The Effects of CEO Overconfidence in US firms

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Abstract

This paper consists of an analysis of several possible effects of CEO overconfidence. First, the effect of the overconfidence of executives on the probability of issuing voluntary managerial earnings forecasts is investigated. I conclude that overconfident CEOs are in fact more likely to issue an earnings forecast. However, no support is found for the influence of managerial overconfidence on the accuracy of such forecasts. Finally, a positive effect of CEO overconfidence on firm performance is found.

Keywords

overconfidence, earnings forecasts, performance

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Introduction

CEO overconfidence is a phenomenon that has been found to exist by a variety of scientific papers. Notable and often-mentioned authors in the area of overconfidence of CEOs are Malmendier & Tate (2005, 2015). They argue that the way CEOs are portrayed in American culture leads to many of them being overconfident.

In this paper, I will look at both the likeliness to issue a forecast and the accuracy of the forecasts issued by CEOs. After that, the effect on performance of the firm is investigated. This research is done using a sample of US firms listed on either one of 3 exchanges: American Stock Exchange, NASDAQ, and the New York Stock Exchange.

The research question studied in this paper is: "What is the effect of CEO overconfidence on management's earnings forecasts and firm performance? ".

In general, research on the effects of CEO overconfidence are not, or at least not exclusively, a way to deter firms from choosing an overconfident CEO. In fact, some research has found that in certain situations, firms may wish to hire an overconfident CEO. These situations include times when a company wants to pursue a change in strategy (Malmendier & Tate, 2015). By looking at the effect of CEO overconfidence on earnings forecasts and firm performance, this paper furthers the insight into this topic.

To answer the research question, three hypotheses have been set up. They are the following:

Hypothesis 1
CEO overconfidence increases the likelihood of the issuance of a forecast.

Hypothesis 2
CEO overconfidence increases the likelihood of a forecast being too optimistic.

Hypothesis 3
CEO overconfidence decreases firm performance.

Overall, this paper does not find evidence for negative effects of CEO overconfidence. That is, this paper finds that CEOs are more likely to issue an earnings forecast while no evidence is found on a reduction in accuracy of earnings forecast for more overconfident CEOs. Furthermore, overconfidence seems to have a positive effect on performance.

The fact that a manager's overconfidence can have a significant effect on the way that a company is run has been shown in a number of papers. One illustration is the research done by Hribar & Yang (2011) in which they show that CEOs with overconfident qualities are more likely to issue a forecast, more optimistic in their forecast, and forecast with a narrower range. Their analysis was done doing a different sample of US firms from 2001 to 2010. This paper uses more recent data (up to 2017). Also, Park, Kim, Chang, Lee, & Sung (2018) investigated the effect of CEO hubris on firm performance in Korean firms. In this paper, a similar investigation is done using US firms between from 2000 to 2017. The measure of CEO overconfidence used in this paper is different to both that of Hribar & Yang (2011) and Park, Kim, Chang, Lee, & Sung (2018). Hence, this paper shows that the results in the two aforementioned papers seem to differ when researched in different contexts.

This introduction is the first section of the paper. The following section contains a literature review. After that, a description of all the data used is given. Subsequently, the methodology of the analyses done in this paper is discussed followed by the results. Finally, the paper ends in a conclusion and discussion about the limitations and possibilities for further research.

Literature review

A large number of CEOs seem to show signs of overconfidence as suggested by their propensity to hold stock options until they are about to expire (Malmendier & Tate, 2015). Interestingly, Ferris et al., (2013) also found that managers of firms in so-called Christian countries, which have a tendency to promote individualism, are most likely to be overconfident.

Malmendier & Tate, 2015 describe CEO overconfidence as being an important factor to be considered in the classic agency problem of a firm. This problem is that of the misalignment of interests between managers and shareholders. Overconfidence of managers, which is considered a bias, means that certain incentives that are implemented in an attempt to get CEOs to act in the interest of shareholders will not work. This is because the biases leads managers believe they are already maximizing shareholder value (Malmendier & Tate, 2015).

Effects of CEO overconfidence are diverse. For example, Kim, Wang, & Zhang (2016) show that firms with these types of CEOs run a higher stock price crash risk than firms that have CEOs that are not overconfident. The overconfidence of management results in them exaggerating returns and misjudging projects. Also, Ferris, Jayaraman, & Sabherwal (2013) found that CEOs that are overconfident, on average, make more mergers offers than those who are not. In addition, they found that these CEOs have a greater tendency to finance these mergers with cash.

Hribar & Yang (2011) researched the effect of effect of overconfidence on management forecasts. They concluded that CEOs are more likely to voluntarily forecast, miss their own forecasts, and forecast with a narrower range.

Furthermore, Chen, Crossland, & Luo (2015) find that firms with overconfident CEOs do not improve their forecasts when confronted with their mistakes. This brings to light an important consequence because it shows that, not only do CEOs make honest mistakes as a result of biases, they are also less likely to make the changes necessary to develop their forecasts.

Other research related to CEO overconfidence was done by Park et al. (2018), who found a negative effect of CEO hubris on firm performance in Korea. They also concluded that moderation of this effect could be achieved by certain power dynamics. Third, the authors found board vigilance can reduce entrenchment problems caused by CEO hubris (Park et al., 2018).

Certainly, not all effects of CEO overconfidence are unfavorable. In fact, Banerjee, Dai, Humphery-Jenner, & Nanda, 2015 find that some types of firms are positively affected by appointing overconfident managers. These are firms that are looking for a change in strategy. The positive effects are that they experience increases corporate value as well as innovative efficiency (Banerjee et al., 2015).

Furthermore, Kolasinski & Li, 2013 showed that previously overconfident CEOs learn from their mistakes. This results in them making more valuable acquisitions after they go through personal trading losses. Also, these authors researched and proved that when boards of companies have the right qualities, they can prevent some unfavorable effects of managerial overconfidence. That is, Kolasinski & Li (2013) found that managers made better decisions with respect to the acquisition of other companies if their firm had a strong and independent board.

Data

The sample used contains data from 2742 US firms from the ASE, NASDAQ, and NYSE exchanges between 2000 and 2017 obtained from the Wharton Research Data Services database. Table 1 includes descriptions of each variable. Table 2 contains the descriptive statistics of the variables.

Table 1

Variable Descriptions

Issue	Dummy that indicates whether a CEO issued an EPS forecast. Equal to 1 if a CEO issued an earnings forecast in the corresponding year. Equal to 0 if a CEO did not issue an earnings forecast in the corresponding year
Accuracy	The difference between actual EPS and EPS forecast. Accuracy = actual EPS- forecasted EPS
LnOverC	Logarithm of the total dollar value of in-the-money unexercised exercisable options held by the CEO of a firm
LnAnalysts	Natural logarithm of the number of analysts following a firm
PercInstOwn *Institutional Ownership*	Institutional ownership as a percentage of total shares outstanding
LnTotalAssets	The natural logarithm of the total assets of a firm
EarningsVol *Earnings Volatility*	The standard deviation of income before extraordinary items per company
MTB	Total market value/book value per share

Market-to-Book ratio	
ROA *Return on Assets*	Net income/Total assets
Loss	Dummy that indicates whether a firm made a loss in a certain year
PercShrOwn	Percentage of total shares owned by the CEO
Vested	Number of unexercised exercisable options divided by total common shares outstanding
Leverage	Total Equity/Total Liabilities
BoardSize	The number of board members a firm has

Table 2

Descriptive Statistics

VARIABLE	OBSERVATION	MEAN	STANDARD DEVIATION	MIN	MAX
ISSUE	198,028	0.8523744	0.3547293	0	1
ACCURACY	116,638	-3.587294	222.6402	-35247.51	198.26
ROA	304,647	0.029934	0.3442026	-19.71926	46.45454
TOTALASSETS	333,436	14087.69	84489.99	0.001	2573126
LNTOTALASSETS	333,436	7.593236	1.829589	-6.907755	14.76063
OVERC_W	223,055	2767.257	7894.433	0	55462.51
LNOVERC_W	142,161	6.663339	2.142974	-6.214608	10.92346
PERCINSTOWN	268,951	0.6854335	2.094104	4.02E-09	1079.028
PERCSHROWN	143,919	1.035864	4.055447	0	275
LNANALYSTS	355,965	4.395236	0.9387144	0	6.784457
MTB_W	282,014	669.0336	1892.462	-1312.848	13705.71
LOSS	337,147	0.1709403	0.3764573	0	1
VESTED	173,880	245.1002	22421.61	0	3636190
EARNINGSVOLATILITY_W	475,182	323.828	770.3623	0	5522.386
LEVERAGE	172,375	-6.978748	5973.25	-1073271	81220.16
BOARDSIZE	75,737	9.354503	2.479255	4	34

Choosing control variables

In part 1, one of the control variables is the MTB ratio. This is because firms with lower MTB (so lower growth opportunities) are more likely to issue earnings forecasts (Bamber & Cheon, 1998). *LnAnalysts* is added as a control seeing as the number of analysts following a firm has been found to have an effect on the probability of earnings forecast issuance (Hribar & Yang, 2011). *LnTotalAssets* is used as a control variable because several previous papers have found that firm size has a positive effect on disclosure (Ajinkya, Bhojraj, & Sengupta, 2005; Bhojraj, Libby, & Yang, 2011; Hribar & Yang, 2011; Lang & Lundholm, 1996). Ajinkya et al. (2005) also found that firms with a higher institutional ownership have a higher likelihood to forecast and a higher frequency of forecast issuance. Thus, this paper uses a control variable for institutional ownership called *PercInstOwn*. Firms that make earnings forecasts frequently are likely to have less volatile earnings (Waymire, 1985). Thus, there seems to be a negative relationship between earnings volatility and voluntary earnings forecast. For this reason, earnings volatility is a control variable in the regressions in part 1. Meanwhile, (Miller, 2002) concludes that there is an positive effect of increased earnings on voluntary disclosures. For this reason, it can be expected that CEOs of firms performing poorly are less likely to voluntarily forecast earnings. Thus, we also include the control variable *ROA*. It also seems likely that whether a firm is making a loss has an impact on whether a CEO chooses to issue an earnings forecast. Therefore, following the example of Hribar & Yang (2011), the variable *Loss* is also added as a control in part 1. Also following the example of Hribar & Yang (2011) and Malmendier & Tate (2005), this research includes controls for *Vested* and *PercShrOwn*. The former is equal to the number of unexercised exercisable stock options divided by total common shares outstanding while the latter is the percentage of total shares owned by the CEO.

The regression in part 2 includes 5 control variables, two of which are lags the first and second order lags of the dependent variable *ROA*. It is likely that current performance is dependent on recent past performance. For this reason and to prevent possible omitted variable bias, two lags of ROA are included. By doing this, I control for past firm performance which they also do in Park et al. (2018). Several studies show a relationship between leverage and ROA (e.g. Zeitun & Tian, 2007). Although, the nature of the relationship between leverage and ROA is still a point of dispute (Ibhagui & Olokoyo, 2018) it is included in this regression. Following the example of Park et al. (2018), board size was also added as an independent variable.

Measuring CEO Overconfidence

In this paper, CEO overconfidence is measured using the value of the in-the-money unexercised exercisable options held by the CEO. The reason for looking at options for a measure of overconfidence, is that managers are given options as a form of compensation. In particular, top US executives have been receiving large options grants as part of their compensation since the 1980's (Malmendier & Tate, 2015). The idea behind using the value of in-the-money unexercised exercisable options is that overconfident CEOs hold their firm's options for a longer time than would be expected because they have an irrational amount of confidence in the future performance of their firm. Malmendier & Tate (2005) argue that, assuming that CEOs are risk averse, they should choose to exercise their options early. The reason for this is that CEOs that hold their firm's stock options have underdiversified portfolios. This underdiversification is partially caused by the terms of the contracts that CEOs have. Unlike regular investors, they are not allowed to trade the options they receive and may not be allowed to sell stock. Importantly, they are also forbidden from short selling their firm's stock. However, since CEOs are overconfident about the future prices of their company's stock, they hold their own options for an irrationally long period of time. It is, however, logical that CEOs will not choose to exercise stocks that are not in-the-money (current price exceeds strike price of the option). That is why this measure of overconfidence includes only in-the-money options. Also, stock options held by CEOs have a vesting period during which they cannot be exercised. This is why the measure of overconfidence used in this paper is made up of only exercisable options.

Methodology

The analyses in this paper can be seen as being comprised of two parts. In the first part, I investigate two effects. The first is the effect of overconfidence on the probability of a CEO issuing an earnings forecast. The second effect is the effect of overconfidence on the accuracy of this forecast. As a result of the sample selection bias included in the second regression of part 1, I control for endogeneity using an IV regression. Part 2 is about the effect of overconfidence on performance. In this analysis, ROA is used as a measure of performance.

Part 1: Earnings forecasts

The two regressions that are run in part 1:

1) (Probit Regression)

$$\Pr(Issue) = \beta_1 LnOverC + \beta_2 LnAnalysts + \beta_3 PercInstOwn + \beta_4 LnTotalAssets + \beta_5 EarningsVol \\ + \beta_6 Loss + \beta_7 MTB + \beta_8 ROA + \beta_9 PercShrOwn + \beta_{10} Vested + \epsilon$$

2) (Linear IV regression)

$$Accuracy \\ = \beta_1 OverC + \beta_2 PercInstOwn + \beta_3 LnTotalAssets + \beta_4 EarningsVol + \beta_5 MTB + \beta_6 ROA \\ + \beta_7 Loss + \beta_8 Vested + \epsilon$$

Part 2: Performance

The regression in part 2 is the following:

3) (Linear Regression)

$$ROA_t = \beta_1 LnOverC_t + \beta_2 LnTotalAssets_t + \beta_3 Leverage_t + \beta_4 BoardSize_t + \beta_5 ROA_{t-1} + \beta_6 ROA_{t-2} + \epsilon$$

The t in regression 3 refers to a certain year. Hence, the lags of ROA are the ROA of the previous year and the ROA of two years ago.

The first regression will be a probit regression. This type of regression is the most appropriate choice in this case considering the dependent variable is a dummy variable. Regression 2 and 3 are ordinary least squares regressions. In all three regressions, robust standard errors were used as a measure against heteroscedasticity.

Probit

As a result of a regression 1 being a probit regression, the initial regression results cannot be used as a direct interpretation on the dependent variable. The coefficients represent an effect on the z-score of the relevant probability. In this case, the coefficient of overconfidence in the first regression represents an effect on the z-score of the probability of earnings forecast issuance. To estimate the effect on the actual probability of issuance I look at the marginal effect. Of course, the marginal effect differs depending on the value of the independent variable. This is why the marginal effect at the means of each of the independent variables is presented in the results section.

Instrumental Variables Regression

Regression 2 is an Instrumental Variables (IV) regression. This implies that the conditions for the instrumental variable were tested. The two conditions are the exogeneity condition and the relevance condition. The first condition must be satisfied so that the instrument is uncorrelated with the error term. If this were not the case, the bias in the regression would remain. This condition cannot be tested. The second condition is that the instrument explains the variable that causes the endogeneity. That is, in this case endogeneity is suspected to be present in the effect of overconfident on accuracy. Hence, the instrument should be a predictor of overconfidence. This is tested using a regression where overconfidence is the dependent variable. The results section further explains the satisfaction of these conditions for the instrumental variable chosen in this paper.

Outliers

In the original dataset, some values had notable outliers. To prevent these outliers from driving the results, they were removed by winsorizing. This implies that values above or below the benchmark values are set to be equal to the benchmark value. The levels chosen for benchmark in winsorizing in this paper are 1% and 99%. The variables are that were winsorized are: Overconfidence, MTB, and Earnings Volatility. These variables can be recognized in the results by the subscript w.

Results

Effect on Forecast Issuance

Table 3

Probit Regression

VARIABLES	(1) Issue	(2) Margins Issue
LnOverC_w	0.0200***	0.00452***
	(2.610)	(2.610)
LnAnalysts	-0.0878***	-0.0198***
	(-5.046)	(-5.053)
PercInstOwn	-0.0337	-0.00761
	(-0.634)	(-0.634)
LnTotalAssets	-0.0258**	-0.00582**
	(-1.966)	(-1.967)
MTB_w	6.66e-05***	1.50e-05***
	(6.630)	(6.656)
ROA	-1.012***	-0.229***
	(-4.212)	(-4.227)
Loss	-0.184***	-0.0416***
	(-3.278)	(-3.283)
PercShrOwn	0.0146***	0.00329***
	(2.904)	(2.911)
Vested	-0.00142	-0.000321
	(-0.600)	(-0.600)
EarningsVol_w	-1.12e-05	-2.53e-06
	(-0.331)	(-0.331)
Constant	1.572***	

(12.81)

Observations	12,276	12,276

Robust z-statistics in parentheses

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

Notes: This table shows the results of the probit regression of LnOverC_w on the probability of a voluntary issuance of an earnings forecast. The sample consisted of data between 2000 and 2017 of 2742 US firms. LnOverC_w is the chosen measure of CEO overconfidence. It is the natural logarithm of the estimated value of In-the-money unexercised exercisable options in dollars. All of the control variables are included in this table. A subscript w indicates that the (control) variable has been winsorized as a measure against outliers. The marginal effects are the effects on Issue of the independent variables at each of their respective means.

Table 3 shows the results of the regression of overconfidence on the probability of a forecast issuance. In general, the results are to be expected. The results indicate that the effect size on the z-score of Issue is 0.0200. That is, the effect on the probability of issuance is significant and therefore unsurprising. Hypothesis 1 is thus accepted.

To determine some of the marginal effects on the probabilities in the regression, I calculated the marginal effect on Issue at the means of all the independent variables.

It can be seen that there is a small positive marginal effect of overconfidence on the probability of earnings forecast issuance. The effect of overconfidence on the probability of a CEO voluntarily issuing an earnings forecast is 0.00452 for a CEO with average overconfidence when keeping all control variables constant.

Effect on Forecast Accuracy

When investigating the effect of overconfidence on forecast accuracy, it is important to consider that the sample contains only those CEOs that chose to voluntarily forecast.
To control for the endogeneity as a result of this sample selection bias, I run an Instrumental Variables regression. The instrumental variable chosen was LnAnalysts. It is important to first examine the two

conditions necessary for the instrumental variable. That is, to test the relevance condition and to reason whether the exogeneity condition holds.

The results of the test (regression) of the relevance condition can be found in table A1. It is likely that the exogeneity condition required for an Instrumental Variables regression is satisfied. This condition can never be tested. However, the number of analysts does not seem to determine forecast accuracy (Hribar & Yang, 2011). Therefore, the sample selection bias that is present in the non-IV regression on Accuracy is   likely   removed   using   the   IV   regression.

Table 4

IV regression

	(1)
VARIABLES	Accuracy
OverC_w	-0.000121
	(-0.444)
PercInstOwn	0.788***
	(2.959)
TotalAssets	1.19e-06
	(1.232)
EarningsVol_w	0.000435
	(1.117)
MTB_w	-6.12e-05
	(-0.349)
Loss	0.0630
	(0.224)
Vested	0.0524
	(0.596)
ROA	29.09***
	(25.35)
Constant	-1.982***
	(-13.74)

Observations	32,779
R-squared	0.191

t-statistics in parentheses

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

Notes: This table presents the results of the linear instrumental variables regression of OverC_w on Accuracy. The chosen instrumental variable is LnAnalysts. The sample used consists of 2742 US firms from 2000 to 2017. OverC_w is the chosen measure of CEO overconfidence. It is the estimated value of In-the-money unexercised exercisable options in dollars. Accuracy is calculated by subtracting the forecasted EPS value from the actual EPS value.

Table 4 shows that when controlling for sample selection bias there seems to be no significant effect of overconfidence on accuracy. So, the results indicate that EPS forecasts made by overconfident CEOs are no less accurate than those made by rational CEOs. As a result, hypothesis 2 is rejected.

These results contradicts the findings of Hribar & Yang (2011). Interestingly, the results do indicate that firms with a higher performance are more likely to accurately predict their own future earnings. This is consistent with the findings of Hribar & Yang (2011).

Effect of Overconfidence on performance

Table 5

The effect of overconfidence on performance

	(1)
VARIABLES	ROA
LnOverC_w	0.000505**
	(2.555)
LnTotalAssets	-0.000173
	(-0.843)
Leverage	-9.37e-07
	(-0.912)
BoardSize	-0.000308**

	(-2.544)
ROAlag1	0.947***
	(47.36)
ROAlag2	-0.0169
	(-1.442)
Constant	0.00509**
	(2.264)
Observations	15,577
R-squared	0.910

Robust t-statistics in parentheses

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

Notes: This table shows a linear regression of overconfidence on performance measured by ROA. The sample used is that of 2742 US firms between 2000 and 2017. LnOverC_w is the chosen measure of CEO overconfidence. It is the natural logarithm of the estimated value of In-the-money unexercised exercisable options in dollars.

As can be seen in table 5, a significant effect has been found of overconfidence on performance. This effect is small and positive. Thus, the analysis suggests that overconfidence CEOs are actually likely to have a positive impact on their firm in terms of performance. This leads to a rejection of the 3rd hypothesis. Firms might therefore consider overconfidence, at least partially, as a positive characteristic. This may be relevant in, for instance, hiring decisions in companies.

However, these results are inconsistent with some earlier studies. It is in contrast with the idea that overconfident CEOs make less than optimal decisions due to their boldness. For example, Park et al. (2018) found a negative effect of CEO hubris on performance in Korean firms.

This positive effect on firm performance can be explored in the context of the entrenchment theory (Shleifer & Vishny, 1989). That is, there is a high likelihood of overconfident CEOs becoming entrenched in the firm (Park et al., 2018). Therefore, it may be that overconfident CEOs make investments that benefit the corporation in an attempt to secure their own position. It is, however, important to note, that Shleifer & Vishny (1989) find that overconfident CEOs, when in entrenched, are able to make inefficient decisions in terms of financial performance. That is, the control that CEOs obtain as a result of entrenchment can

have adverse effects for the firm. Nevertheless, the positive effect of firm performance found in this paper may be caused by the previously mentioned entrenchment theory.

Conclusion and Discussion

To conclude, the research question "What is the effect of CEO overconfidence on management's earnings forecasts and firm performance?" will be answered. There is a positive effect on the probability of management issuing an earnings forecast. Meanwhile, there is no effect of CEO overconfidence on management's earnings forecast accuracy. In terms of firm performance, a positive influence of overconfidence was found.

This research supports the finding of Hribar & Yang (2011) in that there is a positive effect of overconfidence on the probability of a CEO issuing an earnings forecast. So, overconfident CEOs are more likely to voluntarily issue an earnings forecast. However, while Hribar & Yang (2011) also found that overconfident CEOs are more likely to miss their own forecast, no evidence of this was found in this paper. Thus, although overconfident CEOs are biased, this paper finds no evidence for a decrease in the accuracy with respect to the forecasting of earnings.

Furthermore, the effect of CEO overconfidence on the performance of the firms was analyzed. The results suggest a significant and positive effect of overconfidence on ROA, meaning overconfident CEOs actually slightly improve firm performance on average. This contrasts the findings of Park et al. (2018) who find a negative effect of hubris on firm performance.

One limitation in this study lies in the dummy variable *Issue*. In the obtained dataset containing this guidance values, no distinction was made between unavailable data and the lack of a forecast. That is, there may have been CEOs who did indeed issue an earnings forecast for which the data was simply not available in the WRDS database. This implies that, in reality, there may have been more earnings forecasts issued which are not taken into account in this analysis. Hence, there is a possible bias in the coefficient of the effect of overconfidence on issuance.

Possible improvements include the addition of more control variables. Importantly, Hribar & Yang (2011) mention mergers and acquisitions and equity issues as a possible source of omitted variable bias relating to the effect of overconfidence on the probability and accuracy of issuance. That is, they mention that firms may have an incentive to release biased information during an M&A event or equity issue. Also it would be interesting to look at year and industry effects as Hribar & Yang (2011) did.

Future research could further investigate the concrete implications of CEO overconfidence for firms and investors. While this paper looked at the effect on performance, there is room for research on other firm factors. Of course, this would also be of interest to investors. Furthermore, other research on overconfidence might consider other executives than CEOs to see whether similar results are obtained.

Appendix

Table A 1

Relevance condition IV regression

VARIABLES	(1) OverC_w
LnAnalysts	128.4***
	(27.58)
PercInstOwn	4.108***
	(0.861)
TotalAssets	-0.00519***
	(0.000571)
EarningsVol_w	1.750***
	(0.0834)
MTB_w	0.541***
	(0.0280)
Loss	-1,506***
	(74.09)
Vested	337.3***
	(15.76)
ROA	3,075***
	(266.9)
Constant	458.6***
	(129.1)
Observations	83,325
R-squared	0.161

Robust standard errors in parentheses

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

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