconfidence relative to a rational manager. We examine recent research to better understand distortions in investment policy caused purely due to the managerial overconfidence and the possible interactive effect due to a combination of overconfidence and leverage.

In the presence of rational investors, Heaton (2002) shows that underinvestment or overinvestment could occur when an optimistic manager incorrectly believes that the investors undervalue the risky securities issued by the firm. If an optimistic manager is forced to finance an investment opportunity through an external issue, he or she will underinvest when their belief suggests that the positive NPV generated by a good project is less than the extent of perceived underpricing. On the other hand, an optimistic manager incorrectly believes that some negative NPV projects are actually a positive NPV projects and is liable to use the available free cash flow within the firm to finance such negative NPV projects. Although, the distortion in

investment policy occurs regardless of the type of external security issued, it is less severe for debt issues relative to equity issues.

Malmendier and Tate (2005) empirically confirm the predictions in Heaton (2002) by finding that the sensitivity of investment to cash flow increases in overconfidence. In addition, overconfidence significantly affects sensitivity of investment to cash flow only in financially constrained firms. Malmendier and Tate (2008) use merger decisions as a corporate event and find that overconfident CEOs undertake value-destroying mergers due to overestimating firm's ability to generate returns, especially when they have access to internally generated funds. The announcement effect of a merger bid made by overconfident CEO is significantly lower (-90 basis points) relative to other CEOs (- 12 basis points), further corroborating the nature of value destroying investments. The above studies abstract from agency costs and show that the managerial overestimation of future returns and the resulting (perceived) underpricing of a firm securities cause overinvestment that adversely affects the wealth of all claimholders. In this context, a forced turnover of an overconfident manager benefits bondholders and stockholders.

Hackbarth (2009) uses a real options framework and analyzes the investment and financing decisions of overconfident managers in the presence of shareholder-bondholder conflicts. He shows that managerial overoptimism causes leverage to increase thereby resulting in a greater debt overhang problem. At the same time, incorrect overestimates of future earnings reduce the perceived number of states in which underinvestment might occur. This results in a reduction in underinvestment. The theory predicts that the reduction in underinvestment dominates the negative effects of increased leverage in the presence of *mildly* biased manager thereby reducing the agency cost of debt. An implication of his model is that a turnover of a mildly biased



manager increases the expected underinvestment costs due to greater uncertainty about the type of replacement and adversely affects bondholders and stockholders.

Existing empirical research that examines bondholder reaction to turnover and overconfidence is scant. Adams and Mansi (2009) examine stockholder and bondholder reactions to turnover events but do not consider the impact of managerial overconfidence. Turnover announcements are found to be value *increasing* for shareholders but value *decreasing* for bondholders without any overall change in firm value. These authors find forced turnovers result in 28 basis points higher abnormal yield spreads in relation to voluntary turnover. Bonds with non-investment grade bonds experience an abnormal mean spread of 40 basis points relative to 2 basis points for investment grade bonds. There is no significant difference between an outside and inside CEO replacement. The lack of change in overall firm value and the wealth transfer is probably a result of not differentiating the effects of overconfidence in growth versus value firms.

Yang, Paul, Jaewoo and Ryan (2013) estimate an ordered logistic regression and find that credit rating is negatively related to overconfidence after controlling for firm characteristics such as size, profitability, and risk that prior research has shown are associated with the cost of debt.<sup>1</sup> They also estimate a changes specification where they examine changes in credit ratings in response to changes in CEO overconfidence, again based on CEO turnover. Consistent with expectations, they find that replacing the existing CEO with a more overconfident CEO is negatively associated with changes in credit ratings. Since rating agencies do not make changes to credit rating immediately after a manager is fired, we focus on an event study around a turnover event to capture stakeholder' reaction, independent of the type of new hire.

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<sup>1</sup> See Kaplan and Urwitz 1979; Ahmed, Billings, Morton, and Stanford-Harris 2002.

In the next section, we include managerial overconfidence in an agency cost based model and characterize the distortions in investment policy. The results from this model provide us with testable hypotheses.<sup>2</sup>

### 3. Model and hypothesis development

Consider a three-date (two-period) model. The firm value consists of the value of assets in place and the value of a growth opportunity that expires at  $t_1$ . The assets in place generate a random cash flow of  $X > 0$  at time  $t_1$ . If accepted, the growth opportunity requires an investment outlay of  $I$ , and generates a cash flow at  $t_2$  of  $H$  with probability  $p$  or  $L$  with probability  $(1-p)$ , where  $H > I > L > 0$ . The internally available funds,  $X$ , can be used to finance the investment outlay.

The assets in place are financed by equity and a zero-coupon risky debt with a promised payment of  $M$  at  $t_2$ , where  $H > M > L$ . If  $X > I$ , the investment outlay is fully financed using internal funds. We assume that the outstanding debt contains restrictive dividend covenants that prohibit the distribution of excess funds that remains after financing the investment outlay. If  $X < I$ , we assume that  $I - X$  is financed by a junior debt issue with a promised payment of  $F$  at  $t_2$ , where  $(H - M > F)$ . If the investment at  $t_1$  is rejected, then the outstanding bondholders have priority over shareholders and receive  $\text{Min}(X, M)$  at  $t_1$ .

There is no informational asymmetry in this model. All participants are assumed to be risk-neutral, simultaneously observe the realization  $X$ , and share the same beliefs about the probability  $p$ . An overconfident manager concurs with the other participants about the values of  $p$ ,  $I$ , but overestimates the cash flow from the growth opportunity by a factor of  $\alpha > 1$ .

Specifically, an overconfident manager believes  $t_2$  cash flows to be  $\alpha H$  with probability  $p$  and  $\alpha L$

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<sup>2</sup> Our model adapts the model in Harikumar, Kadapakkam and Singer (1994) to illustrate the role of managerial confidence. Proofs are similar and we can provide them if necessary.

with probability  $(1-p)$ . The value of  $\alpha = 1$  for a rational manager.<sup>3</sup> This definition is consistent with Hirbar and Yang (2013) who find that overconfident managers issue overoptimistic earnings forecasts that they subsequently miss. Also, our model differs from Heaton (2002), because the overconfident manager and the outside investors in this model have the same beliefs about the probability  $p$  and any difference in perceived valuation arises only due to difference in beliefs about the level of cash flows from the growth opportunity.

We abstract from the capital structure decision at  $t_0$  and focus on the investment decision at  $t_1$  in the presence of debt overhang (Myers (1977)). Let  $p(\alpha)_i^*$  be the minimum probability of  $H$  at which a manager, acting in the interest of shareholders and a bias factor  $\alpha \geq 1$  will accept a project, where  $i = e$  denotes an all equity firm and  $i = d$  denotes presence of outstanding debt at  $t_1$ . We denote  $p(\alpha = 1)_i^*$  as  $p_i^*$  and  $p(\alpha > 1)_i^*$  as  $p_{oi}^*$ . The following proposition establishes a benchmark for the investment policy.

**Proposition 1:** (All equity case): Regardless of the level of  $X$ , a manager invests in all projects

with values of  $p > p(\alpha)_e^*$ , where  $p(\alpha)_e^* = \frac{I - L}{\alpha(H - L)}$ .

Since an overconfident manager overestimates the cash flows from the growth opportunity ( $\alpha > 1$ ), he or she (wrongly) perceives all negative NPV projects with  $p \in (p_{oe}^*, p_e^*)$  as having a positive NPV and invests in such projects resulting in an overinvestment problem. The overinvestment in this model results from an overestimation of the level of cash flows and not due to perceived mispricing of a security issue as in Hackberth (2009) or Heaton (2002).

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<sup>3</sup> A manager can also exhibit conditional overconfidence when he or she overestimates only the upside cash flow as  $\alpha H$  (and correctly estimates the downside cash flow,  $L$ ) or overestimates only the downside cash flow  $\alpha L$  (and correctly estimates the upside cash flow,  $H$ ).

In the presence of outstanding (risky) debt at  $t_1$ , a manager, acting in the interest of shareholders, might pass up positive NPV projects and underinvest if the expected benefits net of those accruing to outstanding bondholders are less than the investment outlay. Moreover, if the manager has access to free cash flow, he or she may overinvest by accepting negative NPV projects. We characterize the interaction of this agency problem with the manager type in the next two propositions.

**Proposition 2:** (External financing of project): When the firm has outstanding debt at  $t_1$  that carries a promised payment of  $M$  at  $t_2$ , a manager maximizes shareholders' wealth by investing in all projects with  $p \in (p_d^*(\alpha, X), 1)$ , where

$$p_d^*(\alpha, X) = \frac{I - X}{\alpha(H - M)} \text{ for } 0 \leq X < M \text{ and,}$$

$$p_d^*(\alpha, X) = \frac{I - M}{\alpha(H - M)} \text{ for } M \leq X < I.$$

In this model, we assume that the financing of the investment outlay follows a pecking order by first using all available internal funds and then resorting to debt financing. Hence, a shortfall is financed through an external issue of a (risky) subordinated debt. The cash flow  $H$  is assumed to be sufficient to settle all the debt claims. However, in the bad state, since the cash flow  $L < M$ , the subordinated debt holders anticipate to receive nothing. Note that, since managers and investors agree on the probability  $p$ , the subordinated debt issue is priced fairly.

Consider Figure 1. Given  $H$  and  $L$ , firms with lower values of internal funds characterize a relatively higher value of the growth opportunity i.e., a 'growth' firm. For values of  $X < X_2$ , the extent of underinvestment a rational manager engages in is given by the region 'anb'. In contrast, an overconfident manager of a growth firm ( $X < X_1$ ) underinvests less than a rational manager as depicted by the region 'knp'. An implication of this result is that if an overconfident manager of

a growth firm leaves the firm, the uncertainty surrounding a turnover increases the expected underinvestment costs thereby resulting in a loss in value to stockholders and bondholder returns.<sup>4</sup> However, if a firm is in a situation where the growth opportunities are characterized by very high positive NPV projects, i.e.,  $p \gg p_d^*$ , the expected loss is negligible. Our first testable hypothesis is:

**Hypothesis 1:** A voluntary turnover of an overconfident manager in a growth firm results in loss in value for stockholders and bondholders due to an increase in expected underinvestment costs. (i.e., a negative announcement effect).

If the firm generates more cash flow internally i.e.,  $X > X_1$ , the overconfident manager has the greater incentive to engage in overinvestment relative to a rational manager. This is depicted by the region ‘pbc dgh’. However, as in the above case, if a firm is in a situation where the growth opportunities are characterized by very high positive NPV projects, i.e.,  $p \gg p_e^*$ , the expected gain is negligible. This result gives our second testable hypothesis:

**Hypothesis 2:** A voluntary turnover of an overconfident manager in a value firm results lower expected overinvestment and consequently a gain in value for shareholders and bondholders. (i.e., positive announcement effect).

#### 4. Sample and Variable Definitions

The sample is derived from EXECUCOMP, which provides the date on CEO departures. Our data period extends from 1992 – 2011. We are interested in examining the bondholder and stockholder wealth effects of the turnover of overconfident CEOs (non-overconfident CEOs) in high growth and value firms. First, we calculate our test variable, CEO overconfidence, by taking

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<sup>4</sup> In this model, the first and second moments of growth cash flows are increasing in  $\alpha$ . Thus, the investment policy adopted by overconfident manager in Proposition 2, results in potentially more negative NPV investments that are also perceived riskier. Considering that equity is like a call option, this behavior is consistent with shareholder value maximization.

into consideration the CEO's value of unexercised exercisable options. The compensation of a CEO typically includes stocks and options. However, the CEO's human capital is invested in the company so that bad performance decreases his or her outside options as well. We expect that rational CEOs to exercise their options early in order to diversify. Therefore, the value of the CEO's unexercised exercisable options is one way to capture CEO overconfidence (Malmendier and Tate, (2005, 2008), Campbell et al., (2011), Malmendier et al., (2011), Hirshleifer et al., (2012)).

Following Campbell et al. (2011), for each year, we compute the percent of option moneyness (*moneyness%*) for each CEO, where option moneyness is defined as calculating the realizable value per option (EXECUCOMP variable *opt\_unex\_exer\_est\_val* divided by *opt\_unex\_exer\_num*) and dividing that number by the average exercise price. The average exercise price is fiscal year end price of share minus the ratio of EXECUCOMP variable *opt\_unex\_exer\_est\_val* over *opt\_unex\_exer\_num*.

We now turn our attention to bond abnormal return. We use Bessembinder et.al (2008) to calculate bond abnormal returns for three months following the CEO turnover event. We start with all bond transactions in the FISD database. We eliminate the following type of bonds – bonds in close to bankruptcy or default, bonds where a tender exchange offer is active, bonds whose face value is not \$1000, puttable bonds, foreign bonds, zero coupon bonds, unrated bonds, bonds with less than one year of remaining maturity, bonds with more than 50 years of maturity, bond transactions where the transaction value is less \$100,000, and bonds where the price is less \$25 which are bonds close to default. The presence of multiple bonds by firms impedes the return calculation. Bessembinder et.al (2008) suggest to calculate the weighted average returns of multiple bonds. We then turn our attention to construct returns for matching portfolios. For

investment grade bonds, we create six matching portfolios based on bond rating - AAA to AA+, AA to AA-, A+ to A-, BBB+ to BBB-, BB+ to BB-, B+ to B-, and all the remaining non-investment grade bonds are clustered into one portfolio. The weighted monthly returns are calculated for these portfolios. Based on the event month, we then calculate the cumulative abnormal returns for the contemporaneous month, the one month after, and the two months after by subtracting the matching portfolio returns from the contemporaneous month, one month forward, and two months forward.

After calculating the bond abnormal returns we calculate the cumulative abnormal stock returns using Event Study Metrics. We calculate the 1month, 2 months, and 3 months forward cumulative abnormal returns. We merge this data with COMPUSTAT to extract the firm level control variables. Some of the control variables that we use in our study are as follows – Rating and Maturity is defined as numerical credit rating scale as explained earlier, and remaining maturity defined as the maturity year minus the transaction year. We use the above two control variables only for the bond sample. Size, is defined as the log of total assets. Leverage, is defined as the ratio of total long term debt to total assets. ROA, is defined as the ratio of operating income before depreciation to total assets. Q, is defined per Chung and Pruitt(1994) as the sum of market value of equity, preferred stock, total long term debt, net current liabilities scaled by total assets. Finally, Volatility is defined as defined as the natural log of the ratio of the rolling lagged 24 month standard deviation to the forward looking 24 month standard deviation. Other variables that capture firm characteristics include: Capex is capital expenditures scaled by total assets, Cash - Cash and cash equivalents scaled by total assets, R&D - Research and Development expenditure scaled by total assets, and Ppent\_at - Net property plant and equipment scaled by total assets

## 4.1 Summary Statistics

### *Sample characteristics*

The sample size under various classifications is presented in Table 1.

[Insert Table 1 here]

Our study has a total of 458 turnover bond observations with firm characteristics and security returns data. Of these, 400 were voluntary turnovers (87%) and 58 were forced turnovers (13%). Based on our classification of overconfidence, we have 138 observations of overconfident CEOs voluntarily leaving a firm and 19 observations of overconfident CEOs being forced to leave. The total number of stock observations is 719. Of these 649 (89%) were voluntary turnovers and 79 (11%) were forced turnover. Our sample of voluntary turnover of overconfident CEOs has 433 observations. In relation, we have 25 observations of forced turnover of overconfident CEOs. Although, we report summary statistics for both types of turnovers, bulk of our analysis focuses on voluntary turnovers.

### *Firm characteristics*

Table 2 contains firm characteristics for the observations in each security class (bonds and

[Insert Table 2 here]

stocks), classified by CEO type. Panel A presents the summary statistics for the bond observations. The firms managed by overconfident CEOs have a relatively higher average sales turnover of \$16.7 billion compared to rational CEOs who manage firms with average sales of \$14.5 billion. The average market value of assets to book value of assets (Q) is 1.327 and return



on assets (ROA) is 14.1% for firms managed by overconfident CEOs relative to a value of 1.039 and 10.7%, respectively, for rational CEOs. This implies that the firms managed by overconfident CEOs are more profitable. Prior literature alludes to overconfident CEOs engaging in value destroying investments. Of the 157 overconfident CEOs in our sample, only 19 were forced to leave a firm. The remaining 138 overconfident CEOs left their firm voluntarily. Hence, it appears that the overconfident CEOs in our sample engage in *value enhancing* activities and not *value destroying* activities. This is also evident in the average leverage ratio. Prior literature predicts that overconfident CEOs take on more leverage relative to their rational counterpart. In our sample, the leverage of firms managed by overconfident CEOs is lower at 21% relative to 26.9% for firms managed by rational CEOs. The average remaining years to maturity is 8.5 years for firms with overconfident CEOs relative to 7.97 years for firms with rational CEOs. The average bond rating is higher for firms with overconfident CEOs. This also supports the notion that the overconfident CEOs in our sample inspire confidence among the bondholders. The other variables are about the same for firms managed by both types of CEOs. The summary statistics for the stock observations in Table 2 (Panel B) also indicates that firms managed by overconfident CEOs have a higher Q, lower leverage, higher ROA, and higher sales relative to rational CEOs. Hence, the overconfident CEOs in the bond and stock samples appear to engage in *value enhancing* activities and not *value destroying* activities.

### *Abnormal Returns*

Table 3 contains the cumulative abnormal returns for shareholders and bondholders during

[Insert Table 3 here]

the announcement month, one month forward and two months forward. Consider the return reaction to voluntary turnover announcements in Panel A. The stockholders and the bondholders react more negatively to an overconfident CEO leaving a firm relative to a rational CEO. In light of the higher Q and ROA of the firms managed by such overconfident CEOs, it is not surprising that the shareholders and bondholders dislike such a CEO leaving a firm voluntarily. In contrast, a forced turnover of an overconfident CEO (Panel B) is met with a positive announcement date reaction among stockholders for all three event windows. The reaction among bondholders is less negative on the announcement of a forced turnover than to a voluntary turnover of an overconfident CEO. Overall, these observations suggest that the stakeholders do not always perceive overconfident CEOs to act in detrimental ways that destroy firm value. According to Hypotheses 1 and 2, overconfident managers tend to mitigate the underinvestment problem and exacerbate the overinvestment problem. Thus, if an overconfident manager leaves the firm, the stakeholders face an expected increase in underinvestment and a decrease in overinvestment. The negative reaction to a voluntary turnover announcement is consistent with a net increase in expected agency cost.

The agency cost implications depend on the type of firm (growth versus value) and turnover of an overconfident CEO. We classify the announcement date reaction based on firm type and turnovers of an overconfident CEO and present the results in Table 4. The shareholders' reaction is mixed. The abnormal returns in value firms are more negative than growth firms on event month 1. However, shareholders in growth firms experience more wealth loss if we consider months 2 and 3. In the average abnormal returns for bondholders in a growth firm is more negative than value firms. However, this is also accompanied with very high standard errors. The reaction in month 1 is negative for the bondholders, as well. This implies that there is

unlikely to be a wealth transfer between the two groups and the loss in firm value stems from a voluntary turnover of an overconfident who has been making *value enhancing* decisions. The bondholders reaction is negative in months 2 and 3. We examine these relationships in the context of cross-sectional regressions in the next section.

## 4.2 Cross-Sectional Regressions

We regress the announcement date abnormal returns for bondholders and stockholders in value and growth firms for voluntary turnovers and present the results in Table 4. Regressions 1

[Insert Table 4 here]

to 3 contain results for the overall sample for the three event windows. Regressions 4 to 6 pertain to value firms and regressions 7 to 9 pertain to growth firms. Panel A presents the results for bonds and Panel B for stocks.

### *Overall regressions*

The moneyness variable indicates the degree of overconfidence with higher values indicating a greater degree of overconfidence. Consider the regressions for the overall sample of voluntary turnovers. We find that announcements of voluntary turnovers of relatively more overconfident CEOs are met with a strong negative reaction among bondholders and stockholders. Adams and Mansi (2009) find that neither voluntary turnovers nor forced turnovers result in a change in firm value. In contrast, our result not only indicates a loss in firm value but that this loss is greater the more overconfident the departing CEOs are. The Maturity variable enters the regression in a positive and significant manner. That is, bondholders react more positively when firms have bonds with longer maturity. From an agency cost perspective, the

debt overhang problem is more severe when the firm has longer term maturity bonds. Consequently, the expected loss due to underinvestment is greater in firms with longer term debt (Hypothesis 1). Our results do not support this hypothesis. Instead, we find that the longer the maturity the positive the bondholders react at the time of a voluntary turnover. The Volatility variable is a relative measure of pre announcement volatility in stock returns to post announcement stock returns. A higher value would imply a relatively lower anticipated volatility post turnover. The positive sign for the Volatility variable implies that the announcement reaction is positive if the stakeholders expect a lower level of uncertainty post turnover. Conversely, the announcement month abnormal returns are more negative if the anticipated post turnover volatility is higher. Finally, based on our definition of the ratings variable, a negative sign indicates a more adverse reaction to bonds with lower credit ratings. Overall, we conclude that voluntary turnover of overconfident CEOs are met with a negative reaction by stake holders. This is exacerbated when the turnover is associated with a higher level of uncertainty. This occurs when a the stakeholders perceive an overconfident CEO to be *value enhancing* and a voluntary turnover of such CEOs result in greater uncertainty about the replacement.

#### *Firm type regressions*

In Panel A, regressions 4, 5 and 6 we find that the bondholders' reaction is significant in Months 2 and 3. Specifically, the bondholders in value firms react very negatively to the announcement of a voluntary turnover of overconfident CEOs. This adverse reaction is more severe for firms that have debt with lower credit ratings. The Maturity variable has a positive sign for Months 3 and 3 and the Volatility variable has a positive sign in Months 1 and 2. Although, these are consistent with the greater uncertainty associated with the turnover event, they are not statistically significant. The variables in regressions 7, 8 and 9 for the growth firms

have similar signs. However, none of these regressions have statistical significance. These results reject both Hypothesis 1 and 2.

Consider the stockholders' reaction in Panel B. Regressions 4, 5 and 6 for value firms indicate a strong negative reaction to a voluntary turnover of overconfident CEOs during each of the announcement windows. The leverage variable is negative in Months 1 and 2 and is statistically significant for Month 1. Voluntary turnovers in Value firms with higher leverage ratios result in lower abnormal returns. The result implies that if a CEO leaves a firm voluntarily, the stockholders react more negatively if the firm has higher leverage. Hypothesis 2 predicts a positive reaction to a turnover of an overconfident CEO and in conjunction with Proposition 2, this reaction is higher for firms with greater leverage. Our results reject Hypothesis 2.

We examine the role of uncertainty around turnover events. The statistically negative sign on the Volatility variable indicates that stockholders react more negatively when they anticipate greater uncertainty in the future. The lagged ROA variable indicates that if a *value enhancing* overconfident CEO voluntarily leaves a firm, it results in a negative reaction among stockholders. Although, this variable is not significant it enters the regression with a negative sign for bondholders, as well. The regressions for growth firms are not statistically significant.

### *Discussion*

In this section, we interpret our results in the context of Goel and Thakor (2008), Campbell et al (2011), and Yilmaz and Mazzeo (2014). These studies suggest a positive role for the overconfidence trait in CEOs. This literature suggests the existence of an optimal level of CEO overconfidence. CEOs who exceed this optimum level of overconfidence are those who engage in value destroying activities. In the presence of effective corporate governance, it would be

reasonable to expect that CEOs who are excessively confident will be forced to leave. Such forced turnovers result in ‘good news’ to stakeholders.

CEOs who exhibit overconfidence traits that do not exceed the optimal level are those who engage in value enhancing activities. It is reasonable to expect that such CEOs will not be asked to leave a firm, despite their overconfidence. If a CEO with such a level of overconfidence leaves a firm voluntarily, and the replacement type is not known at the time of turnover, the stakeholders are faced with a higher level of uncertainty. If the replacement CEO is diffident relative to the departing CEO, the stakeholders face an underinvestment. On the other hand, if the replacement CEO is excessively overconfident then the stakeholders face an overinvestment problem. However, these are not related to debt based agency costs. In reference to Figure 1, these costs can occur even if the quality of projects (i.e.,  $p$ ) is greater than  $p_d^*$ . Our empirical results suggest that the voluntary turnovers of overconfident CEOs in our sample are those with an overconfidence level that is less than the optimal level of overconfidence.

## 5. Conclusion

Agency theory predicts that, overconfident CEOs, acting in the interest of shareholders, improve the underinvestment problem that arises from a debt overhang when a firm is faced with growth opportunities. However, an overconfident CEO in a value firm exacerbate the overinvestment problem and invest in negative NPV projects. These distortions are shown to occur when the CEO overestimates the future cash flows from the firm. These distortions are shown to be independent of other distortions caused by mispricing of securities issues.

This paper empirically examines these issues in the context of voluntary turnovers of CEOs. If an overconfident CEO leaves a growth firm, one would expect the shareholders and

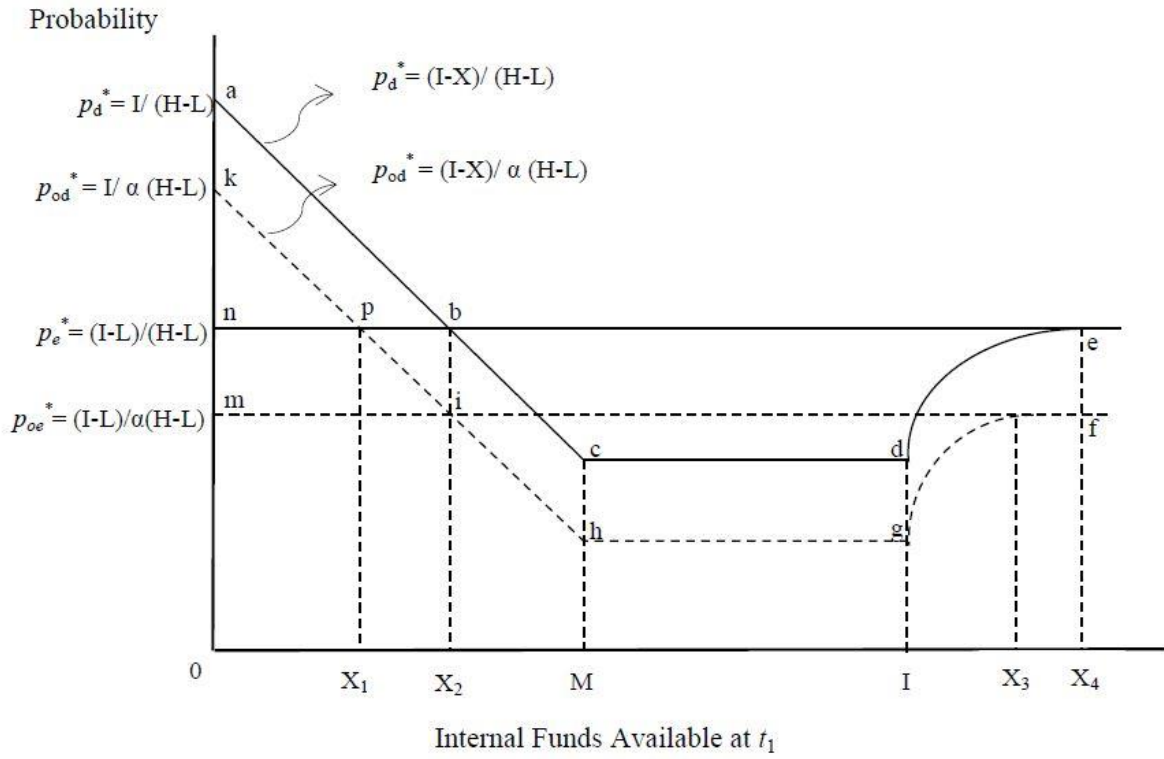
bondholders to react negatively because of the possibility of increased underinvestment. We do not find empirical evidence that supports this prediction. If an overconfident CEO employed in a value firm leaves, one would expect a possible reduction in overinvestment and the stakeholders to react positively. We do not find evidence to support this view, either. On the contrary, we find that the shareholders and bondholders react very negatively to the announcement of an overconfident CEO leaving voluntarily.

In a well-functioning corporate governance climate, one would expect *excessively* overconfident CEOs to be forced to leave with a high probability (Campbell. et al (2011)). This would imply that more likely than not, the overconfident CEOs who are not forced to leave are indeed valued by the stakeholders. The characteristics of the firms in our sample that are managed by overconfident CEOs show higher market to book values, higher return on assets and lower leverage, relative to less overconfident CEOs. Goel and Thakor (2008) show that *some* amount of overconfidence increases firm value and consequently the value of stakeholders' claims.<sup>5</sup> Based on the negative reaction of bondholders and stockholders, we interpret that the voluntary (and not forced) turnover of CEOs in our sample are those with overconfidence attributes that add value. Our results support the literature that suggests an interior optimum level of overconfidence that is not based on an debt related agency cost trade-off.

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<sup>5</sup> Although, Hackberth (2009) also shows that *mild* overconfidence increases firm value, it is based on an agency cost trade-off that is not supported by the evidence in our paper.

**Figure 1:** This figure illustrates the agency cost based implications of an overconfidence trait in CEOs.





**Table 1:** This overall sample classification by turnover type, manager type, and their combinations are presented in this table.

**Sample of Bond Observations**

	Obs	%
Overall Sample	458	100%
Forced Turnover	58	13%
Voluntary Turnover	400	87%
With rational CEOs	301	66%
Overconfident CEO	157	34%
Voluntary/Rational	262	57%
Voluntary/Overconfident	138	30%
Forced/Rational	39	9%
Forced/Overconfident	19	4%

**Sample of Stock Observations**

	Obs	%
Overall Sample	719	100%
Forced Turnover	79	11%
Voluntary Turnover	640	89%
With rational CEOs	487	68%
Overconfident CEO	232	32%
Voluntary/Rational	433	60%
Voluntary/Overconfident	207	29%
Forced/Rational	54	8%
Forced/Overconfident	25	3%

**Table 2:** This table contains the summary statistics for firm and security related variables classified based on manager type.

**Panel A: Summary statistics for the bond observations**

**Rational CEO**

<b>Variable</b>	<b>Mean</b>	<b>Std Dev</b>	<b>N</b>	<b>Median</b>
Sales	14959.030	33134.920	301	5628.660
Q	1.039	1.171	301	0.761
Capex	0.041	0.041	301	0.031
Leverage	0.269	0.193	301	0.235
Cash in hand	0.081	0.088	301	0.052
Free Cash Flow	0.053	0.079	301	0.053
R&D Expdt	0.019	0.042	301	0.000
ppent_at	0.271	0.224	301	0.231
ROA	0.107	0.104	301	0.105
Maturity	7.967	7.288	301	6.000
Rating	11.515	4.269	301	11.000
Volatility	-0.052	0.585	294	0.008

**Overconfident CEO**

<b>Variable</b>	<b>Mean</b>	<b>Std Dev</b>	<b>N</b>	<b>Median</b>
Sales	16712.630	23668.370	157	7208.770
Q	1.327	1.176	157	1.039
Capex	0.046	0.039	157	0.039
Leverage	0.210	0.123	157	0.190
Cash in hand	0.076	0.083	157	0.047
Free Cash Flow	0.080	0.052	157	0.084
R&D Expdt	0.017	0.032	157	0.000
ppent_at	0.267	0.231	157	0.218
ROA	0.141	0.080	157	0.144
Maturity	8.510	8.106	157	5.000
Rating	9.338	3.273	157	9.000
Volatility	-0.052	0.504	157	0.008

**Table 2 (continued):**

**Panel A: Summary statistics for stock observations**

**Rational CEO**

<b>Variable</b>	<b>Mean</b>	<b>Std Dev</b>	<b>N</b>	<b>Median</b>
Sales	3309.390	9142.720	491	974.768
Q	1.290	1.591	493	0.853
Capex	0.058	0.061	493	0.042
Leverage	0.211	0.226	493	0.165
Cash in hand	0.137	0.176	493	0.058
Free Cash Flow	0.015	0.194	493	0.054
R&D Expdt	0.047	0.099	493	0.006
ppent_at	0.279	0.212	493	0.220
ROA	0.066	0.207	493	0.101
Volatility	-0.128	0.427	470	-0.114

**Overconfident CEO**

<b>Variable</b>	<b>Mean</b>	<b>Std Dev</b>	<b>N</b>	<b>Median</b>
Sales	6225.640	15647.340	233	1658.150
Q	1.562	1.778	233	1.117
Capex	0.058	0.056	233	0.049
Leverage	0.176	0.155	233	0.131
Cash in hand	0.119	0.166	233	0.049
Free Cash Flow	0.067	0.116	233	0.083
R&D Expdt	0.045	0.078	233	0.013
ppent_at	0.250	0.195	233	0.214
ROA	0.121	0.137	233	0.134
Volatility	-0.048	0.418	228	-0.079

**Table 3:** This table contains the cumulative abnormal returns for voluntary and forced turnover subsamples for each asset class (shareholders and bondholders) during the announcement month, one month forward and two months forward. The abnormal returns are classified based on turnover type and CEO type.

**Panel A: Abnormal Returns (Voluntary Turnover)**

	Stock Observations						Bond Observations					
	Obs	Variable	Mean	Std Dev	N	Median	Obs	Variable	Mean	Std Dev	N	Median
Rational	433	Month1	-0.0253	0.2584	366	0.0000	262	Month1	-11.569	125.1390	119	-0.0007
		Month2	-0.0183	0.3552	356	0.0085		Month2	-9.142	106.5518	165	-0.0007
		Month3	-0.0023	0.4193	345	0.0151		Month3	-12.027	121.9029	126	-0.0024
Overconfident	207	Month1	-0.0305	0.2912	170	-0.0221	138	Month1	-32.585	268.5101	68	-0.0021
		Month2	-0.0307	0.3998	166	0.0105		Month2	-24.103	231.0266	92	-0.0011
		Month3	0.0014	0.4678	159	0.0373		Month3	-34.132	270.7193	67	-0.0011

**Panel B: Abnormal Returns (Forced Turnover)**

	Stock Observations						Bond Observations					
	Obs	Variable	Mean	Std Dev	N	Median	Obs	Variable	Mean	Std Dev	N	Median
Rational	54	Month1	-0.0424	0.2922	46	-0.0237	39	Month1	-0.0184	0.0736	19	-0.0003
		Month2	-0.0686	0.3436	45	-0.0317		Month2	-143.4205	505.2771	21	-0.0137
		Month3	-0.0229	0.4281	42	0.0121		Month3	-215.1565	613.3760	14	-0.0190
Overconfident	25	Month1	0.0958	0.1649	23	0.0742	19	Month1	-0.0021	0.0198	11	0.0012
		Month2	0.1286	0.2377	23	0.1513		Month2	-0.0045	0.0178	13	0.0031
		Month3	0.1359	0.3520	23	0.2275		Month3	-0.0110	0.0270	13	-0.0107

**Table 4:** This table considers only voluntary turnovers of overconfident CEOs based on firm type and presents the cumulative abnormal returns for shareholders and bondholders during the announcement month, one month forward and two months forward. A growth firm is defined as  $Q > \text{median } Q$ , and a Value firm is defined as  $Q < \text{median } Q$ .

	Stock Observations						Bond Observations					
	Obs	Variable	Mean	Std Dev	N	Median	Obs	Variable	Mean	Std Dev	N	Median
Growth Firms	140	Month1	-0.0254	0.2461	116	-0.0226	93	month1	-47.118	322.9754	47	-0.0022
		Month2	-0.0381	0.3461	115	-0.0016		month2	-36.331	283.7223	61	0.0002
		Month3	-0.0178	0.4025	110	-0.0229		month3	-45.233	316.5605	49	0.0002
Value Firms	67	Month1	-0.0414	0.3725	54	-0.0065	45	month1	-0.060	0.268864	21	-0.0012
		Month2	-0.0139	0.5039	51	0.0577		month2	-0.042	0.21636	31	-0.0050
		Month3	0.0445	0.5914	49	0.1313		month3	-3.912	16.25079	18	-0.0043

**Table 5:** This table contains the cross-sectional regressions for the sample of voluntary turnover. The dependent variable is abnormal returns to bondholders. Robust t-statistics in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

**Panel A: Dependent variable is abnormal returns to bondholders**

	Overall Regressions			Value Firms			Growth Firms		
VARIABLES	(1) Month1	(2) Month2	(3) Month3	(4) Month1	(5) Month2	(6) Month3	(7) Month1	(8) Month2	(9) Month3
Moneyness	-0.0022 (-1.0981)	-0.0002** (-2.1885)	-0.0002 (-1.5254)	0.0008 (0.7064)	-0.0002*** (-4.9289)	-0.0002* (-1.7111)	-0.0037 (-1.3769)	-0.0024 (-0.6299)	-0.0043 (-0.8885)
Size	0.0030 (0.7479)	-0.0046 (-1.1935)	-0.0101* (-1.7418)	-0.0000 (-0.0094)	-0.0119* (-1.9205)	-0.0077 (-0.7355)	0.0065 (0.9205)	0.0004 (0.0599)	-0.0135 (-1.2629)
Leverage	-0.0271 (-0.9759)	0.0075 (0.1999)	0.0074 (0.1051)	-0.0179 (-0.4009)	0.0793 (1.1497)	0.1076 (0.8098)	-0.0241 (-0.7452)	-0.0384 (-1.2558)	-0.0554 (-0.9349)
Lagged ROA	0.0486 (0.8253)	-0.0605 (-1.0074)	-0.1206 (-1.2173)	-0.0255 (-0.1717)	-0.2326 (-1.4614)	-0.2190 (-0.8481)	0.0594 (0.6562)	0.0487 (0.7598)	0.0480 (0.4329)
Maturity	0.0002 (0.8570)	0.0006** (2.4364)	0.0008* (1.7261)	-0.0005 (-0.5973)	0.0004 (1.0702)	0.0001 (0.0602)	0.0004 (0.9976)	0.0006 (1.4134)	0.0011 (1.4682)
Rating	-0.0003 (-0.2194)	-0.0026 (-1.3909)	-0.0044 (-1.3346)	-0.0010 (-0.5456)	-0.0075** (-2.1142)	-0.0066 (-0.9322)	0.0021 (1.1038)	0.0019 (1.0588)	-0.0022 (-0.7148)
Volatility	0.0054 (1.0671)	0.0133* (1.7406)	0.0206 (1.6409)	0.0063 (0.7692)	0.0088 (0.9438)	-0.0003 (-0.0222)	0.0016 (0.1818)	0.0081 (0.7090)	0.0273 (1.2375)
Constant	-0.0385 (-0.7146)	0.0522 (1.0660)	0.1201 (1.6280)	0.0068 (0.0978)	0.1790** (2.0569)	0.1068 (0.7279)	-0.0978 (-1.1292)	-0.0383 (-0.5245)	0.1218 (1.0782)
Observations	182	241	186	73	93	71	85	120	93
R-squared	0.0519	0.0385	0.0409	0.0479	0.1041	0.0368	0.0890	0.0359	0.0931

**Panel B: Dependent variable is abnormal returns to stockholders**

**Overall Regressions**

**Value Firms**

**Growth Firms**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
VARIABLES	Month1	Month2	Month3	Month1	Month2	Month3	Month1	Month2	Month3
Moneyiness	-0.0008**	-0.0013**	-0.0007	-0.0009***	-0.0015***	-0.0013***	0.0001	0.0001	0.0022
	(-2.2934)	(-2.2373)	(-0.9791)	(-5.9808)	(-5.2919)	(-4.2913)	(0.0236)	(0.0161)	(0.4290)
Size	-0.0009	0.0034	0.0067	-0.0039	-0.0030	0.0048	-0.0057	-0.0019	0.0013
	(-0.1686)	(0.4619)	(0.7105)	(-0.4513)	(-0.2380)	(0.3033)	(-0.6636)	(-0.1802)	(0.0947)
Leverage	-0.0844	-0.0129	0.0015	-0.1684*	-0.1247	0.1302	0.0108	0.1223	0.0610
	(-1.2833)	(-0.1568)	(0.0139)	(-1.6750)	(-0.8724)	(0.7125)	(0.1159)	(1.1189)	(0.4148)
Lagged ROA	-0.0703	-0.1773	-0.0719	-0.3214	-0.7557**	-1.2650***	-0.0463	-0.1399	0.0114
	(-0.6366)	(-1.2332)	(-0.4341)	(-1.3632)	(-2.1398)	(-3.3731)	(-0.3933)	(-0.9469)	(0.0717)
Volatility	0.0489**	0.0894***	0.1020**	0.0374	0.0904*	0.1199**	0.0373	0.0742	0.0951
	(2.1417)	(2.6916)	(2.4897)	(1.1876)	(1.7423)	(2.0152)	(1.0901)	(1.5280)	(1.4811)
Constant	0.0233	0.0046	-0.0114	0.0699	0.1233	0.1127	0.0383	0.0037	-0.0165
	(0.5204)	(0.0743)	(-0.1507)	(0.8428)	(1.0554)	(0.8275)	(0.6188)	(0.0455)	(-0.1631)
Observations	479	471	450	166	161	157	254	252	238
R-squared	0.0205	0.0335	0.0170	0.0508	0.0754	0.0891	0.0113	0.0325	0.0132

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