Optimism, Attribution and Corporate Investment Policy

by

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ABSTRACT

Chief Executive Officers (CEOs) whose observed personal option-holding patterns are not consistent with theoretical predictions are variously described as overconfident or optimistic. Existing literature demonstrates that the investment and financing decisions of such CEOs differ from those of CEOs who do not exhibit such behavior and interprets the investment and financing decisions by overconfident or optimistic CEOs as inferior. This paper argues that it may be rational to exhibit behavior interpreted as optimistic and that the determinants of a CEO's perceived optimism are important. Further, this paper shows that CEOs whose apparent optimism results from above average industry-adjusted CEO performance in prior years make investment and financing decisions which are actually similar, and sometimes superior to, those of unbiased CEOs.

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CHAPTER 1

INTRODUCTION

Since the articulation of the principal-agent problem it has been widely accepted that

firms are not necessarily run in the best interests of their owners. The disproportionate

impact of the Chief Executive Officer (CEO) on both the behavior and the performance

of the firm has prompted research in corporate finance to better understand why CEOs

behave as they do. Agency problems occur when the interests of the CEO and the

shareholders diverge and the CEO can intentionally follow policies that further his own

interests at the expense of those of the shareholders. A different line of research considers

how a CEO's personal bias may cause him to unintentionally act against the best interests

of the shareholders even in the absence of any deliberate attempt to further his own

advantage. Hirshleifer (2001) presents an overview of biases which can affect

investment. Two such biases in the literature are optimism about likely outcomes and a

CEO's overconfidence in the precision of his information. The literature is however not

always consistent in its use of the terms "overconfidence" and "optimism". This paper

follows the traditional approach of Hackbarth (2008), which defines optimistic agents as

predicting "that favorable future events are more likely than they actually are" and

overconfident agents as believing "that they have more precise knowledge about future

events than they actually have." In short, optimists overestimate expected values, and

overconfident agents underestimate risk.

There is a broad and growing literature in which the personal option-holding patterns of

CEOs are used to identify CEOs with an "upward bias in the assessment of future

outcomes" (Malmendier & Tate (2005a)). The bias is labelled overconfidence, by authors

who wish to distinguish a CEO's tendency to overestimate his personal attributes and outcomes from a tendency to overestimate exogenous outcomes, and as optimism, by authors who wish to distinguish it from the tendency to underestimate risk. The bias is generally claimed to be present when a CEO fails to exercise exercisable options until the final year of the options or when a CEO fails to exercise exercisable options exceeding a threshold in-the-moneyness (ITM). Such behavior has been shown to be associated with a variety of negative behaviors. Malmendier & Tate (2005a, 2008) find that a biased CEO's reluctance to raise external financing makes his investment decisions more sensitive to the availability of internal funds. In addition, CEOs subject to this bias engage in more mergers and acquisitions and that the market reacts less favorably to the announcement of their acquisitions. Deshmukh, Goel & Howe (2013) finds that a biased CEO's preference for internal financing causes the CEO to pay lower dividends but the dividend policy deviates less when the firm has growth opportunities. However, there are theoretical and empirical findings demonstrating positive consequences of CEO optimism. Hirshleifer, Low & Teoh (2012) shows biased CEOs in innovative industries are more successful at investing in innovation. Campbell, Gallmeyer, Johnson, Rutherford & Stanley (2011) claims there is an optimal level of CEO optimism and finds that "CEOs with relatively low or high optimism face a higher probability of forced turnover than moderately optimistic CEOs face." While these behavioral distortions have been identified and well documented, it is less well known how CEOs become subject to the optimism bias and whether inter-temporal variation in the exhibition of this bias can provide information about its causes and the resultant quality of a CEO's decisions.

This paper considers whether seemingly optimistic behaviors might sometimes be an unbiased response to short-term conditions and therefore examines the annual variation in a CEO's measured optimism rather than optimism as a permanent characteristic. Information on CEOs' option-holdings found in Compustat's Execucomp database is used to estimate the average in-the-moneyness of unexercised exercisable options as a measure of a CEO's optimism. Concentrating on short term variation in optimism allows the consideration of the determinants of changes in optimism and the classification of optimistic CEOs into distinct groups. The existing literature suggests that, as a whole, CEOs who exhibit optimistic option-holding behaviors are likely to implement sub-optimal and value-destroying investment and financing decisions. Van den Steen (2004) shows how "choice-driven overoptimism" can result from rational behavior under uncertainty, but the CEO's choice is still *ex post* incorrect, in that it was the result of inaccurate expectations. Optimistic option-holding behaviors essentially identify CEOs whose expectations of the future value of the firm are more positive than those of the market. This can be the result of bias or a response to superior information concerning the prospects of the firm or the CEO's abilities. This paper finds that CEOs exhibiting both optimistic option-holding behaviors and superior prior industry-adjusted performance actually implement investment and financing decisions which are comparable to or better than those of non-optimistic CEOs, supporting the hypothesis that, for a significant proportion of CEOs, such behavior is most likely a rational response to temporary conditions rather than the unfortunate consequence of bias.

Related literature that uses the observed option-holding policies of CEOs in order to identify optimistic CEOs are generally "interested in a "permanent" rather than a

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"transitory" … effect" (Malmendier & Tate (2005a)). A CEO is typically classified as exhibiting an optimistic bias only if he displays qualifying behaviors at least twice and, if so, from the first such display until the end of the sample period. In Malmendier, Tate and Yan (2010), the effects of a bias to overestimate future cash-flows are discussed and treated in the same way as the effects of permanent impacts on a CEO's personal history, such as growing up during the Great Depression or having a military background. In Campbell et al. (2011), optimism is treated as "semi-permanent" but only to the extent that a CEO's optimism classification may change if the CEO exhibits the opposite bias later in the sample period. This paper finds that CEOs in the period 1992-2006 who would be classified as exhibiting a permanent bias using the Holder67 measure described in Malmendier & Tate (2005a) actually exhibit option-holding behaviors associated with this bias only infrequently, with 58% of such CEOs exhibiting such behavior less than 67% of the time. Despite the high degree of annual variation in associated option-holding behaviors, the existing literature has focused exclusively on the effects of long term bias. This paper investigates the causes and consequences of short term variations in CEO optimism and demonstrates some important differences between the effects of short term optimism and more permanent optimism.

Next, having established that CEO optimism does indeed vary over the short term, this paper investigates the factors which lead to annual changes in optimism and finds some support for the *self-attribution hypothesis* that CEOs attribute good performance to their own skills and poor performance to bad luck. CEO optimism increases more following good performance than it decreases following poor performance. This is not the expected result if optimism were purely the mechanical consequence of equity returns. This paper

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classifies CEOs exhibiting optimistic option-holding behavior according to the CEO's most recent performance, where CEO performance is measured by the equity returns of the CEO's firm relative to industry returns. CEOs whose option-holding behaviors identify them as optimists and whose optimism increases following superior CEO performance are classified as *Justified Optimists*. This nomenclature is chosen as, while a Justified Optimist's option-holding behavior identifies him as optimistic, this paper hypotheses that his expectation that firm value will increase is the result of his private information rather than a bias. Optimists whose optimism increases despite following inferior CEO performance are classified as *Unjustified Optimists*. This paper chooses to classify optimism as justified based on the CEO's *ex ante* rationale for his increasing optimism rather than the *ex post* realized outcomes of his option-holding decisions as the paper is interested in those CEOs who had a common rational justification for their optimism rather than those whose optimism happened to be profitable. The remainder of the paper investigates whether the determinants of a CEO's optimism impacts his investment and financing decisions. It is hypothesized that Justified Optimists are not actually subject to bias and consequently the investment and financing decisions of Justified Optimists should not be subject to the distortions identified in the existing literature. After all, sometimes an unbiased, rational CEO will correctly have a more positive view of the future than the market, or, in other words, it's not optimism if you know you're right.

Heaton (2002) explains how managerial optimism can impact a firm's investment policy. Overvaluing investment opportunities leads optimistic CEOs with available cash to overinvest relative to an unbiased CEO. However, overvaluing the firm causes an

optimistic CEO to be reluctant to raise external financing for investment. This paper finds that while the investment decisions of CEOs exhibiting optimistic behaviors are on average less sensitive to cash flow (in contrast to Malmendier & Tate (2005a)), the investment decisions of Justified Optimists are no more or less sensitive to cash flow than those of CEOs who are not displaying optimistic behaviors.

Roll (1986) explains how management hubris can lead to value-destroying mergers. Billet & Qian (2008) claims an association between management hubris, acquisitiveness and negative post-acquisition performance. Malmendier & Tate (2008) and Kolasinski & Li (2013) find that a CEO's tendency to overestimate future outcomes is associated with a higher propensity to complete mergers and a less favorable market reaction to those mergers as judged by announcement returns. This paper finds that optimistic CEOs are more likely to attempt a merger, but the announcement returns for Justified Optimists are actually higher than for the average CEO. This result suggests that the M&A performance of Justified Optimists is actually superior to that of CEOs who are not displaying optimistic behaviors.

Deshmukh et al. (2013) predicts and finds that "firms led by overconfident CEOs pay lower dividends than firms led by rational CEOs" and that the "difference between the dividend payments by a rational CEO and an overconfident CEO is smaller in a firm with higher growth (Q)." It is argued that higher growth opportunities indicate less private information for overconfident CEOs to misinterpret and so the dividend decisions of overconfident CEOs and rational CEOs will be more similar. This paper finds that while optimistic CEOs are more likely to pay a lower dividend, the difference in dividend policy versus that of unbiased CEOs only narrows for Justified Optimists. This suggests

that unbiased CEOs make decisions similar to Justified Optimists in the absence of private information. The dividend policy of other types of optimistic CEOs do not become more like the dividend policy of rational CEOs as information about growth opportunities becomes widely available, suggesting that their dividend policy differences are indeed due to the effect of their bias rather than different information sets. Combining the evidence, it is reasonable to conclude that Justified Optimists are not so much overly optimistic as better informed or aware that they possess better skills for dealing with current uncertainties. The investment sensitivity of Justified Optimists is no different from that of unbiased CEOs which suggests Justified Optimists are not more likely to forego value-creating investment opportunities due to biased beliefs about the value of their firm. Justified Optimists do engage in more M&A activity but achieve better returns than CEOs who do not exhibit optimism. Lastly, unlike other optimistic CEOs, the dividend policies of Justified Optimists become more like those of unbiased CEOs as the informational advantage of CEOs versus their shareholders decreases. In short, there is a distinct group of optimistic CEOs whose decisions are either no different from or superior to those of CEOs who do not exhibit optimistic behaviors.

This paper adds to the current literature on overconfidence and optimism. First, this paper demonstrates that many CEOs categorized as overconfident or optimistic actually exhibit the qualifying option-holding behavior relatively infrequently. Furthermore, by focusing on the determinants of annual variation in optimistic behaviors, rather than treating the bias as a permanent trait, it is possible to identify distinct groups of optimistic CEOs. Previously, CEOs who persistently displayed optimistic behaviors were shown to implement seemingly sub-optimal investment and financing decisions. Classifying

optimistic CEOs according to the determinants of their optimism allows the identification

of a significant and distinct group of CEOs whose investment and financing decisions

seem as good as or better than those of unbiased CEOs. While some groups' behaviors

may be characterized as "irrational" (or at least different from those of non-optimistic

CEOs), those CEOs whose ITM is increasing as a result of the CEO's own superior

performance are not biased: their expectations of improved firm value is justified by their

own prior performance and the appropriateness of their investment and financing

decisions.

CHAPTER 2

DATA

This paper employs data from Compustat's Execucomp database for information on CEO

compensation including the number and estimated value of unexercised, exercisable

options and the number and estimated realized value of exercised options. Therefore, the

sample consists of S&P1500 firms from 1992 to 2012. The data is supplemented with

information on stock returns, index returns and market prices from the Center for

Research in Security Prices (CRSP) database. Data on a company's annual balance sheet

and income statement items comes from the Compustat Annual database. Data on

industry returns is taken from French's website

(http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html), as are the

definitions of the 49 different industries.

The Thomson Securities Data Company (SDC) merger database is used to obtain

information on the timing, incidence and proposed financing of takeover attempts to

create a sample of 26,350 acquisitions, mergers and acquisitions of majority interest by

publicly traded US firms announced over the period 1992-2013 where the acquirer held

less than 50% of the target stock before the announcement but sought to own more than

50% after the announcement. Variable definitions, other than those pertaining to CEO

optimism, are given in the parts of the paper describing the experiments where they are

used and in the respective tables.

VARIABLE CONSTRUCTION

This paper closely follows Campbell et al. (2011)'s methodology for calculating estimated average ITM of a CEO's unexercised, exercisable options and the estimated average realized ITM of exercised options using aggregated data from Execucomp. Of a sample of 35,413 CEO-year observations from Execucomp over the period 1992 to 2012, 18,940 could be classified as "high-optimism", "moderate-optimism" or "low-optimism" according to the methodology outlined in Campbell et al. (2011) based on the estimated average ITM of unexercised, exercisable options and the estimated average realized ITM of exercised options. When the estimated average ITM of a CEO's unexercised, exercisable options in a given year is greater than or equal to 100%, this paper classifies the CEO as an Optimist. When a CEO's option-holding policy in a given year would be classified as an indicator of low-optimism or moderate-optimism, this paper classifies the CEO as not an Optimist. Of the remaining CEO-year observations, 15,941 could not be classified as the combination of the ITM of unexercised, exercisable options and the realized value of exercised options did not allow a definitive classification and 68 could not be classified because of missing data.

Column 1 of table 2, Panel A shows the distribution of CEO-year observations by year and their classification as Optimist or Not Optimist by year. There are 11,516 CEO-year observations where the CEO is not an Optimist, representing 4,098 unique CEO's and 2,651 unique firms. There are 7,424 CEO-year observations where the CEO exhibits optimistic behaviors, representing 2,722 unique CEOs and 2,206 unique firms. The last three columns of the table will be explained in Chapter 5.

MEASURING OPTIMISM

There are two general approaches to measuring an individual's optimism. Surveys of specific individuals potentially generate the most accurate measures of optimism but are expensive and time-consuming to collect, particularly for a large sample of individuals or over a long period of time: Ben-David, Graham & Campbell (2007) uses the results of a survey of CFO predictions; Graham, Campbell & Puri (2007) applies psychometric tests to test subjects.

The alternative to surveys of limited samples of subjects is to identify optimistic behaviors using information from existing databases which cover a large sample of CEOs over a long period of time. Researchers have successively innovated by applying related research and exploiting existing databases in order to develop measures of optimism based on existing, large databases. Hall & Murphy (2002) develops a theoretical threshold ITM of 67% at which a rational under-diversified CEO should exercise his stock options. Cicero (2009) confirms that executives do immediately sell their shares after exercising their options about 70% of the time, consistent with reducing their exposure to their own company. Malmendier & Tate (2005) applies this theoretical threshold to actual CEO option-holdings and classify CEOs who "persistently fail" to exercise options at or above the threshold as overconfident. Unfortunately, the information they use is not generally available and, as Kolasinski & Li (2013) puts it, "empirical research on CEO overconfidence is largely limited to a relatively small sample of less than 500 large firms that ends in 1994." Campbell et al. (2011) overcomes this limitation by developing a measure of average values of ITM using information available in Compustat's Execucomp database. While a large sample of US firms is covered over a

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reasonable period, the required option information is only available in Execucomp from 1992. Kolasinski & Li (2013) proposes an even more readily calculable alternative, where a CEO is classified as being overconfident in a given year if the CEO "on average loses money from open-market purchases of his own company's stock in the next 2 years." Confusingly, different authors use the same metric as a measure of both CEO "overconfidence" and CEO "optimism". This paper is concerned with short term variation in a CEO's evaluation of his firm's prospects and follows Campbell et al. (2011) by referring to the metric as a measure of optimism, except when reviewing the existing literature where the cited authors' own preferred description is used.

CHAPTER 3

PERMANENCE OF OPTIMISM

In order to demonstrate the relative infrequency of optimistic behavior amongst CEOs classified as exhibiting a permanent bias, this paper estimates the average ITM of unexercised exercisable options of 1,416 CEOs of 530 large, publicly traded firms over the sample period 1992-2006 using Campbell et al.'s (2011) methodology. CEO's are classified as "Holder67" if the ITM of their unexercised exercisable options is at least 67% at least twice in the sample period.

Table 1 shows the frequency of distribution of CEO-year observations in which ITM of unexercised exercisable options is at least 67%. The rows of the tables represent the number of annual observations where the ITM can be calculated. The columns represent the number of annual observations where ITM met or exceeded the 67% threshold. Panel A shows that 48.7% of CEOs never exhibited optimistic behavior and 13.8% exhibited it only once. Panel B shows the distribution of those CEOs which meet the Holder67 classification for each year.

It should be noticed that 57.7% of CEOs classified as Holder67 (or permanently biased) exhibited this behavior in two-thirds or fewer of the years in which the ITM could be calculated and 40.2% exhibited this behavior in half or fewer of the years in which the ITM could be calculated. Clearly, even those CEOs for whom a tendency to overestimate future outcomes has been identified as a "permanent" trait, the qualifying option-holding behavior is actually exhibited relatively rarely.

This paper seeks to understand what factors cause CEOs to exhibit optimistic behavior and whether the effects of CEO optimism on investment and financing decisions are different when CEO optimism has different causes.

Table 1

Distribution of frequency of CEO-year observations (1992-2006) where ITM of unexercised, exercisable options >=67%

Sample covers option-holding behavior over 1992-2006 of 530 CEOs whose firms were included in the S&P500 at least 4 times over the period 1996-2006. In-The-Moneyness (ITM) of unexercised, exercisable options is calculated using the methodology described in Campbell et al (2011).

Panel A: # CEO-year observations x # Observations where ITM >=67% - as percentage of total CEO-year observations

	Number of years where ITM >=67%																
Number years in sample	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Total
1	9.4%	1.9%															11.3%
2	9.0%	1.6%	1.8%														12.4%
3	7.8%	2.4%	1.1%	1.7%													13.0%
4	5.6%	2.1%	1.3%	0.6%	1.3%												10.9%
5	4.8%	1.2%	1.8%	1.2%	0.9%	0.8%											10.7%
6	3.9%	1.4%	1.1%	1.3%	0.4%	0.6%	0.7%										9.4%
7	3.4%	1.6%	0.9%	0.6%	0.7%	0.5%	0.9%	0.4%									9.0%
8	1.8%	0.6%	0.7%	0.7%	0.6%	0.6%	0.6%	0.6%	0.6%								6.7%
9	1.6%	0.5%	0.3%	0.6%	0.3%	0.4%	0.4%	0.4%	0.1%	0.4%							4.9%
10	0.5%	0.2%	0.2%	0.2%	0.6%	0.4%	0.4%	0.2%	0.4%	0.4%	0.2%						3.6%
11	0.2%	0.1%	0.3%	0.2%	0.3%	0.2%	0.4%	0.1%	0.2%	0.1%	0.1%	0.1%					2.1%
12	0.2%	0.1%	0.4%	0.1%	0.1%		0.3%	0.2%	0.1%		0.1%	0.1%	0.1%				1.8%
13	0.2%			0.1%	0.2%		0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%			1.4%
14	0.4%	0.1%	0.1%				0.1%	0.2%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%		1.8%
15	0.1%			0.1%	0.1%		0.1%	0.1%	0.1%	0.1%	0.1%	0.2%	0.1%	0.1%	0.1%	0.1%	1.0%
Total	48.7%	13.8%	10.0%	7.8%	5.4%	3.5%	4.0%	2.3%	1.7%	1.1%	0.6%	0.4%	0.3%	0.1%	0.2%	0.1%	100.0%

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Table 1
Distribution of frequency of CEO-year observations (1992-2006) where ITM of unexercised, exercisable options >=67%

Sample covers option-holding behavior over 1992-2006 of 530 CEOs whose firms were included in the S&P500 at least 4 times over the period 1996-2006. In-The-Moneyness (ITM) of unexercised, exercisable options is calculated using the methodology described in Campbell et al (2011).

Panel B: # CEO-year observations x # Observations where ITM >=67% - % of total, given Holder67 classification

Number years in sample	Number of years where ITM >=67%																Total
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
1																	0.0%
2			4.7%														4.7%
3			3.0%	4.5%													7.5%
4			3.4%	1.7%	3.4%												8.5%
5			4.9%	3.2%	2.5%	2.1%											12.6%
6			2.8%	3.6%	1.1%	1.5%	1.9%										10.9%
7			2.5%	1.7%	1.9%	1.3%	2.5%	0.9%									10.8%
8			1.9%	1.9%	1.5%	1.5%	1.7%	1.5%	1.7%								11.7%
9			0.8%	1.5%	0.8%	1.1%	1.1%	1.1%	0.4%	0.9%							7.7%
10			0.6%	0.6%	1.5%	0.9%	0.9%	0.6%	0.9%	1.1%	0.6%						7.7%
11			0.8%	0.6%	0.8%	0.6%	0.9%	0.2%	0.6%	0.2%	0.2%	0.2%					4.7%
12			0.9%	0.4%	0.2%	0.2%	0.8%	0.6%	0.4%	0.2%	0.4%	0.2%	0.2%				4.0%
13				0.4%	0.6%	0.2%	0.4%	0.4%	0.4%	0.2%	0.2%	0.2%	0.2%	0.2%			3.2%
14			0.4%	0.4%	0.4%		0.4%	0.6%	0.2%	0.2%	0.2%	0.4%	0.4%		0.2%		3.4%
15							0.2%	0.2%	0.2%	0.2%	0.2%	0.6%	0.4%	0.2%	0.4%	0.2%	2.5%
Total			26.6%	20.8%	14.5%	9.4%	10.8%	6.0%	4.5%	2.8%	1.7%	0.9%	0.8%	0.4%	0.6%	0.2%	100.0%

Frequency of CEO observations where ITM>=67%

Holder 67 CEOs with ITM>=67% in 50% or fewer observations	40.2%
Holder 67 CEOs with ITM>=67% in 67% or fewer observations	57.7%
Holder 67 CEOs with ITM>=67% in 100% of observations	21.7%

CHAPTER 4

DETERMINANTS OF CHANGE IN ANNUAL OPTIMISM

It is widely accepted that humans are subject to a psychological bias called "self-attribution" where individuals credit success to their own skills and failure to external factors or, as Langer & Roth (1975) succinctly puts it, "heads I win, tails it's chance". There are theoretical models linking self-attribution and overconfidence in investors (Daniel, Hirshleifer & Subrahmanyam (1998)) and traders (Gervais & Odean (2011)) and Hilary & Menzly (2006) offers empirical support for a link between confidence and self-attribution for analysts. Using the sample of CEOs and the measure of optimism described in Chapter 2, this paper provides evidence of an association between CEO optimism and self-attribution.

This paper first tests the self-attribution hypothesis by performing a logit regression to show how the probability of a CEO being classified as an optimist is affected by conditional returns. If the self-attribution hypothesis is correct then the probability that a CEO is optimistic increases more as a result of positive total equity returns than it decreases as a result of comparable negative equity returns. This can be tested using the following conditional logit regression:

Conditional Logit Regression (1):

$Pr[\text{Optimistic CEO}_t] = b_1[\text{returns} \mid \text{returns} > 0] + b_2[\text{returns} \mid \text{returns} < 0] + b_3[\text{controls}]$

where a CEO is Optimistic in year t if the ITM of a CEO's unexercised, exercisable options is greater than or equal to 100% in year t.

A conditional logit regression is performed rather than a regular logit regression to allow the use of fixed effects without introducing bias due to the incidental parameters problem,

Chamberlain (1980). Standard errors are robust to heteroskedasticty across the error terms.

The key variables of interest are the conditional returns. The self-attribution hypothesis predicts: $b_1 > b_2 >= 0$. In other words, the probability that a CEO is optimistic increases more as a result of positive total equity returns than it decreases as a result of comparable negative equity returns. It is expected that b_2 will be positive as negative returns are expected to reduce the probability that a CEO is optimistic. It should be expected that returns are associated with optimism as high returns lead to high equity prices and hence, *ceteris paribus*, high ITM of options. However unless the stock price is close to the exercise price of the unexercised option, a situation which is later controlled for, the impact of positive and negative returns on the ITM of the unexercised, exercisable options should be symmetrical. Equity returns are winsorized at 0.5% to avoid distortions from extreme values.

Control variables include: change in total volatility versus (t-1); year x industry fixed effects (using Fama-French 49 classification); and age and gender CEO characteristics. *Total volatility* is calculated as the 60-month annualized volatility of the firm's equity returns. *Young* is an indicator variable with a value of 1 if the CEO is 52 years old or younger in the year of observation (putting the CEO in the youngest tercile of CEOs in the sample) and 0 otherwise. *Old* is an indicator variable with a value of 1 if the CEO is 59 years old or older in the year of observation (putting the CEO in the oldest tercile of CEOs in the sample) and 0 otherwise. *Female* is an indicator variable with a value of 1 if the CEO is female and 0 otherwise. Utility and finance firms (with SICs between 4900-4999 and 6000-6699 respectively) are excluded from the sample as industry specific

regulation may influence the behaviors of their CEOs. The results of these analyses are robust to including these firms.

Model 1 compares the impact of the positive total conditional equity returns and negative total conditional equity returns. Model 2 compares the impact of positive industry-adjusted conditional equity returns and negative industry-adjusted conditional equity returns. Total equity returns are actually the result of CEO performance and general industry trends outside the CEO's control; whereas industry-adjusted returns are more closely related to CEO performance relative to his industry peers. Models 1(b) and 2(b) exclude observations where the ITM of the CEO's unexercised, exercisable options are less than 30%. The remaining CEOs would be classified as *moderately* or *highly* optimistic according to Campbell et al.'s (2011) thresholds. The price of the underlying stock should be sufficiently above than the exercise price of the underlying options to avoid distortions due to the non-linear payoffs of options close to their exercise price. To counter concerns that high values of the ITM of unexercised, exercisable options may identify inattentive CEOs rather than optimistic ones, models 1(c) and 2(c) also exclude years in which the CEO did not exercise any options. Holding some options despite having exercised others indicates a conscious decision not to exercise the remaining options.

Table 2(a) "Self-attribution – differential impact of positive and negative returns on optimism" summarizes the results of the conditional logit regressions estimating the impact of various factors on the probability that a CEO is optimistic for an original sample of 15,054 CEO-year observations of all those CEO-year observations where the CEO optimism could be classified according to Campbell et al.'s methodology described

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above. The table shows the absolute estimated coefficients for the variables and separate t-tests are performed to confirm whether the estimates of b_1 and b_2 are statistically different from one another.

Table 2(a) provides some support for the self-attribution hypothesis. The estimated coefficients for conditional returns in each of the models are significantly different from zero and the point estimates of the coefficients for positive conditional returns are higher than those for negative conditional returns. However, t-tests show that the estimated coefficient for positive total conditional returns is statistically distinguishable from the estimated coefficient for negative total conditional returns only in models 1(b) and 1(c). Models 2(a), 2(b) and 2(c) in table 2(a) show that while the estimated coefficients for industry-adjusted conditional returns in each of the models are significantly different from zero and the point estimates of the coefficients for positive conditional returns are higher than those for negative conditional returns, the coefficients for positive industry-adjusted conditional returns are not statistically different from the coefficients for negative industry-adjusted conditional returns.

Interestingly, changes in the volatility of the stock price of the underlying stock do not have a statistically significant impact on a CEO's optimism even though it will have an impact on the value of the CEO's options. There is a non-linear relationship between CEO optimism and CEO age with both the youngest and the oldest tercile of CEOs being more likely to be optimistic. Table 2(a) also suggests that female CEOs are less likely than male CEOs to be Optimists.

The following robustness check tests how conditional returns directly impact the ITM of a CEO's unexercised, exercisable options through the following ordinary least squares regression.

OLS Regression (2):

ITM = b_1[returns │ returns>0] + b_2[returns │ returns<0] + b_3 [controls]

If the self-attribution hypothesis is correct then we would expect the following to be true: $b_1 > b_2 >= 0$ (the ITM of unexercised, exercisable options should increase as a result of positive returns more than it decreases as a result of negative returns). This is because increasing ITM of unexercised, exercisable options is associated with increasing optimism. It is expected that b_2 will be greater than zero as negative returns should reduce the ITM of unexercised options. Table 2(b) "Self-attribution – differential impact of positive and negative returns on optimism" summarizes the results of OLS regressions estimating the impact of various factors on the change in ITM of a CEO's unexercised, exercisable options for a sample of 15,054 CEO-year observations of all those CEO-year observations where the CEO optimism could be classified according to Campbell et al.'s methodology described above and where the firms were not utility or finance firms. Model 1 considers the differential impact of total conditional returns; model 2 considers the differential impact of positive industry-adjusted conditional returns and negative industry-adjusted conditional returns. As in table 2(a), models 1(b) and 2(b) exclude observations where the ITM of the CEO's unexercised, exercisable options were less than 30% and models 1(c) and 2(c) also exclude observations where the CEO did not exercise any options in order to exclude any observations where the CEO might not have made a deliberate decision to hold onto the unexercised exercisable options. In all models, ITM

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and equity returns are winsorized at 0.5% to avoid distortions from extreme values. The OLS regressions use firm and year fixed effects, otherwise each model uses the same control variables as in table 2(a). Standard errors are clustered by firm and robust to heteroskedasticity and correlation in the residuals across observations for the same firm. The adjusted r-squared for all models is low (about 3-6%). This is to be expected as there are many other factors impacting the ITM of unexercised exercisable options including the availability of exercisable options and the decision the CEO's decision whether to exercise any exercisable options. As predicted, the estimated coefficients for the positive conditional returns are highly significant and positive. The estimated coefficients for negative conditional returns are positive in all models and lower than those for positive conditional returns in all but model 2(c). This is consistent with the predictions of the self-attribution hypothesis: $b_1 > b_2 >= 0$ however the t-tests show that the estimated coefficients for positive conditional returns are only statistically different from those for conditional negative returns for the industry-adjusted returns. Overall, the table suggests that ITM increases more when industry-adjusted returns are positive than it decreases when they are negative: consistent with the self-attribution hypothesis.

ALTERNATIVE EXPLANATIONS

One alternative explanation of these results might be that the CEO was falsely classified as an Optimist due to a combination of the mechanistic impact of higher returns on the ITM of the CEO's unexercised, exercisable options and CEO inertia (resulting in a failure to exercise his options through inaction rather than as a deliberate decision). This explanation is unlikely.

The mechanistic impact of returns on the ITM of unexercised, exercisable options would not generally explain the asymmetric impact of positive and negative returns: as long as the price of the stock underlying the option is not close to the exercise price of the option then an increase in the stock price will cause a comparable change in the ITM of an option to a comparable decrease in the stock price. It is true that when the stock price is close to the exercise price of the option the impact of positive and negative returns will not be symmetrical. However, the ITM of an unexercised, exercisable option is not purely a function of the price of the underlying stock: so long as an option has a positive ITM, the CEO can decide to exercise the option (in which case the option will not be included in the unexercised options) or hold the option. Secondly, to reduce concerns that the asymmetric impact of positive and negative returns is driven by options which were close to the money, models 1(b), 1(c), 2(b) and 2(c) in tables 2(a) and 2(b) exclude observations where the ITM was below 30%. The remaining observations are above Campbell et al.'s (2011) threshold for moderate optimism and are unlikely to have been close to the money options. Table 2(a) shows that the asymmetric impact of positive and negative returns on the probability of a CEO being an optimist actually becomes more pronounced when this adjustment is made.

For CEOs to be misclassified as Optimists, they would also have to unintentionally hold the exercisable high ITM options. Such CEO inertia could occur if the CEOs were too busy to manager their personal wealth; however, over 54% of Optimists did exercise some options (this is only 6% lower than for non-Optimists), suggesting that these CEOs did make a conscious decision to hold onto their remaining exercisable options. Cicero

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(2009) shows that executives are actually sophisticated and deliberate in their choice of option exercising strategies, choosing strategies which exploit differential tax rates and private information. Secondly, concerns about the inertia hypothesis are alleviated by excluding all CEO-year observations where the CEO did not exercise any options in models 1(c) and 2(c). Exercising some but not all options implies that holding the unexercised, exercisable options was a deliberate decision by the CEO. Table 2(a) shows that excluding potentially inert CEOs improves the explanatory power of the models while increasing the gap between the estimated coefficients b_1 and b_2.

A second potential concern is that annual changes in the ITM of unexercised, exercisable options may be measuring annual changes in CEO risk tolerance rather than changes in CEO optimism. Hall & Murphy's (2002) threshold ITM was calculated assuming the CEO had a Constant Relative Risk Aversion (CRRA) of 3. A CEO with a much higher risk tolerance will have a higher ITM threshold. If the ITM of unexercised exercisable options were actually measuring changes in annual risk tolerance rather than changes in optimism then the expected results of some tests in this paper would be different. It should not be expected that CEOs with high risk tolerance should prefer low payout ratios (as this paper finds) and it should not be expected that risk tolerance reacts asymmetrically to positive and negative total returns. It is therefore reasonable to accept that the observed option-holding behavior is a result of annual changes in the CEO's optimism rather than risk tolerance.

In summary, the combined results of the conditional logit and OLS regressions provide considerable, if not definitive, evidence to support the self-attribution hypothesis.

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Table 2(a) Self-attribution - differential impact of positive and negative returns on optimism

Conditional logit regressions of factors influencing probability of CEO being an optimism

Sample of 15,054 CEO-year observations (excluding finance and utility firms) over the period 1992-2012. Models 1(b) and 2(b) exclude observations where the ITM of a CEO's unexercised, exercisable options are less than 30%. Models 1(c) and 2(c) also exclude observations where the CEO did not exercise any options. Table shows estimated coefficients from conditional logit regressions of the probability that the ITM of a CEO's unexercised, exercisable options >=100%. *Total returns (t), given >0* are total positive equity returns in year t. *Total returns (t), given <0* are total negative equity returns in year t. *Industry-adj returns(t), given >0* are positive industry-adjusted equity returns in year t. *Industry-adj returns (t), given <0* are negative industry-adjusted equity returns in year t. *Change in total volatility (t)* is the change in annualized 60-month volatility of a firm's monthly stock returns from (t-1) to t. *Young* is an indicator variable with value 1 if the CEO is 52 or younger in the year of the observation and 0 otherwise. *Old* is an indicator variable with a value of 1 if the CEO is 59 or older in the year of the observation and 0 otherwise. *Female* is an indicator variable with a value of 1 if the CEO is female and 0 otherwise. All models include fixed effects for industry x year. Standard errors are robust. The superscripts ***, ** and * indicate statistical significance at the 1%, 5% and 10% levels, respectively.

| | Pr(Optimist) | | | | | |
	Model 1(a)	Model 1(b)	Model 1(c)	Model 2(a)	Model 2(b)	Model 2(c)
Number of observations used	11,032	9,421	4,776	11,032	9,421	4,776
Pseudo R-squared	0.042	0.034	0.039	0.047	0.037	0.042
Stock Returns						
Total returns (t), given >0	0.979***	0.959***	1.082***	x	x	x
Total returns (t), given <0	0.880***	0.186	0.192	x	x	x
Industry-adj returns (t), given >0	x	x	x	1.096***	1.003***	1.181***
Industry-adj returns (t), given <0	x	x	x	0.997***	0.799***	0.730***
Change in total volatility (t)	-0.577	-0.405	-0.433	-0.763	-0.425	-0.547
CEO characteristics						
Young (<52 years old)	0.154	0.110**	0.194***	0.157***	0.112**	0.198***
Old (>59 years old)	0.108*	0.116**	0.075	0.105**	0.11**	0.072***
Female	-0.795***	-0.688***	-0.761***	-0.811***	-0.705***	-0.777**
Fixed effects						
Years x Industry (FF49)	Y	Y	Y	Y	Y	Y
t-test: coefficient of cond'l returns equal	x	N***	N**	x	x	x

Table 2(b) Self-attribution - differential impact of positive and negative returns on optimism

OLS regressions of factors influencing ITM of unexercised, exercisable options

Sample of 15,054 CEO-year observations (excluding finance and utility firms) over the period 1992-2012. Models 1(b) and 2(b) exclude observations where the ITM of a CEO's unexercised, exercisable options are less than 30%. Models 1(c) and 2(c) also exclude observations where the CEO did not exercise any options. Table shows estimated coefficients from OLS regressions of the ITM of a CEO's unexercised, exercisable options >=100%. *Total returns (t), given >0* are total positive equity returns in year t. *Total returns (t), given <0* are total negative equity returns in year t. *Industry-adj returns(t), given >0* are positive industry-adjusted equity returns in year t. *Industry-adj returns (t), given <0* are negative industry-adjusted equity returns in year t. *Change in total volatility (t)* is the change in annualized 60-month volatility of a firm's monthly stock returns from (t-1) to t. *Young* is an indicator variable with value 1 if the CEO is 52 or younger in the year of the observation and 0 otherwise. *Old* is an indicator variable with a value of 1 if the CEO is 59 or older in the year of the observation and 0 otherwise. *Female* is an indicator variable with a value of 1 if the CEO is female and 0 otherwise. All models include firm and year fixed effects. Standard errors are clustered by firm. The superscripts ***, ** and * indicate statistical significance at the 1%, 5% and 10% levels, respectively.

| | OLS ITM | | | | | |
	Model 1(a)	Model 1(b)	Model 1(c)	Model 2(a)	Model 2(b)	Model 2(c)
Number of observations used	11,499	9,791	5,224	11,499	9,791	5,224
R-squared (adj)	0.042	0.034	0.057	0.038	0.031	0.048
Stock Returns						
Total returns (t), given >0	0.959***	0.910***	1.311***	x	x	x
Total returns (t), given <0	0.883**	0.871*	1.329*	x	x	x
Industry-adj returns (t), given >0	x	x	x	1.147***	1.052***	1.579***
Industry-adj returns (t), given <0	x	x	x	0.323*	0.371*	0.195
Change in total volatility (t)	1.370**	1.424**	3.016**	1.199*	1.291*	2.651**
CEO characteristics						
Young (<52 years old)	0.063	-0.032	-0.300	0.066	-0.035	-0.289
Old (>59 years old)	0.133	0.160	0.104	0.136	0.157	0.112
Female	-0.187	0.048	0.073	-0.145	0.066	0.138
Fixed effects						
Firm	Y	Y	Y	Y	Y	Y
Years	Y	Y	Y	Y	Y	Y
t-test: coefficient of cond'l returns equal	x	x	x	N**	N*	N**

CHAPTER 5

GROUPING OPTIMISTIC CEOS

This paper shows that there is a significant and distinct group of optimistic CEOs whose apparently optimistic behavior is not necessarily the result of psychological bias and that this sub-group of CEOs makes investment and financing decisions which are no different from or superior to those of unbiased, non-optimistic CEOs.

Malmendier & Tate (2005a) divides its Holder67 CEOs into 'Hold and Win 67' and 'Hold and Lose 67', according to the outcome of their decision to hold exercisable options with an ITM of greater than 67% turned out *ex post*, in order to test whether investment distortions may be due to superior private information. They find no difference between the two groups. Kolasinski and Li (2013) defines CEOs as justifiably confident CEOs, according to the *ex post* 180-day returns from buying their own company stock and finds that the merger announcement returns of the justifiably confident CEOs are no different from those of CEOs who are not confident.

While claiming that optimism is justifiable based on *ex post* realized returns might be intuitively appealing, optimism is defined as a tendency to overestimate the value of uncertain future outcomes, it ignores the rationale for a CEO's expectation. A manager who believes his firm is undervalued without any reasonable justification will be right in a rising market; whereas a rational CEO without bias will not always realize positive outcomes even when the positive outcome could be rationally justified. In other words, the rationale for a decision is a better indication of the absence of bias than the *ex post* results of that decision.

This paper distinguishes between justified and unjustified optimism based on the rationale for the optimism. Chapter 4 of this paper provides support for the claim that CEO optimism is subject to self-attribution (it increases more when CEO performance is positive than it decreases when CEO performance is negative) and so it is reasonable to separate optimistic CEOs into justifiable optimists and unjustifiable optimists according to the CEO's recent performance rather than the *ex post* accuracy of their expectations. The results of this methodology suggest that this approach may be superior to the alternative of determining justifiability based on outcomes. Kolasinski and Li (2013) highlights that, according to its methodology, the merger announcement returns for justifiably confident CEOs are negative; whereas Chapter 7 of this paper shows that its methodology yields positive merger announcement returns for justified optimists.

To identify "Justified Optimists", this paper selects optimistic CEOs whose optimism increased following positive industry-adjusted equity returns. To identify "Unjustified Optimists", optimistic CEOs whose optimism increases despite following negative industry-adjusted equity returns are selected. The rationale for this classification is that increases in optimism due to positive industry-adjusted returns are likely to be due to the demonstrated superior skill or judgment of the CEO; whereas increases in optimism despite negative industry-adjusted returns are more likely to be due to the CEO's bias. The classification is performed using increasing ITM of unexercised, exercisable options as a measure of increasing optimism.

Table 3, panel A summarizes the annual frequency of Justified Optimists and Unjustified Optimists. There are 3,079 CEO-year observations where the CEO is classified as a Justified Optimist (16.3% of the total CEO-year observations and 41.5% of the

observations classified as Optimistic). There are 1,269 CEO-year observations where the CEO is classified as an Unjustified Optimist (6.7% of the total CEO-year observations and 17.1% of the observations classified as Optimistic).

Table 3, Panel B summarizes the characteristics of the different groups of CEOs. The differences in the ITM of unexercised, exercisable options and returns reflect the definitions of the various groups. There seems to be no significant difference in the mean ages of the different groups of CEOs and, due to the low percentage of female CEOs, the differences in the gender ratio of the various groups is also low.

The CFO Optimist indicator is shown as a simple robustness test for the Justified Optimist indicator. If the optimism of Justified Optimists is indeed justified, it would be expected that the CFOs working for Justified Optimists should be more likely to exhibit optimism than the CFOs of Unjustified Optimists. Firstly, CFOs are likely to be astute concerning the financial prospects of the firm and optimal option-holding behavior. Secondly, the CFO is less likely than the CEO to be subject to a biased evaluation of the CEO's abilities. Lastly, Wang, Shin & Francis (2012) shows that CFOs tend to earn higher returns than CEOs when trading the stock of their own company and concludes that CFO trades have more informational content than those of CEOs.

The *CFO Optimist* indicator is equal to 1 when the CFO exhibits optimistic option-holding behavior and is set to 0 otherwise. Table 3, Panel B shows that Justified Optimists have the highest mean value for CFO Optimist indicator (indicating that 73.8% of Justified Optimists' CFOs are also optimistic, compared to 26.3% for CFOs of the average CEO and 66.4% of CFOs of the average Optimist). Separate t-tests show the differences in means between Justified Optimists and all other CEOs (54.7%) and

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between Justified Optimists and all other Optimist CEOs (12.6%) are both statistically

significant with p-values less than 1%. If it is accepted that CFOs are less likely to be

biased and are more likely to be financially astute, then the higher coincidence of CFO

optimism and CEO optimism for Justified Optimists is an indication that Justified

Optimists are indeed justified in their optimism.

While this is reassuring, the key test of whether the behavior of Justified Optimists is

indeed not the result of a psychological bias is whether Justified Optimists as a group

implement financing and investment decisions different from those of CEOs who do not

exhibit optimistic option-holding behavior.

Table 3
Summary Statistics
Panel A: CEO observations by year
Sample includes CEOs of S&P1500 firms whose optimism can be calculated according to the methodology described in Campbell et al. (2011). CEO classified as Optimist if ITM of unexercised exercisable options >=100% in given year. Justified Optimist is an Optimist where the ITM-ness of unexercised exercisable options has increased versus the prior year and industry-adjusted returns are positive. Unjustified Optimist is an Optimist where the ITM-ness of unexercised exercisable options has increased vs prior year and industry-adjusted returns are negative.

Year	Total	Not Optimist	Optimist	Justified Optimist	Unjust'd Optimist	Optimist Other
1992	214	149	65	x	x	65
1993	659	401	258	71	67	120
1994	797	503	294	116	35	143
1995	903	547	356	164	96	96
1996	977	537	440	210	75	155
1997	1,096	516	580	304	105	171
1998	1,027	503	524	244	50	230
1999	988	473	515	195	96	224
2000	1,018	502	516	242	64	210
2001	935	581	354	105	55	194
2002	791	573	218	57	15	146
2003	1,056	686	370	98	150	122
2004	1,139	710	429	214	89	126
2005	1,073	649	424	200	62	162
2006	1,166	668	498	163	84	251
2007	1,121	648	473	214	21	238
2008	695	512	183	46	7	130
2009	735	535	200	63	64	73
2010	897	642	255	129	62	64
2011	811	577	234	125	23	86
2012	842	604	238	119	49	70
Total	**18,940**	**11,516**	**7,424**	**3,079**	**1,269**	**3,076**

Table 3
Summary Statistics

CEO classified as Optimist if ITM of unexercised exercisable options >=100% in given year. Justified Optimist is an Optimist where the ITM-ness of unexercised exercisable options has increased versus the prior year and industry-adjusted returns are positive. Unjustified Optimist is an Optimist where the ITM-ness of unexercised exercisable options has increased vs prior year and industry-adjusted returns are negative.

	N	Mean	Median	Std Dev	Min	Max
All CEOs						
Optimist indicator	18,940	0.392	0.000	0.488	0.000	1.000
Justified Optimist indicator	18,940	0.163	0.000	0.369	0.000	1.000
Unjustified Optimist indicator	18,940	0.067	0.000	0.250	0.000	1.000
CFO Optimist indicator	5,163	0.263	0.000	0.440	0.000	1.000
ITM-ness of unexercised, exercisable options	18,940	1.739	0.773	5.053	0.000	61.372
Total returns (%)	17,562	28.2%	17.9%	72.4%	-97.8%	2809.5%
Industry-adjusted returns (%)	17,562	9.7%	3.0%	66.5%	-313.1%	2654.2%
CEO age	18,266	55.4	55.0	7.2	29.0	91.0
CEO female indicator	18,940	0.016	0.000	0.124	0.000	1.000
All Optimists						
Justified Optimist indicator	7,424	0.415	0.000	0.493	0.000	1.000
Unjustified Optimist indicator	7,424	0.171	0.000	0.376	0.000	1.000
CFO Optimist indicator	1,649	0.664	1.000	0.472	0.000	1.000
ITM-ness of unexercised, exercisable options	7,424	3.688	1.875	7.667	1.000	61.372
Total returns (%)	6,843	45.7%	31.7%	83.0%	-97.8%	1772.6%
Industry-adjusted returns (%)	6,843	24.6%	13.4%	76.6%	-313.1%	1739.0%
CEO age	7,218	54.9	55.0	7.5	32.0	90.0
CEO female indicator	7,424	0.012	0.000	0.110	0.000	1.000
Justified Optimists						
CFO Optimist indicator	679	0.738	1.000	0.440	0.000	1.000
ITM-ness of unexercised, exercisable options	3,079	3.943	2.026	7.760	1.000	61.372
Total returns (%)	3,079	76.1%	52.6%	95.2%	-54.8%	1772.6%
Industry-adjusted returns (%)	3,079	57.1%	35.2%	84.5%	0.0%	1739.0%
CEO age	3,028	55.0	55.0	7.4	33.0	80.0
CEO female indicator	3,079	0.012	0.000	0.109	0.000	1.000
Unjustified Optimists						
CFO Optimist indicator	234	0.543	1.000	0.499	0.000	1.000
ITM-ness of unexercised, exercisable options	1,269	3.467	1.752	7.800	1.000	61.372
Total returns (%)	980	21.9%	20.2%	34.2%	-87.5%	142.4%
Industry-adjusted returns (%)	980	-24.1%	-15.4%	26.0%	-313.1%	0.0%
CEO age	1,237	55.5	55.0	7.6	34.0	83.0
CEO female indicator	1,269	0.008	0.000	0.088	0.000	1.000
Other Optimists						
CFO Optimist indicator	736	0.635	1.000	0.482	0.000	1.000
ITM-ness of unexercised, exercisable options	3,076	3.524	1.808	7.512	1.001	61.372
Total returns (%)	2,784	20.4%	6.6%	68.1%	-97.8%	828.5%
Industry-adjusted returns (%)	2,784	5.7%	-0.9%	62.7%	-215.4%	747.2%
CEO age	2,953	54.5	54.0	7.6	32.0	90.0
CEO female indicator	3,076	0.014	0.000	0.119	0.000	1.000

CHAPTER 6

OPTIMISM AND INVESTMENT SENSITIVITY TO CASH FLOW

Heaton (2002) presents a simple model to describe the interaction between managerial optimism, investment and free cash flow. An optimistic manager overvalues his firm's investment opportunities causing him to want to overinvest but he also overestimates the value of his firm and therefore sees external financing as costly. An optimistic CEO will therefore invest more than an unbiased CEO when the firm's cash flow is sufficiently high but will reduce investment more than an unbiased CEO when the firm's cash flow is low.

This paper hypothesizes that while Justified Optimists may be more likely to invest than other unbiased CEOs, the investment sensitivity to cash flow of Justified Optimists should be no different from that of unbiased CEOs. Justified Optimists, if unbiased, will not forfeit good investment opportunities due to a lack of internal funds. This hypothesis is tested by regressing investment against the interaction term between the optimism indicator variable and normalized cash flow, along with standard controls for explaining corporate investment. Malmendier & Tate (2005a) interpret a statistically significant estimated beta for this interaction term as an indication of investment sensitivity to cash flow. Although investment cannot be less than zero, the distribution of investment across firms shows no distortions and so a truncated Tobit regression is not necessary to avoid any potential bias of an OLS regression.

OLS (3):

Investment = b_1[cash flow] + b_2[Q] + b_3[optimism] + b_4[optimism*cash flow] + b_5[controls]

where investment is defined as firm capital expenditures normalized by capital at the beginning of the year; cash flow is calculated as operating income before depreciation minus interest, tax and dividend payments and is normalized by capital at the beginning of the observation year; Q is calculated as the market value of assets divided by the book value of assets; optimism is represented by indicator variables for CEO optimism; and controls include standard variables for investment regressions such as CEO stock ownership and aggregate vested options, firm size, year fixed effects and firm fixed effects. Firm size is measured as the natural log of total assets. Standard errors are clustered by firm. Outlier values of normalized cash flow and investment are removed by trimming observations with the highest and lowest 1% of values. There are 4,299 CEO-year observations with usable data, of which 15.9% are Justified Optimists, 7.6% are Unjustified Optimists and 15.6% are Optimists (excluding Justified and Unjustified Optimists).

The key variables of interest are the interactions between the optimism indicator variables and cash flow. These interaction variables are calculated as the product of cash flow and the respective optimism indicator variables. If the hypothesis is correct and the investment decisions of Justified Optimists are no more sensitive to cash flow than those of non-optimistic CEOs then the estimated beta for the interaction between the Justified Optimism indicator and cash flow (b_4) should not be significantly different from zero. Table 4 summarizes the results of the analysis.

It should be expected that optimistic CEOs will invest more than non-optimistic CEOs as they are likely to overestimate the returns of investment projects, in which case the estimated betas for the optimism indicator variables should be positive and statistically

significant. Table 4, which summarizes the OLS regressions, shows that while the estimated betas are positive and statistically significant for all optimists in model 1 and all types of optimists in model 2, they are not statistically significant for Justified Optimists in model 3. A t-test comparing the estimated betas for the Optimist (excl. Justified & Unjustified Optimists) indicator variable and the Justified Optimist indicator variable shows they are not equal, with a statistical significance of 1%. Together this suggests that Optimists (excluding Justified and Unjustified Optimists) invest more than non-optimist CEOs and that Justified Optimists invest no less and may invest more than non-optimist CEOs.

Most importantly, although the investment sensitivity to cash flow is negative for Optimists as a group (see model 1), as predicted, the investment sensitivity to cash flow of Justified Optimists is not statistically different from that of rational CEOs (see models 2 and 3). A t-test shows the estimated betas for the interaction terms of the Optimist (excl. Justified & Unjustified)*Cash Flow and Justified Optimist*Cash Flow are also not equal to one another (with a statistical significance level of 1%). This suggests that any overinvestment by Justified Optimists relative to non-optimistic CEOs is independent of the availability of internal funds. It may be that a Justified Optimist is better able to convince external financiers of the reasonableness of his evaluation of the project's return. It may be that a Justified Optimist simply prefers to share some of the project's gains with external investors rather than forfeit all the gains of a positive NPV project. As hypothesized, Justified Optimists are a distinct group from other optimistic CEOs: they do not overinvest as much as other optimists and, most importantly, their investment is no more sensitive to cash flow than that of non-optimistic CEOs.

Interestingly, and contrary to Malmendier & Tate (2005a), the investment sensitivity to cash flow of Optimists (excluding Justified and Unjustified Optimists) is actually negative, implying that as cash flow increases the investment decisions become more like those of non-optimistic CEOs. This would be a perverse result if it is interpreted as meaning that Optimistic CEOs invest less as cash flow increases. A more intuitive interpretation is consistent with Jensen's (1986) agency costs of cash flow theory: optimistic CEOs overinvest due to higher expected returns, but non-optimistic CEOs overinvest due to higher availability of internal funds. Thus, as cash flows increase, non-optimistic CEOs will invest more thereby reducing the difference in investment between non-optimistic and optimistic CEOs.

In summary, while the investment decisions of Optimists (excluding Justified and Unjustified Optimists) are distinct from non-optimistic CEOs, this analysis finds no evidence to suggest that the investment decisions of Justified Optimists are any more sensitive to changes in cash flow than the investment decisions of non-optimistic CEOs and provides only limited evidence that their investment decisions are any different from non-optimistic CEOs.

Table 4

CEO Optimism and Corporate Investment

Sample of 18,940 CEO-year observations over the period 1992-2012. Dependent variable is *Investment* defined as firm capital expenditures normalized by capital at the beginning of the year. *Optimist* is an indicator variable with a value of 1 if the CEO is an optimist according to the classification described part II. *Justified Optimist* is an indicator variable with a value of 1 if CEO is classified as *Justified Optimist* due to increasing ITM-ness of unexercised, exerciseable options, as defined in part V. *Unjustified Optimist* is an indicator variable with a value of 1 if CEO is classified as *Unjustified Optimist* due to increasing ITM-ness of unexercised, exercisable options as defined in chapter 5. *Optimist (excluding Justified/Unjustified)* is an indicator variable with a value of 1 if the CEO is an *Optimist* but is not a *Justified Optimist* or *Unjustified Optimist*. *Cash flow* is cash flow normalised by capital at the beginning of the year, calculated as [(oibdp - xint -txt - dvc)/ppegt]. *Q* is the market value of assets over the book value of assets. *Stock Ownership* is the percentage of company stock held by the CEO. *Vested Options* is aggregate number of unexercised options held by the executive at fiscal year end that were vested as a percentage of total shares outstanding. *Firm size* is log of assets. All models include firm and year fixed effects. The table shows the estimated co-efficient for each explanatory variable. Standard errors are clustered by firm. The superscripts ***, ** and * indicate statistical significance at the 1%, 5% and 10% levels, respectively.

	Model 1	Model 2	Model 3
Observations used	4,288	4,288	4,288
R-squared (adj)	0.160	0.165	0.170
Optimism Indicator Variables			
Optimist	0.018***	x	x
Justified Optimist	x	0.009*	0.007
Unjustified Optimist	x	0.012*	0.011*
Optimist (excl. Justified & Unjustified)	x	0.031***	0.029***
Optimist * CF	-0.021**	x	x
Justified Optimist*CF	x	-0.004	0.001
Unjustified Optimist*CF	x	-0.020	-0.019
Optimist (excl. Justified & Unjustified) *CF	x	-0.037***	-0.034***
Explanatory Variables			
Cash Flow	0.063***	0.064***	0.128***
Q	0.006***	0.059**	0.008***
Controls			
Stock Ownership	0.001**	0.001**	0.001
Vested Options	-0.241	-0.202	-0.270
Firm size (log of total assets)	0.009*	0.009*	0.013**
Interactive Terms			
Q*Cash Flow	x	x	-0.004*
Stock Ownership * Cash Flow	x	x	0.001
Vested Options * Cash Flow	x	x	0.264
Size * Cash Flow	x	x	-0.009*
Fixed effects			
Year	Y	Y	Y
Firm	Y	Y	Y

CHAPTER 7

OPTIMISM AND M&A ACTIVITY

Existing literature finds an association between a CEO exhibiting an optimistic bias and

his propensity to engage in mergers and acquisitions (M&A) and that the market reacts

less favorably to announcements of acquisitions by CEOs exhibiting such a bias. It is

hypothesized that Justified Optimists are not biased and are therefore less likely to

engage in irrational value-destroying M&A activity. This paper finds that while there is

evidence that Justified Optimists are more likely to attempt a takeover, the announcement

of such an attempt is associated with positive abnormal returns, even after controlling for

the means of financing the deal. Given Justified Optimists' option-holding decisions are

based on positive prior industry-adjusted performance and their M&A decisions are

positively received by the stock market, the M&A decisions of Justified Optimists should

not be described as the result of a bias.

Table 5 "Probability of takeover attempt" shows the results of conditional logit

regressions of how various factors impact the probability of a CEO engaging in a

takeover attempt within one year and within the next three years. A CEO is classified as

engaging in a takeover attempt if he is chief executive of a publicly traded US firm

(excluding utility and finance firms) which announces an attempt to acquire, merge with

or acquire a majority interest in a target firm where the acquirer holds less than 50% of

the target stock before the announcement but seeks to own more than 50% after the

announcement. The sample period for the conditional logit regression of the probability

of a takeover attempt within three years is necessarily shorter by two years. In column 1,

the dependent variable takes the value of 1 if the CEO engages in a takeover attempt

within one year and otherwise takes a value of 0. In column 2, the dependent variable takes a value of 1 if the CEO engages in a takeover attempt within three years and otherwise takes a value of 0. The unit of observation is the CEO-year. The primary variables of interests are the indicator variables indicating that the CEO was a Justified Optimist, an Unjustified Optimist or an Optimist (excluding Justified and Unjustified Optimist) in a given year. Positive estimated coefficients for these indicator variables would indicate that these CEO types are more likely to engage in M&A activity, negative estimated coefficients would indicate a lower propensity to engage in M&A activity. The conditional logit regression includes controls for firm characteristics which might impact the CEO's likelihood of engaging in M&A activity: firm size, cash availability and the firm's market-to-book ratio. Industry and year fixed effects control for the potential influence of merger waves and any industry specific tendency to engage in (or avoid) mergers.

The economic characteristics of the CEO's firms have the expected impacts on the probability of a takeover attempt: large, cash-rich firms are more likely to engage in a takeover attempt. The signs of the estimated coefficients for CEO age indicator variables suggest that young CEOs are more likely to engage in a takeover attempt and old CEOs are less likely to engage in a takeover attempt.

As expected, optimistic CEOs are generally more likely to engage in a takeover attempt. The estimated coefficients of the Optimist (excluding Justified and Unjustified Optimists) and Justified Optimist indicator variables are positive and statistically significant; the estimated coefficient for the Unjustified Optimist indicator variable is not. The estimated coefficient of the Justified Optimist indicator variable is always the highest. Separate t-

tests show that the estimated coefficient of the Justified Optimist indicator is different

from those of the Unjustified Optimist and the other Optimist (excluding Justified and

Unjustified Optimists) indicators for the one year period, suggesting that Justified

Optimists are the most likely to engage in takeover attempts.

Table 6 "Cumulative Abnormal Returns and Optimism" provides evidence on the impact

of CEO optimism and announcement returns relating to takeover attempts. It shows the

estimated betas of an OLS regression of cumulative abnormal announcement returns

(CARs) for takeover attempts with CEO optimism as explanatory variables and controls

for deal characteristics, acquiring firm characteristics, as well as year and Fama-French

49 industry fixed effects. Standard errors are clustered by firm.

Columns 1 and 2 show estimates for value-weighted announcement returns for the three

day window from the day before the announcement of a takeover attempt to the day after

the announcement (-1,+1). Columns 3 and 4 show estimates for value-weighted

announcement returns for the seven day window from 3 days before the announcement of

a takeover attempt to 3 days after the announcement (-3,+3). The seven day window

captures the impact from any rumors or insider-trading before the announcement and any

slow to react investors after the announcement; the shorter three day window misses such

impacts but also excludes the impact of any unrelated information released over the

longer period.

Columns 1 and 3 do not control for how the takeover attempt was to be financed.

Columns 2 and 4 use indicator variables to control for the method of financing the deal.

Cash(>50%) is an indicator variable with a value of 1 if, according to Thomson SDC, the

deal was to be mostly financed with cash and otherwise has a value of 0. *Stock (>50%)* is

an indicator variable with a value of 1 if, according to Thomson SDC, the deal was to be mostly financed with stock and otherwise has a value of 0. *Hostile* is an indicator variable with a value of 1 if, according to Thomson SDC, the takeover attempt was categorized as hostile and otherwise has a value of 0. There are 2,617 announcement events which can be matched with the CEO sample and have calculable CAR's, of which 22.2% are Justified Optimists, 8.1% are Unjustified Optimists and 20.9% are Optimists (excluding Justified and Unjustified Optimists).

The following results are of interest. Firstly, the announcement returns for takeover attempts by CEOs who are Justified Optimists are significantly higher than for those by the average CEO. This is true for both windows and is also true when controls for financing are included. This is consistent with the hypothesis that Justified Optimists are rational and do not engage in value-destroying takeovers. Secondly, the estimated betas for other optimists are positive but only the estimated beta for the Optimists (excluding Justified and Unjustified Optimists) is statistically significant and only for the returns over the 3-day window. This further supports the hypothesis that Justified Optimists are a group distinct from the other CEOs classified as optimists.

Overall, these results support the hypothesis that Justified Optimists do not engage in value-destroying M&A activity. Rather they are more likely to attempt a takeover but the market judges merger attempts by Justified Optimists more favorably than attempts by other CEOs. Thus, it appears that the underlying cause of what has been perceived in prior literature as optimism matters crucially.

Table 5

Probability of Takeover Attempt

Conditional logit regressions of factors affecting probability of a CEO attempting a takeover

Sample of 15,054 CEO-year observations (excluding finance and utility firms) over the period 1992-2012. Incidence of takeover attempts from Thomson SDC database. Dependent variable in logit regressions is probability of a takeover attempt within 1 year of the observation and probability of a takeover attempt within 3 years of observation. *Justified Optimist* is an indicator variable with a value of 1 if CEO is classified as *Justified Optimist* due to increasing ITM-ness of unexercised, exerciseable options, as defined in part V. *Unjustified Optimist* is an indicator variable with a value of 1 if CEO is classified as *Unjustified Optimist* due to increasing ITM-ness of unexercised, exercisable options as defined in part V. *Optimist (excluding Justified/Unjustified)* is an indicator variable with a value of 1 if the CEO is an *Optimist* but is not a *Justified Optimist* or *Unjustified Optimist*. *Firm size* is log of assets. *Cash* as % of total assets is [che/at]. MTB is [((at-ceq)+(csho*prcc_f))/at]. *Young* is an indicator variable with value 1 if the CEO is 52 or younger in the year of the observation and 0 otherwise. *Old* is an indicator variable with a value of 1 if the CEO is 59 or older in the year of the observation and 0 otherwise. *Female* is an indicator variable with a value of 1 if the CEO is female and 0 otherwise. All models include industry x year fixed effects. The table shows the estimated co-efficient for each explanatory variable with robust standard errors. The superscripts ***, ** and * indicate statistical significance at the 1%, 5% and 10% levels, respectively.

	Pr (within 1 year)	Pr(within 1-3 years)
Observations used	11,718	12,426
Pseudo R-squared	0.042	0.044
Optimism indicator variables		
Justified Optimist	0.373***	0.276***
Unjustified Optimist	0.080	0.080
Optimist (excl. Justified & Unjustified)	0.164**	0.210***
Firm's economic characteristics		
Firm size (log of total assets)	0.315***	0.324***
Cash as % total assets	1.028***	1.224***
Market to Book	0.050***	0.058***
CEO characteristics		
Young (<52 years old)	0.117**	0.113**
Old (>59 years old)	-0.152**	-0.168***
Female	-0.184	-0.063
Fixed effects		
Years x Industry (FF49)	Y	Y
Sample period	1992-2012	1992-2010
t-test: Justified=Optimist	N**	x
t-test: Justified=Unjustified	N***	N**

Table 6

Cumulative Abnormal Returns and Optimism

OLS Regressions of CARs over takeover attempt announcement windows.

Sample of 2,617 announcements which met criteria described in part VI and could be matched to CEOs in main sample. Deal characteristics from Thomson SDC. Dependent variable in (-1,+1) column is value-weighted Cumulative Abnormal Returns (CARs) from 1 day before announcement of takeover until 1 day after the announcement. Dependent variable in (-3,+3) column is value-weighted Cumulative Abnormal Returns (CARs) from 3 days before announcement of takeover until 3 days after the announcement. *Justified Optimist* is an indicator variable with a value of 1 if CEO is classified as *Justified Optimist* due to increasing ITM-ness of unexercised, exerciseable options, as defined in part V. *Unjustified Optimist* is an indicator variable with a value of 1 if CEO is classified as *Unjustified Optimist* due to increasing ITM-ness of unexercised, exercisable options as defined in part V. *Optimist (excluding Justified/Unjustified)* is an indicator variable with a value of 1 if the CEO is an *Optimist* but is not a *Justified Optimist* or *Unjustified Optimist*. *Cash (>50%)* is an indicator variable with a value of 1 if the takeover attempt is to be financed mostly with cash. *Stock (>50%)* is an indicator variable with a value of 1 if the takeover attempt is to be finance most with equity. *Hostile* is an indicator variable with a value of 1 if the takeover attempt is reported as hostile on Thomson SDC. *MTB* is [((at-ceq)+(csho*prcc_f))/at]. *Firm size* is log of assets. *Book leverage* is [(dltt+dlc)/at]. *Cash Flow as % assets* is [(oibdp-xint-txt-dvc)/at]. All models include year fixed effects and Fama-French 49 industry fixed effects. The table shows the co-efficient for each explanatory variable with standard errors clustered by firm. The superscripts ***, ** and * indicate statistical significance at the 1%, 5% and 10% levels, respectively.

	(-1,+1)		(-3,+3)	
Observations used	2,617	2,617	2,617	2,617
R-squared (adj)	0.024	0.030	0.024	0.025
Optimism indicator variables				
Justified Optimist	0.007*	0.007*	0.014***	0.014***
Unjustified Optimist	0.001	0.001	0.008	0.008
Optimist (excl. Justified & Unjustified)	0.008	0.008*	0.007	0.007
Deal characteristics				
Cash (>50%)	x	0.006**	x	0.004
Stock (>50%)	x	-0.010***	x	-0.009*
Hostile	x	-0.007	x	-0.008
Acquiring firm characteristics				
Cash as % assets	-0.011	-0.007	-0.002	0.001
Market-to-Book	0.003**	0.003***	0.003***	0.003***
Firm size (log of total assets)	-0.003***	-0.003***	-0.003***	-0.003***
Book leverage	0.014	0.011	0.019	0.016
Cash Flow as % assets	-0.107**	-0.111**	-0.122**	-0.125**
Fixed effects				
Years	Y	Y	Y	Y
Industry (FF49)	Y	Y	Y	Y

CHAPTER 8

OPTIMISM AND PAYOUT POLICY

OPTIMISM AND DIVIDEND PAYOUT

Deshmukh et al. (2013) models the interaction between CEO overconfidence and dividend policy, where overconfidence is defined as "an upward bias in expectations of future outcomes (overoptimism)", and predicts that biased CEOs will pay lower levels of dividends than unbiased CEOs and the "reduction in dividends associated with CEO overconfidence is greater in firms with lower growth opportunities". The paper's empirical results confirm the predictions of the model. The results of the random-effects Tobit model of dividend payout show a negative estimated beta for optimists and a positive estimated beta for the interaction between optimists and growth firms.

The rationale given for the lower overall dividend payout is that biased CEOs believe external funds to be expensive and so cash is conserved to maintain financial slack. The explanation for the interaction between growth opportunities and overconfidence is more complex. Deshmukh et al. (2013) highlights that a CEO's beliefs about the value of investment projects may be "based on private information … or on widely available public information. CEO overconfidence has a greater impact in the former case than in the latter." Where information is widely available, both overconfident and rational CEOs will choose to invest in these growth opportunities, making the CEO's personal bias less important in determining the cash needs and hence the dividend policy of the firm. Where information is private, the impact of the managers belief's on his evaluation of the investment opportunities will be larger.

If Justified Optimists are not biased then it would be expected that they would pay out lower dividends when they had private information about growth opportunities which were not recognized by the market but would pay similar dividends to unbiased CEOs if all the growth opportunities were fully reflected in the market price. It should therefore be expected that the estimated beta of a Justified Optimist indicator variable should be negative and the estimated beta of the interaction between the Justified Optimist indicator variable and growth opportunities should be positive.

If optimistic CEOs (excluding Justified Optimists) are not rational then it would be expected that they would pay out lower dividends regardless of whether the firm's growth opportunities are fully reflected in its market price: the overvaluation of their firms' investment opportunities is based on their bias and not on private information. Therefore, it should be expected that the estimated beta for Optimists (excluding Justified and Unjustified Optimists) should be negative but the estimated beta for the interaction between the respective optimism indicator variable and growth opportunities should be zero (or at least lower than for the interaction between the Justified Optimist indicator variable and growth opportunities). The perceived need for cash for investment of a biased CEO is due to his bias and not due to private information not yet reflected in the market valuation of the firm.

These hypotheses will be tested by regressing dividend payout against the CEO optimism measures and standard controls for dividend policy similar to table 4 of Deshmukh et al. (2013). As the distribution of dividend payouts across the sample is distorted because dividend payout is truncated at zero, a Tobit regression is appropriate in order to avoid the potential bias of an OLS regression.

<u>Random Effects Tobit Regression (4)</u>:

Dividend Payout = b_1[optimism] + b_2[optimism*growth opportunities] + b_3[controls]

where dividend payout is defined as the ratio between dividends to market value of

equity; optimism is represented by indicator variables for CEO optimism; and controls

include standard variables for dividend regressions such as cash flow, CEO stock

ownership (%), CEO vested options, firm size, year fixed effects and industry fixed

effects (Fama-French 49). Following Deshmukh et al (2013), growth opportunities are

measured by the ratio of market value to book value of assets; cash flow is defined as

operating income before depreciation normalized by total assets; firm size is measured as

the natural log of sales; and outlier values of cash flow and investment were removed by

trimming the observations with the highest and lowest 1% of values. All models control

for firm-level random effects. The sample excludes utility and finance firms as their

payout policies are influenced by regulation. There are 8,682 CEO-year observations

with sufficient non-missing data to be included in the analysis, of which 17.0% are

Justified Optimists, 7.2% are Unjustified Optimists and 18.5% are Optimists (excluding

Justified and Unjustified Optimists).

A random effects model is used to match the approach of Deshmukh et al (2013) and to

limit the drawbacks of fixed effects models, namely: the significant loss of degrees of

freedom due to the implicit use of indicator variables; and the loss of time-invariant

explanatory variables.

Table 7 shows the results of the analysis. Model 1 does not breakdown the different

groups of optimists and the results match the predictions of Deshmukh et al (2013): the

estimated beta for the Optimism indicator is negative, the estimated beta for the

interaction between Optimism and growth opportunities is positive and both estimates are statistically significant. In order to determine whether all optimistic CEOs exhibit the same behaviors, model 2 of table 7 uses separate indicator variables for the three types of optimists: Justified Optimists, Unjustified Optimists and Optimists (excluding Justified and Unjustified Optimists). As predicted, the estimated betas for these three indicator variables are all negative and highly significant: any CEO who believes his firm to be undervalued (whether correctly or not) should prefer to maintain his firm's financial slack by retaining dividends. Also as predicted, the estimated beta for the interaction term between growth opportunities and the Justified Optimist indicator variable is positive and statistically significant; whereas the estimated beta for the interaction term for other optimists is not significantly different from zero. The dividend policy of a Justified Optimist who is CEO of a growth firm is more similar to that of an unbiased CEO of a growth firm as there is less private information not yet reflected in the firm's market price. If all optimistic CEOs were alike then the estimated beta for the interaction between optimism and growth opportunities for all optimists would be positive and significantly different from zero. However, the estimated betas for the interaction between growth opportunities and Unjustified Optimists and Optimists (excluding Justified and Unjustified Optimists) are not statistically different from zero, suggesting that the dividend policies for these classes of optimists are not more similar to those of unbiased CEOs when they manage high growth firms. In other words, there is again evidence to suggest that Justified Optimists are distinct from other optimists and that they behave like unbiased CEOs, while the other types of optimist do not.

OPTIMISM AND TOTAL PAYOUT

It can be argued that it is inappropriate to only consider dividend payout rather than total

payout policy as dividend payout does not consider the significant cash amounts returned

to shareholders through stock repurchases. Furthermore, the personal wealth of CEOs

with vested options will be impacted in different ways when the firm pays its

shareholders via dividends rather than via stock purchases. Executive options are

generally not adjusted for the impact of dividend payments or stock repurchases on the

underlying stock's price. When a firm pays a dividend then *ceteris paribus* the ex-

dividend price will be lower, thereby reducing the value (and ITM) of any associated

options. On the other hand, when a firm repurchases its own stock, the stock price will

increase, thereby increasing the value (and ITM) of any associated options. A CEO with

unexercised options should therefore prefer to return cash to the firm's shareholders by

stock repurchases rather than paying dividends. As all optimistic CEOs, by definition,

have unexercised options, they should prefer stock repurchases to dividend payments.

The random effects Tobit regression (4) is repeated using total payout ratio rather than

dividend payout as the dependent variable. For consistency, the total payout ratio is

calculated as the ratio of the sum of the value of repurchased stock and dividends paid to

the market value of the firm's equity. The results are shown in table 8.

It should be noted that the results are similar to those for regressions of dividend payout:

all optimists have lower payout ratios but the estimated beta for the interaction term for

optimism and growth opportunities is only statistically significant for Justified Optimists.

When the total payout ratio is the dependent variable, the signs and significance of all the

other explanatory variables are consistent with Deshmukh et al (2013).

In summary, analysis of the relationship between payout policy and optimism suggests that Justified Optimists are not subject to bias. Although they pay lower dividends than CEOs who are not optimists, this is rational if they correctly judge the firm to be undervalued and hence that external financing is expensive. Most importantly, the "underpayment" of dividends is smaller for firms which the market recognizes as having higher growth opportunities. This is not true for other groups of optimists.

Table 7
CEO Optimism and Dividend Policy
Random-effects Tobit regression of factors influencing dividend payout

15,054 CEO-year observations (excluding finance and utility firms) over the period 1992-2012. Dependent variable is *Dividend Payout*, defined as % of market value. *Optimist* is an indicator variable with a value of 1 if the CEO is an *Optimist* according to the classification described part II. *Justified Optimist* is an indicator variable with a value of 1 if CEO is classified as *Justified Optimist* due to increasing ITM-ness of unexercised, exerciseable options, as defined in part V. *Unjustified Optimist* is an indicator variable with a value of 1 if CEO is classified as *Unjustified Optimist* due to increasing ITM-ness of unexercised, exercisable options as defined in part V. *Optimist (excluding Justified /Unjustified)* is an indicator variable with a value of 1 if the CEO is an *Optimist* but is not a *Justified Optimist* or *Unjustified Optimist*. *Cash flow* is cash flow normalised by total assets, calculated as [oibdp/at]. *Growth Opportunities* is the ratio of market value of assets to book value of assets. *Stock Ownership* is the percentage of company stock held by the CEO. *Vested Options* is aggregate number of vested unexercised options held by the executive at fiscal year end as a percentage of total shares outstanding . *Firm size* is log of sales. All models include year fixed effects and Fama-French 49 industry fixed effects and control for firm-level random effects. The table shows the estimated co-efficient for each explanatory variable. The superscripts ***, ** and * indicate statistical significance at the 1%, 5% and 10% levels, respectively.

	Model 1	Model 2
CEO Optimism		
Optimist	-0.006***	x
Justified Optimist	x	-0.006***
Unjustified Optimist	x	-0.005***
Optimist (excl. Justified & Unjustified)	x	-0.005***
Optimist*Growth	0.001*	x
Justified Optimist*Growth	x	0.001**
Unjustified Optimist*Growth	x	0.001
Optimist (excl. Justified & Unjustified)*Growth	x	0.000
Firm characteristics		
Stock Ownership	-0.000	-0.000
Vested Options	-0.013	-0.012
Growth opportunities	-0.001***	-0.001***
Cash Flow as % assets	0.003	0.004
Firm size (log of total assets)	0.004***	0.004***
Tangible assets	-0.000	-0.000
Year FE	yes	yes
Industry FE	yes	yes
Random effects	yes	yes
Observations	8,682	8,682
Log-Likelihood	9,778	9,780
Chi-squared	1,472***	1,477***

Table 8
CEO Optimism and Total Payout Policy

Random-effects Tobit regression of factors influencing total payout

15,054 CEO-year observations (excluding finance and utility firms) over the period 1992-2012. Dependent variable is *Total Payout Payout*, defined as % of market value. *Optimist* is an indicator variable with a value of 1 if the CEO is an *Optimist* according to the classification described part II. *Justified Optimist* is an indicator variable with a value of 1 if CEO is classified as *Justified Optimist* due to increasing ITM-ness of unexercised, exerciseable options, as defined in part V. *Unjustified Optimist* is an indicator variable with a value of 1 if CEO is classified as *Unjustified Optimist* due to increasing ITM-ness of unexercised, exercisable options as defined in part V. *Optimist (excluding Justified /Unjustified)* is an indicator variable with a value of 1 if the CEO is an *Optimist* but is not a *Justified Optimist* or *Unjustified Optimist*. *Cash Flow* is cash flow normalised by total assets, calculated as [oibdp/at]. *Growth Opportunities* is the ratio of market value of assets to book value of assets. *Stock Ownership* is the percentage of company stock held by the CEO. *Vested Options* is aggregate number of vested unexercised options held by the executive at fiscal year end as a percentage of total shares outstanding. *Firm size* is log of sales. All models include year fixed effects and Fama-French 49 industry fixed effects and control for firm-level random effects. The table shows the estimated co-efficient for each explanatory variable. The superscripts ***, ** and * indicate statistical significance at the 1%, 5% and 10% levels, respectively.

	Model 1	Model 2
CEO Optimism		
Optimist	-0.017***	x
Justified Optimist	x	-0.021***
Unjustified Optimist	x	-0.013***
Optimist (excl. Justified & Unjustified)	x	-0.015***
Optimist*Growth	0.002**	x
Justified Optimist*Growth	x	0.002***
Unjustified Optimist*Growth	x	0.001
Optimist (excl. Justified & Unjustified)*Growth	x	0.001
Firm characteristics		
Stock Ownership	-3.1×10^{-4}***	-3.1×10^{-4}***
Vested Options	0.139***	-0.140***
Growth Opportunities	-0.007***	-0.007***
Cash Flow as % assets	0.135***	0.135***
Firm size (log of total assets)	0.007***	0.007***
Tangible assets	-0.001*	-0.001*
Year FE	yes	yes
Industry FE	yes	yes
Random effects	yes	yes
Observations	7,989	7,989
Log-Likelihood	9,515	9,520
Chi-squared	1,680***	1,693***

CHAPTER 9

CONCLUSIONS

This paper finds that self-attribution helps to explain annual variation in CEO optimism: CEO optimism increases more as a result of good firm performance than it decreases as a result of poor CEO performance. Furthermore, there is evidence that those CEOs whose optimism increases as a result of superior industry-adjusted performance are not subject to bias but instead appear to be reacting to their ability or to their firms' specific conditions. The corporate investment and financing decisions of Justified Optimists should therefore be no worse, or better, than those of CEOs who are not exhibiting optimistic behavior, which is what this paper finds. Justified Optimists invest more than unbiased CEOs but their investment decisions are no more sensitive to cash flow than those of unbiased CEOs; Justified Optimists are more likely to engage in M&A activity but the market reacts positively to this activity; Justified Optimists do pay out lower dividends than unbiased CEOs but this difference decreases if the market recognizes a firm's growth opportunities.

The literature generally treats CEO overconfidence and optimism as a permanent trait and the corporate investment and financing decisions associated with CEOs classified as overconfident or optimistic are generally treated as inferior to those of CEOs who are not classified as overconfident or optimistic. This paper demonstrates that overconfident behavior is actually exhibited relatively infrequently by CEOs who are classified as permanently overconfident: 57.7% of overconfident CEOs exhibited the characteristic behavior in less than 67% of the years where the behavior could be classified.

This paper helps to identify when optimistic behavior is likely to be the result of bias and when it is likely to be a rational response to a firm's specific conditions. Identifying CEOs whose optimism is justifiable may aid investors in their evaluation of CEO decisions and improve capital market efficiency. Identifying CEOs whose optimism is not justifiable may aid research into how corporate governance and contracting can modify the behaviors of biased CEOs. Lastly, this paper may help CEOs themselves to better evaluate their own performance and identify potential biases.

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