EXPLORATIONS INTO MARKET TIMING FACTORS

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ABSTRACT

This dissertation consists of three essays on factors that influence how managers choose when to pursue important company investment decisions and the quality of those investment decisions. The dissertation research seeks to more fully develop researchers' understanding of whether stock prices influence when companies decide to repurchase company stock and when they decide to sell additional stock and whether or not internal behavioral biases and pressures from large external investors further influences these decisions. My results further strengthen the notion that behavioral finance needs a stronger presence within the corporate finance realm.

The first essay investigates how the presence of large external activist hedge fund investors distorts corporate stock repurchase policy. I show that prior to being targeted companies repurchase stock less often than their peers and that the converse is true after these firms are targeted by activist hedge funds. Moreover, I find that this stock repurchase increase leads to repurchases that are seemingly less correlated with market timing attempts and are of worse quality than their non-targeted peers.

The second essay investigates how managerial overconfidence affects how corporate managers time their repurchases with market undervaluation periods. I find that overconfidence seemingly elicits an increased propensity to repurchase stock and that this behavioral bias can account for the popularly held notion that managers repurchase poorly. An additional analysis of market liquidity surrounding the repurchase suggests that investors believe moderately confident

repurchases are informed trades aimed at benefitting from a temporarily low stock price while overconfident repurchases are not.

The third essay investigates how managerial overconfidence affects seasoned equity offerings and how likely management is to issue such an offering alongside periods of temporary stock price overvaluation. I find that overconfident managers are generally no less likely to offer equity than their moderately confident peers; however, as stock returns increase moderately confident managers are significantly more likely to pursue equity offerings. Additionally, an analysis of short-term cumulative abnormal returns and long-term buy-and-hold abnormal returns provides evidence that overconfident equity offerings are less likely to be market timing attempts when compared to moderately confident attempts.

DEDICATION

This dissertation is dedicated to my family, Ty and Kim Handy, and my brother, Beau Handy. Throughout the entirety of my life they have been a constant source of support and encouragement. I greatly value my friendship with each of them and look forward to our future.

LIST OF ABBREVIATIONS AND SYMBOLS

α	Regression Constant
β_i	Regression Coefficient, beta
CAR	Cumulative abnormal return
CEO	Chief Executive Officer
CFO	Chief Financial Officer
CRSP	Center for Research in Security Prices
ε_i	Standard error of observation i
R^2	R-squared
SEO	Seasoned equity offering
X_i	Vector of i explanatory variables

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They have been a source of community, strength, and support throughout all of my graduate

studies. Finally, and most importantly, I offer thanks to my God. To him be all the glory, honor,

and praise.

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CHAPTER 1

INTRODUCTION

This dissertation consists of three essays exploring specific factors that distort the decision to time corporate decisions with company stock prices. It is commonly held that companies ideally wish to repurchase company stock during periods of stock price undervaluation. By timing their repurchases in such a matter they are able to invest in themselves at a cheaper price and also potentially increase their earnings per share more economically. In addition to timing stock repurchases, companies are also able to time their stock offerings. Seasoned equity offerings, commonly referred to as SEOs, are often timed alongside periods of high stock prices. By timing SEOs alongside high stock prices managers are able to raise a greater level of capital for each additional share sold than they otherwise could should they not time the market. The research in this dissertation seeks to offer explanations for previous observations that managers are generally poor at timing the market. Additionally, I suggest factors that explain which managers are more prone towards market timing than others.

The first essay studies the impact of activist hedge fund investors upon the time of corporate stock repurchases. Activist hedge funds purposefully invest large amounts of capital in a particular company in order to have a significant enough voting presence that they can change corporate strategies. The ultimate goal of such tactics is that by changing corporate inefficiencies or by suggesting new corporate strategies, the hedge funds hope to increase the company stock price in such a way that they make a profit on their initial investment. One of the most popular activist hedge fund requests is that companies increase their cash distributions by increasing their stock repurchases. Such pressure from external investors should naturally distort management's

attempt to time repurchases alongside periods of stock price undervaluation. I find that this is indeed what happens. A regression analysis suggests that after being targeting by activist hedge funds there is a general increase in average quarterly repurchase size, and in some cases these companies also repurchase more often. Additionally, I find that there is a marked difference in repurchase quality, how well the repurchases are timed with low stock prices, after being targeted. Activist targets repurchase their shares at a price that is above both the average and median within-quarter price and at prices that are significantly higher than future stock prices. Interestingly though, cumulative abnormal returns following the repurchase announcements are high for activist-targeted firms than non-targeted firm, thereby suggesting that investors positively receive the announcement despite the fact that the repurchase will likely be poorly timed. Overall, this essay expands upon the impacts activist hedge funds have upon corporate decisions and offers an explanation for why many companies seem to repurchase poorly.

In the second essay I again focus on the timing of stock repurchases and offer another explanation as to why firms seemingly repurchase poorly: overconfident managers. Managerial overconfidence is the observation that some managers seemingly overestimate their ability to positively influence future stock prices. These managers are more likely to view stock prices as too low because they perceive investors as uninformed regarding the manager's ability and as such do not value the company highly enough. This systematic pricing bias should affect stock repurchases. If the manager believes the stock price is too low he or she should also be more prone to repurchase stock because the manager observes potential market timing signals more frequently, even when the stock price is in fact not undervalued. The second essay's results suggest this is true. I classify managers as either overconfident or moderately confident based upon their insider stock investment patterns and then compare average quarterly stock repurchase

prices to a variety of stock price benchmarks occurring in non-repurchase quarters. I find that moderately confident managers repurchase at lower prices than overconfident managers and at prices that are closer to the quarterly low stock price. Additionally, I analyze bid-ask spreads and show that spreads significantly increase during moderately confident repurchase periods and significantly decrease for overconfident repurchasing periods. Consistent with the information-asymmetry and market timing of repurchases hypotheses I conclude that moderately confident repurchases are informed attempts to time the market, while overconfident repurchases are made for other reasons.

Finally, my third essay focuses on the timing of seasoned equity offerings, more popularly referred to as SEOs. If managerial overconfidence biases managers toward believe stock prices are systematically too low then they should also be biased against issuing equity simply due to market timing signals. If a successfully timed SEO is one issued during a period of temporary overvaluation and overconfident managers rarely believe the stock price is overvalued then one could hypothesize that overconfident managers would prefer not to issue equity and would rarely do so. My third essay suggests otherwise: overconfident managers are not generally less likely to offer SEOs but rather they are less likely to time their SEOs alongside high stock prices. The difference is subtle yet important. My results suggest that overconfident managers are no less likely to rely on equity to fund potential investment projects when additional capital is needed, but are less likely to issue additional equity simply as a means to capture temporary high stock prices. Additionally, I find that SEO announcements made by overconfident managers are immediately followed by positive cumulative abnormal returns and that these positive returns remain for the following two quarters after the offer.

CHAPTER 2

HEDGE FUND ACTIVISTS AND SHARE REPURCHASES

2.1   Introduction

Recent literature surrounding activist investing has stirred some controversy regarding

whether or not activist investors improve firm value. For example, on the one hand, Brav, Jian,

Partnoy, Thomas (2008) find that hedge fund activists attain success or partial success in two-

thirds of their attempts and the average abnormal return post activism approximately 7% with no

subsequent revearsal. Similarly, Bebchuck, Brav, Jian (2013) find no long-run decreases in

operating performance and no reversal in short-term abnormal stock price increases. On the other

hand Greenwood and Schor (2009) suggest that only in cases where the targeted firm is

eventually taken over and acquired do activists actually improve the firm. Klein and Zur (2011)

argue that hedge fund activism significantly reduces bondholders' wealth by over 8% following

the initial activist SEC 13D filing and suggest expropriation of wealth from bondholders to

shareholders. Despite the general conflict one result is consistently agreed upon – activists tend

to target firms who have large cash holdings and smaller than average cash payout. In-depth

analysis describing the repurchasing behavior of firms targeted by activist hedge funds, however,

remains scarce. Using accurate actual repurchase data acquired after 2004, this paper analyzes

the repurchasing behavior of firms targeted by activist hedge funds and suggests another

determinant for why firms repurchase stock: to appease large-scale activist investors.[1] Increased institutional investor holdings should correlate with increased investor information, and as these informed trades drive the stock price to converge to its actual value and decreasing any undervaluation probability. Consequently, to the extent market undervaluation affects repurchase propensity, one would expect fewer repurchases. I find that despite an increase of at least 5% in institutional ownership repurchase propensity increases significantly and average quarterly repurchase size increases by approximately 4.51 million shares. Firms are repurchasing more shares, more often, after being targeted by hedge fund activists.

Consistent with previous hedge-fund activist literature I find an overall increase in company stock price ex-post. Additionally, in comparison to non-targeted firms, I find that activist-targeted firms repurchase at higher prices than non-targeted firms in comparison to average quarterly stock prices (95 basis points, statistically significant at the 1% level). This trend holds if I compare repurchases prices to median quarterly stock prices and the quarterly low stock price. On the whole, these results suggest that firms facing increased repurchasing pressure are likely less concerned with market timing factors and time their repurchases relatively poorly.

Repurchase price analysis further suggests that repurchase performance post targeting decreases. In comparison to control firms, activist-targeted firms repurchase at a price that is 3.18% higher than the average daily stock price in the quarter following the repurchase.

Cumulative abnormal return (CARs) around repurchase announcements exhibit significantly different market reactions to open-market repurchase plans announced by activist-targeted firms compared to non-targeted firms. Though both firm types see significant abnormal returns in the five days following a repurchase announcement, activist-targeted firms have CARs

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[1] See Dittmar 2000 for a thorough analysis regarding other repurchase determinants.

that are 147 basis points higher. This is not necessarily unexpected given that one of the major reasons given for activist targeting is that cash payout is too low, and the market should react more strongly to an announcement by these firms.

This is not the first paper to investigate how hedge-fund activists affect corporate policy (Brav, 2008); however, this paper is the most in-depth repurchase investigation and is the first to analyze OMR timing and performance. This paper is the first to analyze activist repurchasing behavior using accurate share repurchase data reported in company 10Q/10K filings as mandated by the SEC.

I analyze the open market repurchase executions (instead of announcements) of 535 firms (16,185 firm-quarter observations) that have been identified as being targeted by an activist hedge fund. Hedge fund activists are required by the SEC to fill out a 13D form upon purchasing more than 5% of a firm's outstanding shares[2]. The 13D Form requires that activist firms provide various transaction details including "The purpose of the transaction" and the date the transaction occurred. Activists must file this information within 10 days of the initial transaction. By using the 13D filing date I am able to create a relatively small event window surrounding the activism event and can confidently evaluate repurchasing behavior both before and after targeting.

The repurchase analysis within this paper is based upon work done by De Cesari et al. (2012). In their paper they analyze a randomly selected set of firms and their repurchasing behavior between February 2004 and July 2006. Their study's purpose is twofold: to analyze whether or not firms execute OMRs when the firm is relatively undervalued and whether or not institutional ownership determines when and how profitable the repurchases are. The differences between our papers however are significant. Firstly, to date, no paper has specifically looked at the repurchase timing of firms targeted by activist investors. While De Cesari et al. gauge

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[2] Section 12 of the Securities Exchange Act of 1934

investor information levels using general institutional investor holdings, I focus specifically on activist attempts. I argue that, by not only investing in the firm, but also actively pushing for changes in corporate structure, activist hedge funds are more informed traders than the general institutional trader. Secondly, by using Compustat quarterly data I am able to create a longer and broader repurchase time-series than De Cesari and analyze the majority of activist attempts occurring between 2006 and 2011. Finally, by focusing on hedge funds I am able to focus on relatively unregulated institutional investors and consequently I am able to avoid some of the selection bias that may arise from institutional investor regulation.

The remainder of this paper is organized as follows. Section II describes the most recent literature on hedge fund activist investing and corporate share repurchases and sets up my hypotheses. Section III describes both the hedge fund activist investment sample and the open market share repurchase sample and defines all variables used. Section IV provides descriptive statistics and results. Section V concludes.

2.2   Previous Literature

2.2.1 Hedge Fund Activism:

The notion that institutional investors can improve firm value by purchasing large stock holdings and pressuring management to change corporate policy is not new (e.g. see Gillan & Stark, 2007). However, shareholder activist investing analysis using traditional institutional investors (e.g. mutual funds and pension plan managers) has varied results and conflicting conclusions due to the numerous regulatory and structural barriers accompanying those institutions (Black (1990)). By focusing attention upon hedge funds, researchers have largely avoided these difficulties and hedge fund activist investing continues to be a popular research

area.[3] Recent results can be broken down into those answering one, or both, of two general questions: 1.) Who do hedge fund activists target? 2.) How do activists affect the targeted company?

Across all studies it is generally agreed upon that hedge fund activists tend to focus upon smaller, relatively successful companies that consistently have large cash holdings and small growth opportunities (Klein and Zur (2009), Greenwoord and Schor (2009), Clifford (2008) Brav et al. 2008, Boyson and Mooradian 2007, Brav et al. 2008). These "value" companies tend to be more highly leveraged and are also cheaper. They have higher institutional ownership and analyst coverage, and greater market liquidity. Most recently, Gantchev and Jotikasthira (2013) show that increased sales by non-activist institutional investors needing liquidity significantly increase the probability that a firm will be targeted by a hedge fund activist. The majority of activists explicitly state that the target is undervalued and they plan on improving firm value. My repurchase analysis should naturally follow because the factors that affect targeting propensity also affect repurchase behavior (discussed further below).

Disagreements regarding whether or not activists actually benefit the firm and its shareholders have caused hedge fund activism to become a rather controversial subject over the last few years. Most researchers argue that the activists improve firm value. Boyson and Mooradian (2007) suggest that hedge fund activists improve both target "short-term and long-term operating performance," especially when activists seek to reduce cash holdings and make corporate governance changes. Brav, Jian, Partnoy, and Thomas (2008a, 2008b), henceforth BJPT, suggest that activist investment improves firm value by up to 7% in the short-term with no reversal over the following year. Klein and Zur (2009) show that activism attempts, including

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[3] See Brav, Jian, and Kim (2012) or Schneider and Ryan (2011) for a thorough discussion of hedge fund activist investing theory and recent publications.

those not pursued by hedge funds, tend to improve firm value, though hedge fund activists more frequently pursue increasing corporate payouts while non-hedge funds more often tend to demand changes in operating strategies such R&D levels and capital expenditure. This paper looks only at hedge fund activists and their effect on repurchase policy. Boyson and Mooradian (2012) suggest that target improvement is greater for targets of experienced activist hedge funds versus those targeted by lesser experienced hedge funds. Recent accounting literature suggest that prior to their targeting, firms exhibit relatively lower corporate tax avoidance and that after being targeted these firms exhibited greater savings when targeted by hedge funds experienced in improving corporate tax avoidance during previous activist attempts (Chen, Huang, Li, and Stanfield (2012)). Jian, Li, and Wang (2012) show that hedge funds are highly prevalent in the chapter 11 bankruptcy procedure and that chapter 11 firms can much more successfully survive bankruptcy when supported by an activist hedge fund.

On the contrary, Greenwood and Schor (2009) find that high abnormal returns appear only if the targeting hedge fund acquires the firm ex-post and that those firms who remain independent for at least a year show abnormal returns that are not significantly different from zero. Furthermore, they suggest the eventual corporate takeover increases stock price, not long-term corporate governance changes. Klein and Zur (2011) find that activist attempts benefit shareholders while costing existing bondholders. They document that around the initial 13D filing the average excess bond return is -3.9% with an additional -4.5% occurring over the remaining year.

In response to suggestions that activist attempts are short-sighted and myopic, Bebchuck, Brav, and Jiang (2013) find no evidence of long-run abnormal return reversal post activist attempts.[4] Katelouzou (2013) shows similar results for international hedge fund activists.

While it is documented that total firm payout increases after being targeted by an activist hedge fund, no research has focused specifically on share repurchases timing. A thorough literature search found no paper linking specific repurchase determinants to activist-targeted firms, nor any that analyzes how repurchases made by activist-targeted firms may differ from those having not been targeted.

2.2.2 Corporate Share Repurchases:

The question of whether or not market underpricings affect share repurchases has received considerable attention over the past decade. The most popularly cited papers include Cook, Krigman, and Leach (2004), McNally, Smith and Barnes (2006), Ikenberry, Lakonishok, and Vermaelen (2000), Brockman and Chung (2001), De Cesari, Espenlaub, Khurshed, and Simkovic (2012), Bonaimé and Ryngaert (2013), Ben-Rephael, Oded, and Wohl (2013).

Using voluntarily disclosed repurchase data, Cook et al. were able to analyze highly accurate actual repurchase data and found that firms repurchase at market prices below the average market price. In particular they note that NYSE firms do a good job at repurchasing below average prices while NASDAQ firms do not. They also analyze and report that firm repurchases correlate with narrower bid-ask spreads and conclude that repurchases contribute to market liquidity. McNally et al. show that Canadian firms repurchase significantly below average market prices (up to 5.5% lower). Ikenberry et al. also analyze the repurchase behavior of Canadian firms and suggest that Canadian firms largely repurchase according to stock price undervaluation and that those who do experience higher post-announcement abnormal returns

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[4] e.g. Bratton and Wachter (2010) and Fox and Lorsch (2012)

following a repurchase announcement and tend to have higher program completion rates. In

contrast to Cook, Krigman, and Leach (2004), Brockman and Chung (2001) use actual

repurchase data as reported to the Stock Exchange of Hong Kong and report that, though

managers tend to time their repurchases well, the repurchases increase investor information-

asymmetry and lead to wider bid-ask spreads and increased liquidity costs. De Cesari et al.

analyze post-SEC regulation monthly repurchases to determine whether or not firms execute

open-market repurchases at relatively low stock prices. They also analyze institutional investor

holdings as reported in SEC 13F filings to see if institutional ownership affects a firm's

propensity to repurchase stock and firm repurchase profitability. Ultimately they conclude that

firms repurchase at relatively low prices, saving them on average 0.25% of the company's

market capitalization, and that institutional ownership reduces the gains from company open-

market repurchases. Bonaimé and Ryngaert (2013) analyze whether or not corporate insiders

trade personal company stock in the same direction as company repurchases. They conclude that

while insider trading occurs more frequently when firms are repurchasing non-trivial stock

amounts, firm repurchases occur most frequently when insiders are selling stock. This suggests

that firm repurchases may not necessarily be an attempt to take advantage of temporary market

mispricings but might also be a way for firms to support stock prices and avoid price dilution.

Ben-Rephael, Oded, and Wohl (2013) use monthly actual repurchase data and offer more

evidence that firms repurchase stock at a price below average market prices and that this

discount is negatively related to firm size and positively related to market-to-book ratio.

Other recent publications not directly aimed at market timing effects have shed further

light on the nature of share repurchases (Chan, Ikenberry, Lee, and Wang (2010), Bonaime

(2012) and Chen and Wang, (2012). Chan et al. (2010) focus on repurchase announcements and

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whether or not open-market repurchase announcements, which do not require a firm to repurchase all shares announced, are used by managers as a way to mislead investors. They find that, though theory might suggest otherwise, few managers use repurchase announcements to mislead investors, and that doing so yields no long-run economic benefits. In a similar study, Bonaime (2012) analyzes the completion rate of announced repurchase plans and finds that those firms who complete prior repurchase plans tend to have higher post-announcement market returns, implying that a reputational effect might exist. Finally, Chen and Wang (2012) analyze the impact financial constraints impose upon repurchasing firms and find that those firms who repurchase while financially constrained have poorer post-buyback abnormal returns and operating performance than firms repurchasing while less financially constrained.

Since targeted firms typically repurchase less often prior to being targeted, and the activists often pressure the firm to increase payouts, this analysis shines light on the impact institutional investors have upon corporate share repurchases. Furthermore, since it has been proposed in earlier literature (e.g. Dittmar, 2000) that firms might repurchase to thwart takeover attempts, analyzing repurchase behavior prior to activist attempts, especially hostile attempts and those aimed at the target's eventual takeover, can shed light on whether or not firms repurchase stock to thwart outside investor impact upon the firm. Finally, with much controversy surrounding the idea of whether or not activist investing improves long-term firm performance, by analyzing market reactions to buyback plans announced post-activist attempt I am able to gauge the market's reaction to the firm's increased payout policy and offer further clarity on whether or not activist attempts benefit the target.

2.2.3 Hypothesis Development:

It has been shown that a variety of determinants affect whether or not a firm repurchases stock – the ultimate goal of this paper is to extend these results and provide evidence that suggests that the presence of an activist investor influencing management significantly affects corporate repurchase policy. As stated above, a large body of literature suggests that activists wish to increase cash payout. This increase can occur either of three ways – an increase in general repurchase size, through more numerous repurchases, or a combination of the two. If activist-targeted firms simply have large cash surpluses but are no more profitable in general than non-targeted firm one would expect a large initial share repurchase with fewer or smaller future repurchases. Alternatively, if activist-targeted firms earn more cash in general than non-targeted firms one would expect more numerous repurchases following activism. Finally, and perhaps most likely given prior studies described above, activist-targeted firms have a greater cash surplus on hand *and* are more profitable in general. Consequently, one would expect larger repurchases that occur more often than non-targeted firm. A combination of the following two hypotheses can account for each scenario:

H1: Activist-targeted firms target firms with higher initial cash holdings and as such the average quarterly repurchase size is greater than non-targeted firms.

H2: Activist-targeted firms target firms that have higher cash flow than non-targeted firms and as such the propensity to repurchase is greater.

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The general consensus among researchers today is that OMRs are used during periods of seeming market undervaluation. If a firm repurchased stock strictly due to stock undervaluation, increased market undervaluation periods should correlate with increased repurchases. However, according to De Cesari et al. a more informed investor population should decrease the probability of market undervaluation and firms wishing to time the market should repurchase less often. From this, it follows that if targeted firms increase payouts despite increased institutional investor holdings then market timing plays less of a determining role in the repurchase decision. Hypothesis 3 is as follows:

> **H3**: Pressure from the hedge fund activist to repurchase stock encourages the targeted firm to repurchase at prices that are closer to, or indeed greater than, the underlying stock's fundamental value. As such market timing theories play less of a determining role in the targeted firm's repurchase decision.

The driving force behind the market timing repurchase theory is that firms hoping to benefit from the eventual price correction look to repurchase stock during undervaluation periods. It should be clear that the higher the repurchase price, the smaller the probability of an undervaluation and greater the probability that the firm repurchases at a price that is too high. If hedge fund activists encourage companies to repurchase at higher and higher stock prices it is natural to hypothesize that these repurchases could have been made at a lower price allowing them to benefit more by any subsequent price increase. Formally, hypothesis 4 is as follows:

H4: Pressure from the hedge fund activist to repurchase stock encourages the targeted firm to repurchase at higher prices and thereby resulting in less optimal repurchases.

Hedge funds often target a particular company because its cash payout is too small. It is then reasonable to expect that any sort of additional cash payout will be welcomed by the market, especially for activist-targeted firms. If the activist-targeted firms pay out too little, and the market recognizes this, one should expect higher abnormal returns following a repurchase announcement from an activist-targeted firm. Formally, hypothesis 5 is as follows:

H5: OMR plan announcements should be followed by abnormally high returns compared to their non-targeted peers.

2.3   Data and Methodology

The data used in this paper results from the merging of two primary datasets: A large hand-collected data set comprised of hedge fund activist events from 1994 – 2011 and the set of quarterly actual repurchases from 2004-2012 as taken from Standard and Poor's Compustat. I thank Dr. Alon Brav and his research team for allowing me the use of his hedge fund activist dataset and briefly describe their data collection process below.[5] In regard to the repurchasing data, I provide much greater detail regarding the collection process and how it differs from other prevailing collection methods. All quarterly financial data is taken from Standard and Poor's Compustat and all stock information, including price, shares outstanding, and trade volume are taken from CRSP.

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[5] See BJPT (2008) for a detailed overview of the data collection process.

2.3.1 Hedge Fund Activism Dataset

Due to the absence of any centralized activist hedge fund dataset BJPT (2008) hand-collected an initial hedge fund activist dataset based largely on Schedule 13D filings, a mandatory filing requirement resulting from the 1934 Exchange Act. All firms acquiring more than 5% of a public firm's securities (any class) are required by law to file this document with the SEC no later than 10 days after the acquisition. Of particular importance to researchers is the fact that the 13D filings require acquiring investors to explain why the investor acquired the securities, particularly if the investor's intentions include future mergers and acquisition activity, liquidation of the firm's assets, change to corporate capital structure or dividend policy, and other general corporate changes. By analyzing the Schedule 13D and other outside news sources (e.g. Factiva), BJPT have compiled a dataset of hedge fund activist attempts over the years 1994-2011. This dataset includes basic identifier data include Compustat GVKEY, CRSP PERMNO, Cusip, and fund and company name for both the targeting hedge funds and the targeted corporations. From the Schedule 13Ds and Factiva searches BJPT gather important information including the date of the first activist attempt, the date the firm ends its activist position, the various goals activists seek to achieve and the tactics they use to achieve them. The most popular method to achieve stated goals is "the hedge fund intends to communicate with the board/management on a regular basis with the goal of enhancing shareholder value." Hedge fund activist methods can be highly aggressive, or hostile, to firm management. A hostile activist attempt is defined as an attempt where the activist intends, or threatens, the firm with a proxy vote, potential takeover, or legal action (sue).

The initial activist dataset has 2685 activist attempts focusing on 1139 targets (some firms are targeted by multiple hedge funds). In order to accurately gauge the repurchase behavior

of firms before being targeted I require two years of repurchase history before being targeted. As such, only firms being targeted after January 1st, 2006 are included as activist firms. Those firms who are targeted before 2006 are still included in the sample, but not flagged as activist targeted firms – this should bias the paper against finding a significant difference between the two groups. Table 2.1 provides descriptive statistics.

2.3.2 Repurchase Dataset

Researchers investigating actual corporate share repurchases have to overcome two large difficulties: pre-2004 repurchase proxies taken from non-SEC sources have been shown to be inaccurate and biased, and the newer repurchase proxies compiled from SEC filings require large time and effort to collect. As such newer datasets are generally limited to a small subset of firms over a short time frame.

Using Compustat's PRCRAQ quarterly repurchase proxy allows me to analyze a longer time-series of stock repurchases over a greater firm cross-section. This measure is populated only after 2004 and is based upon SEC quarterly filings. PRCRAQ does not differentiate between repurchase types and as such non-OMR repurchases may be included. I require a firm to purchase at least .01% of its quarterly shares outstanding in order for that quarter to be classified as a repurchase quarter. To further test the data's accuracy I compare the Compustat PRCRAQ measure to a sample of hand-collected monthly repurchase data taken directly from SEC 10-Q and 10-K filings and find the Compustat measure to be highly accurate.

Ultimately my sample consists of the entire Compustat universe existing after January 1st, 2004 until December 31st, 2013 not including firms in the financial or utilities industries (3-digit SIC codes 600-699 and 400-499) and those firms where CRSP data is not available. In total my sample consists of 97, 460 firm-quarter observations, consisting of activist targeted repurchase

quarters, activist non-targeted repurchase quarters, non-targeted repurchase quarters and non-targeted non-repurchase quarters.

2.3.3 Methodology

To test my hypotheses, I run the following regression model over my entire sample.

$$Y_i = \alpha + \beta_1 ActAfter + \sum_{i=1}^{n} \beta_i X_i + \varepsilon_i$$

where Y_i is a vector of repurchase measures including: *REP,* defined as either 0 or 1 based on whether or not the firms repurchases stock in the specified quarter of interest, respectively, *REPSIZE,* defined as the size of the quarterly number of shares repurchased (millions), *PEAVG,* defined as the difference between the average quarterly repurchase price and the within-quarter average daily stock price as a percent of the within-quarter average daily stock price, *REP-NONREP,* defined as the difference between the average quarterly repurchase price across all repurchase quarters and the within-quarter average daily stock price during non-repurchase quarters as a percent of the non-repurchase within-quarter average daily stock price, and *PROFIT,* defined as the rate of return of buying shares at the average quarterly repurchase price and selling the shares at the within-quarter average daily stock price in the quarter following the repurchase. *ACTAFTER* is a dummy variable that receives a 1 if the observed firm-quarter is one where the firm has been targeted by an activist and occurs on or after the targeting quarter. It receives a 0 elsewise. This is the main variable of interest when comparing firms targeted by activist hedge fund to those that have not been. X_i is a vector of control variables including: *FSIZE*, which is the natural logarithm of quarterly firm total assets, *DTOA*, the firm's quarterly debt to asset ratio, defined as the natural logarithm of quarterly firm total liabilities divided by

total assets, *MTOB* defined as firm quarterly market capitalization divided by firm stockholder's equity net any preferred stock, *STDPRC* (*STDPRCL1)*, defined as the standard deviation (lagged) of within-quarter daily stock price, *CSHOPQL1*, defined as the number of shares repurchased in the previous quarter, *ACTDIVYIELD*, defined as an interaction variable between *ACTAFTER* and *DIVYIELD*, the ratio of common dividends per share to price per share, *CRISIS*, a dummy variable populated with a 1 if the firm quarter occurred during the financial crisis (defined as either 2007 or 2008) and with a 0 otherwise, and *MNHBAS*, defined as the within-quarter average daily half bid-ask spread.

2.4   Results

I now turn to the question of whether or not hedge fund activist-targeted firms see a marked rise in OMRs post-activism. I begin by analyzing the propensity to repurchase stock after being targeted by a hedge fund activist investor. Table 2.2 provides probit regression analysis regarding the decision to repurchase. Within the model, the dependent variable *REP* takes on the value of 1 if the firm makes a repurchase during the quarter and 0 otherwise. The variable of greatest interest is *ACT_AFTER* which describes activist-targeted firm quarters. Looking only at the univariate results (column 1), Table 2.2 suggests that activist-targeted firms repurchased less often than their peers before being targeted (a coefficient of -0.18 significant at the 1% level) and that this significantly reverses after being targeted (a coefficient of 0.15 significant at the 5% level). This result is consistent with the idea that activist hedge funds strive to increase corporate payout. However, including control variables leads to no significant relationship between activist-targeted firms and their peers (column 3). As hypothesized it is possible that firms would only repurchase more often if they have higher cash flow in general. To the extent that smaller firms may not have systematically higher cash flow we would not

expect smaller firms targeted by activist investors to increase their propensity to repurchase, thereby driving my results. By splitting the sample into quintiles based on quarterly total company assets (columns 4-9) I can more clearly focus on the effect activism has on the repurchase decision. I find that only the largest firms (column 9) see an increased repurchase propensity (a coefficient of 0.35 significant at the 1% level.)

Table 2.3 analyses the average repurchase size by number of shares. It is likely that firms who already repurchase often but at smaller amounts will not see an increase in propensity to repurchase shares despite increasing total cash payout. Multivariate results (columns 3 and 4) suggest that post targeting firms increase their average quarterly repurchase size. Column 3 analyzes all firm quarter observations and suggests that hedge fund activism is correlated with an increase of 4.51 million shares repurchased during repurchase quarters. Column 4 removes all non-repurchase quarters thereby increasing the coefficient to 9.16, significant at the 1% level. Note that interacting *ACT_AFTER* with firm size yields a statistically significant and negative coefficient. This may help to explain the results appearing in Table 2.2 suggesting that the propensity to repurchase only increases in larger firms. The negative interaction term suggests that as activist-targeted firms increase in size they increase their quarterly repurchase size at a smaller rate, perhaps due to repurchasing more often. Interestingly, the coefficient associated with the average repurchase price, *PRCRAQ*, is positive. Whether or not this is a result of firms choosing to repurchase at higher prices or larger repurchase plans increasing market price is not clear. Tables 2.4 and 2.5 shed light on repurchase prices.

I now turn to the question, "How well do firms repurchase after being targeted by a hedge fund activist?" According to market timing theory, firms successfully timing the market make their repurchases during periods of firm undervaluation. Due to the fact that specific repurchase

dates are unavailable I do not analyze cumulative abnormal returns (CARs) surrounding an event date. Instead I compare the average quarterly repurchase price to various within-quarter price benchmarks and refer to this as how efficiently a firm repurchases its shares. The efficiency measure is the difference between the average quarterly repurchase price and the specific price benchmark reflected as a percent, similar to the *DIFF* measure used by Ben-Raphael, Oded, and Wohl (2013). The more efficiently a firm repurchases it stock the smaller the percent difference; a negative percent difference suggests that the firm repurchases at a price lower than the price benchmark and is desirable. Firms that successfully time the market necessarily must be efficient repurchasers. Table 2.4 provides regression results. Columns (1-3) use the average daily within-quarter closing price as the price benchmark. Column 3 suggests that the percent difference between the quarter's average repurchase price and the average daily stock price is 95 basis points (BPs) higher for activist-targeted firms compared to their non-targeted firms. Were activist-targeted firms more efficient repurchasers we would expect this coefficient to be negative. Columns 4-6 use the quarter's low stock price as the price benchmark. One could argue that this benchmark best reflects market timing propensity and repurchase efficiency because firms wishing to time the market should strive to make repurchases as close to the quarterly low price as possible. A perfectly efficient repurchaser should have an efficiency measure of 0 because an open market repurchase less than the lowest price is impossible. Column 6 suggests that activist-targeted firms repurchase as prices that are 1.55% higher than the quarterly low price and 1.55% higher than their non-targeted peers. Columns 7-9 use the median within-quarter daily stock price as the price benchmark and provides similar results. All columns suggests that larger firms repurchase at higher prices, consistent with the results of Oded et al.

Within-quarter market timing may not necessarily be repurchasers' predominant focus. That is to say repurchasers may not be overly worried about how well they repurchase compared to within-quarter stock prices but compared to future stock prices outside the quarter. I refer to this as outside-quarter repurchase timing. My timing measures are similar to the efficiency measures with one major difference: instead of focusing on within-quarter prices I focus on the prices in the following quarter. All other intuition is similar – firms wish to repurchase at prices that are substantially lower than the following quarter's price benchmarks. The more negative the timing measure, the better the repurchase. Table 2.5 analyzes outside-quarter repurchase timing using the average daily stock price and the low price for the quarter following the repurchase. Columns 1-3 use the average daily stock price for the following quarter as the price bench mark. Column 1 provides univariate results and suggests that activist-targeted firms repurchase at prices that are 2.77% higher than the average daily stock price in the following quarter compared to their non-targeted peers. This may seem surprising given previous results that hedge fund activism increases future stock prices. However, if we look specifically at the initial activism quarter the results differ. *QTR1STACT* is one if the repurchase quarter is the first quarter during which the activist-targeted the firm. The timing coefficient here is highly negative (-4.94 significant at the 95 level) and suggests that repurchases made during the activism quarter are made at prices significantly below the following quarter's stock price (a good repurchase).

It should be mentioned here that once a firm is targeted it is always considered a targeted firm whether or not the activist is still a substantial common stock holder. According to BJPT the majority of activist hedge funds held the required 5% stock necessary to be considered an activist at the sample's end. Accordingly there should be no significant difference in activism presence between the first quarter and the last quarter and the timing measures occurring further away

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from the initial activism date should better reflect activists' effect upon outside-quarter repurchase timing. Columns 4-6 use the following quarter's low stock price as the price benchmark. The results are similar in direction and magnitude (2.77% and 3.18% respectively), although the *QTR1STACT* coefficient is approximately double in size (-10.75 and -8.21 respectively). The following coefficients are omitted from display for brevity: *STDPRC, STDPRCL1, STDRET, AVGRETL1, STDRETL1, STDRETL2, MTOBL1,* and *CONSTANT.*

Despite the seemingly poor repurchase behavior that occurs after being targeted by an activist investor, a predominant motivation behind targeting a firm is to increase its cash payout. If firms are paying out too little and hedge fund activists correctly identify those firms then the initial repurchase announcements made by the firm post-targeting should excite the market and signal the eventual payout corrections. It is a natural expectation that CARs should be more positive following repurchase announcements made by targeted firms compared to their non-targeted peers. Table 2.6 computes CARs for the 1, 3, 5, 10, and 30 day(s) following the repurchase announcement date as reported by Thomson Reuters' SDC Platinum. Only repurchases flagged as open market repurchases are included within the sample. The Carhartt 4-factor model is utilized to compute abnormal returns. Panel A provides basic difference-in-means results. According to the table, CARs are higher for activist-targeted firms and that difference peaks 5 days after the announcement date with a difference of 1.46% significant at the 1% level. It is not surprising that the differences between the two firm classes lose statistical significance after day five because it is reasonable to assume that market reactions to repurchase announcements are likely to fade after five days and the event date becomes rather noisy. Panel B provides these results in a regression analysis setting. Results are similar in magnitude and significance.

2.5   Conclusion

My results demonstrate that hedge fund activists successfully increase corporate payout through open market repurchases. Regression analysis suggests that firms tend to repurchase more often after activist targeting and that as firm size increases corporate payout increases result more from repurchasing more often and less from repurchasing larger amounts each quarter. Smaller firms repurchase larger amounts each quarter and see no marked increase in repurchase propensity.

Traditional repurchase theory suggests that many repurchases are a result of trying to time the market with seeming stock price undervaluation. I find that the increased repurchase behavior occurring after being targeted by hedge fund activists is less consistent with market timing theory. These repurchases are made at prices that are significantly higher than the within-quarter low stock price and higher than the within-quarter average stock price. Despite the general increase in stock price occurring after hedge fund activism I find that only those repurchases in the initial activism quarter are profitable, and that repurchases made after the first quarter are bought at prices significantly higher than the following quarters low and average stock price.

Finally, repurchase announcement analysis suggests that despite the eventual inefficient repurchases, repurchases made by activist-targeted firms are better received by the market. CARs following an OMR announcement by an activist-targeted firm are roughly 1.5% higher than those following a non-targeted announcement during the five days following the announcement. Such results are not necessarily surprising given the activist likely believe cash payouts are too small.

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Table 2.1: Company Summary Statistics – Quarterly

This table presents quarterly summary statistics on various corporate accounting descriptors including the number of quarterly shares repurchased and the average repurchase price. Columns (1)-(5) focus on the quarters occurring after a firm has been targeted by a hedge fund activist. Only targeted firms appear in this sample. Columns (6)-(10) focus on quarters occurring either before an activist targeting or on quarters where no activist attempt has been made. Column (11) tests the difference in means. All accounting data has been taken off Standard & Poor's Compustat and stock price data was gathered from Center for Research in Security Prices (CRSP).

Summary Statistics	Non-Targeted Firms					Targeted Firms					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
VARIABLES	N	Mean	Std. Dev.	Min	Max	N	Mean	Std. Dev.	Min	Max	t-score
Total Assets	94,587	3,259	20,268	0.00	846,988	14,559	1,224	3,537	2.079	49,579	12.09***
Cash	94,583	369.3	2,211	-0.02	91,386	14,559	151.1	560.7	0.00	15,640	11.85***
Common Shares Repurchased	95,228	0.724	5.862	0.00	297.8	14,601	0.297	2.207	0.00	121.4	8.71***
Total Liabilities	94,533	2,005	15,938	0.00	719,808	14,550	737.6	2,225	0.14	33,227	9.57***
Net Income	94,436	45.51	436.7	-38,96	15,910	14,539	7.420	180.9	-13,85	7,699	10.37***
Average Repurchase Price	41,480	19.49	45.19	0.00	2,296	6,460	12.99	19.85	0.00	403.7	11.39***
Total Sales	94,477	756.9	3,790	-196.70	124,238	14,550	281.3	888.1	-827.40	21,288	15.07***
Market Cap.	70,685	3,773	17,760	0.00	626,550	11,059	1,135	3,637	0.86	60,438	15.56***
Average Stock Price	93,107	21.37	43.58	0.03	2,432	14,360	15.66	18.60	0.04	422.8	15.48***
Shares Outstanding	93,686	110,126	446,790	12.52	1.088e+07	14,436	57,033	141,670	765.00	2.491e+06	4.16***
Firm Age (Quarters)	95,228	248.0	191.9	0.00	1,044	14,601	247.8	191.1	5.00	1,044	0.10

Table 2.2: Propensity to repurchase

This table presents probit regressions of repurchases on various company descriptors. A repurchasing quarter is defined as any quarter appearing in the sample where Compustat's *CSHOPQ* variable is greater than zero. *ACT_DUMMY* equals one if the quarter occurs before activist targeting. *ACT_AFTER* equals one if the quarter occurs after the firm is targeted. *FSIZE* is the natural log of a firm's total assets. *DTOA* is the company's total debt divided by total assets. *CASH* is the natural log of a company's total cash. *MTOB* is the company's market capitalization divided by the value of common equity. *DIVYIELD* is the company's quarterly dividend divided by the closing quarterly stock price. *STDPRC* is the standard deviation of daily closing stock prices within a quarter. *STDRET* is the standard deviation of daily buy and hold return. *2007 (2008)* equals one if the quarter occurs during 2007 (2008). Columns (4)-(8) split the sample into firm size quintiles. All variables are winsorized at the 1st and 99th percentiles. Regressions include industry fixed-effects and time fixed effects. Standard errors (in parentheses) are clustered by firm.

				Firm Size Quintiles				
				1st	2nd	3rd	4th	5th
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
ACT_DUMMY	-0.18***		-0.04	0.01	0.02	0.05	-0.14	-0.18
	(0.055)		(0.056)	(0.195)	(0.131)	(0.106)	(0.113)	(0.130)
ACT_AFTER	0.15**		0.07	-0.13	0.11	0.06	-0.04	0.36***
	(0.058)		(0.061)	(0.256)	(0.136)	(0.116)	(0.127)	(0.132)
FSIZE		0.31***	0.28***					
		(0.015)	(0.015)					
CASH		0.04***	0.05***	0.11***	0.05*	0.06***	0.07***	0.16***
		(0.011)	(0.011)	(0.034)	(0.026)	(0.022)	(0.021)	(0.021)
DTOA		-0.12***	-0.13***	-0.00	-0.13***	0.05	-0.12**	-0.22**
		(0.024)	(0.023)	(0.061)	(0.044)	(0.042)	(0.052)	(0.093)
DIVYIELD		0.47***	0.35*	-0.09	0.66	0.73	-0.17	-0.07
		(0.184)	(0.185)	(0.210)	(0.427)	(0.749)	(1.211)	(0.768)
MTOB		0.01***	0.01***	-0.02*	-0.01	-0.01	0.01*	0.01*
		(0.002)	(0.002)	(0.012)	(0.007)	(0.006)	(0.005)	(0.006)
STDPRC			-0.00	-0.14***	-0.08***	-0.05***	-0.01	-0.01***
			(0.003)	(0.041)	(0.024)	(0.017)	(0.009)	(0.005)
AVGPRC				0.06***	0.02***	0.01***		0.00
				(0.010)	(0.005)	(0.003)		(0.001)
2007 DUMMY	-0.26***	-0.16***	0.41***	0.32***	0.29***	0.45***	0.46***	0.55***
	(0.028)	(0.032)	(0.030)	(0.115)	(0.079)	(0.071)	(0.068)	(0.061)
2008 DUMMY	-0.15***	-0.04	0.53***	0.74***	0.70***	0.78***	0.51***	0.49***
	(0.028)	(0.031)	(0.032)	(0.114)	(0.080)	(0.074)	(0.070)	(0.063)
Constant	-0.12***	-3.40***	-3.87***	-4.72***	-3.58***	-2.08***	-2.54***	-5.19***
	(0.024)	(0.167)	(0.164)	(0.673)	(0.460)	(0.401)	(0.422)	(0.384)
Observations	92,920	92,582	92,062	13,642	15,893	16,893	17,555	18,982

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

Table 2.3: Quarterly repurchase size

This table regresses repurchase size on various company descriptors. A repurchase quarter is any sample quarter where Compustat's *CSHOPQ* variable is greater than zero. *ACT_DUMMY* equals one if the quarter occurs before activist targeting. *ACT_AFTER* equals one if the quarter occurs after the firm is targeted. *FSIZE* is the natural log of a firm's total assets. *DTOA* is the company's total debt divided by total assets. *CASH* is the natural log of a company's total cash. *MTOB* is the company's market capitalization divided by the value of common equity. PRCRAQ is the quarter's average repurchase price. *DIVYIELD* is the company's quarterly dividend divided by the closing quarterly stock price. *MNHBAS* is the mean half bid-ask spread represented as a percentage. *STDPRC(L1)* is the standard deviation (lagged) of daily closing stock prices within a quarter. *STDRET* is the standard deviation of daily buy and hold return. *2007 (2008)* equals one if the quarter occurs during 2007 (2008). Column (4) excludes all quarters with zero repurchases. All variables are winsorized at the 1st and 99th percentiles. Regressions include industry fixed-effects and time fixed effects. Standard errors (in parentheses) are clustered by firm.

	(1)	(2)	(3)	(4)
ACT_AFTER	-0.97***		4.51***	9.16***
	(0.316)		(1.567)	(3.355)
FSIZE		1.71***	1.75***	2.99***
		(0.260)	(0.266)	(0.461)
ACT_AFTER * FSIZE			-0.80***	-1.44***
			(0.283)	(0.541)
CASH		0.31***	0.30***	0.64***
		(0.111)	(0.111)	(0.235)
DTOA		-0.88***	-0.87***	-1.41***
		(0.225)	(0.224)	(0.439)
DIVYIELD		1.84	1.71	8.52
		(2.111)	(2.115)	(6.425)
MTOB		0.08***	0.08***	0.08**
		(0.023)	(0.023)	(0.035)
PRCRAQ		0.01**	0.01**	-0.02*
		(0.004)	(0.004)	(0.008)
STDPRC		-0.16***	-0.17***	-0.01
		(0.052)	(0.052)	(0.034)
STDPRCL1		-0.10*	-0.10*	-0.05
		(0.059)	(0.059)	(0.030)
MNHBAS		283.40***	283.77***	575.55***
		(55.939)	(55.822)	(132.881)
2007_Dummy	2.76**	0.74***	0.72**	1.43***
	(1.393)	(0.280)	(0.280)	(0.494)
2008_Dummy	2.07	-0.07	-0.11	0.26
	(1.338)	(0.280)	(0.283)	(0.464)
Observations	39,975	38,794	38,794	19,462
R-squared	0.11	0.23	0.23	0.30

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

Table 2.4: Price Efficiency

This table regresses price efficiency on various company descriptors. Price efficiency is determined as the percent difference between the firm's average repurchase price (PRCRAQ) and the within-quarter stock price measure (average daily close, median daily close, quarterly low price). *ACT_AFTER* equals one if the quarter occurs after the firm is targeted. *FSIZE* is the natural log of a firm's total assets. *DTOA* is the company's total debt divided by total assets. *CASH* is the natural log of a company's total cash. *MTOB* is the company's market capitalization divided by the value of common equity. *STDPRC(L1)* is the standard deviation (lagged) of daily closing stock prices within a quarter. *STDRET* is the standard deviation of daily buy and hold return. *CSHOPQ(L1)* is the number of shares repurchased in the (prior) quarter. *MNHBAS* is the mean half bid-ask spread represented as a percentage. *2007 (2008)* equals one if the quarter occurs during 2007 (2008). Column (4) excludes all quarters with zero repurchases. All variables are winsorized at the 1st and 99th percentiles. Regressions include industry fixed-effects and time fixed effects. Standard errors (in parentheses) are clustered by firm.

	Average Quarterly Stock Price			Low Quarterly Stock Price			Median Quarterly Stock Price		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
ACT_AFTER	0.76***		0.95***	2.26***		1.55**	0.74**		1.11***
	(0.285)		(0.333)	(0.698)		(0.649)	(0.350)		(0.365)
FSIZE		0.34***	0.35***		0.44**	0.45**		0.34***	0.34***
		(0.105)	(0.105)		(0.196)	(0.196)		(0.114)	(0.114)
FLIFE		0.00*	0.00*		0.00	0.00		0.00*	0.00*
		(0.000)	(0.000)		(0.001)	(0.001)		(0.000)	(0.000)
CASH		-0.07	-0.06		-0.14	-0.13		-0.10	-0.09
		(0.076)	(0.075)		(0.162)	(0.162)		(0.085)	(0.085)
DTOA		0.47**	0.45**		1.77***	1.75***		0.60***	0.58***
		(0.182)	(0.182)		(0.466)	(0.466)		(0.214)	(0.213)
MTOB		-0.03**	-0.03**		-0.07**	-0.07**		-0.05***	-0.05***
		(0.016)	(0.016)		(0.030)	(0.030)		(0.016)	(0.016)
STDPRC		-0.31***	-0.31***		0.32**	0.32**		-0.24***	-0.24***
		(0.117)	(0.117)		(0.140)	(0.140)		(0.092)	(0.091)
STDPRCL1		0.15**	0.15**		-0.27***	-0.27***		0.09*	0.09*
		(0.059)	(0.059)		(0.076)	(0.075)		(0.047)	(0.048)
STDRET		0.23	0.23		8.13***	8.13***		1.02***	1.02***
		(.20)	(.20)		(0.99)	(0.99)		(.31)	(.31)
CSHOPQ		-0.00	-0.00		0.00	0.00		0.00	0.00
		(0.005)	(0.005)		(0.007)	(0.007)		(0.005)	(0.005)
CSHOPQL1		0.01*	0.01*		0.01*	0.01*		0.01*	0.01*
		(0.005)	(0.005)		(0.007)	(0.007)		(0.006)	(0.006)
MNHBAS		2.26***	2.28***		-2.79	-2.75		130.04*	132.66*
		(.81)	(.81)		(1.75)	(1.75)		(78.989)	(79.113)
2007 DUMMY	0.56**	0.73*	0.78**	0.90**	-0.75	-0.66	1.74*	1.14***	1.21***
	(0.233)	(0.384)	(0.384)	(0.402)	(0.583)	(0.583)	(0.921)	(0.436)	(0.436)
2008 DUMMY	1.57***	1.55***	1.64***	13.50***	-0.57	-0.42	1.90***	0.90*	1.01*
	(0.282)	(0.434)	(0.434)	(0.772)	(1.073)	(1.074)	(0.356)	(0.530)	(0.530)
Observations	19,925	14,902	14,902	19,925	14,902	14,902	19,925	14,902	14,902
R-squared	0.05	0.09	0.09	0.14	0.33	0.33	0.01	0.08	0.08

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

Table 2.5: Repurchases Profitability

This table regresses repurchase profitability on various company descriptors. Profitability is determined as the percent difference between the firm's average repurchase price (PRCRAQ) and the following quarter's stock price measure (average daily close, median daily close, quarterly low price). *ACT_DUMMY* equals one if the quarter occurs before activist targeting. *ACT_AFTER* equals one if the quarter occurs after the firm is targeted. *QTR1STACT* equals one if the quarter is the initial activism quarter. *FSIZE* is the natural log of a firm's total assets. *DTOA* is the company's total debt divided by total assets. *CASH* is the natural log of a company's total cash. *MTOB* is the company's (lagged) market capitalization divided by the value of common equity. *DIVYIELD* is the quarterly dividend paid divided the closing quarterly stock price. *MNHBAS* is the mean half bid-ask spread represented as a percentage. *2007 (2008)* equals one if the quarter occurs during 2007 (2008). Column (4) excludes all quarters with zero repurchases. All variables are winsorized at the 1st and 99th percentiles. Regressions include industry fixed-effects and time fixed effects. Standard errors (in parentheses) are clustered by firm.

	Average Price Profitibility			Low Price Profitibility			Median Price Profitibility		
	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
ACT_DUMMY	0.58		1.01	2.89**		2.48*	0.11		0.11
	(0.783)		(0.838)	(1.337)		(1.323)	(0.251)		(0.263)
ACT_AFTER	2.77***		3.18***	3.14*		3.89**	0.63**		0.89***
	(1.015)		(1.097)	(1.632)		(1.690)	(0.308)		(0.316)
QTR1STACT	-4.94**		-2.50	-10.75***		-8.21**	0.60		2.47**
	(2.499)		(2.970)	(3.459)		(3.906)	(1.011)		(1.127)
FSIZE		0.98***	1.03***		0.65	0.75		0.26***	0.27***
		(0.290)	(0.291)		(0.466)	(0.467)		(0.087)	(0.087)
DTOA		0.72	0.61		2.04**	1.85**		0.43***	0.41**
		(0.506)	(0.507)		(0.808)	(0.810)		(0.159)	(0.159)
CASH		-0.77***	-0.76***		-1.30***	-1.29***		-0.02	-0.02
		(0.236)	(0.233)		(0.379)	(0.375)		(0.066)	(0.066)
MTOB		-0.12***	-0.11***		-0.13*	-0.12		-0.05***	-0.04***
		(0.036)	(0.037)		(0.068)	(0.070)		(0.014)	(0.014)
DIVYIELD		72.15***	72.21***		111.36***	111.59***		10.69**	10.73**
		(18.519)	(18.519)		(34.368)	(34.524)		(4.711)	(4.676)
MNHBAS		277.03*	290.42**		116.81	139.64		161.81***	164.49***
		(144.397)	(144.211)		(244.846)	(243.582)		(59.121)	(59.296)
2007 DUMMY	8.83***	10.55***	10.77***	13.70***	15.58***	15.90***	0.85***	1.24***	1.28***
	(0.644)	(0.859)	(0.864)	(0.982)	(1.143)	(1.148)	(0.195)	(0.304)	(0.305)
2008 DUMMY	19.47***	20.49***	20.84***	41.40***	36.57***	37.04***	1.08***	1.21***	1.29***
	(0.774)	(0.991)	(0.999)	(1.317)	(1.482)	(1.485)	(0.224)	(0.332)	(0.333)
Observations	18,914	14,751	14,751	18,941	14,779	14,779	19,925	15,650	15,650
R-squared	0.17	0.19	0.19	0.22	0.25	0.26	0.05	0.07	0.07

Robust standard errors in parentheses

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

Table 2.6: Repurchase Announcements – CARs

This table presents the cumulative abnormal returns (CARs) occurring after a company announces its intent to initiate a repurchase plan. Theoretical returns are based upon the Carhartt 4-factor model using the 100 days before the event as the control sample. Event windows include the 1, 3, 5, 10, and 30 days following the repurchase announcement. Repurchase announcement dates are taken from Thomson Reuters' SDC Platinum. Only open market repurchase announcements made by U.S. firms are included. Activist targeted quarters are the quarters during and after a company has been targeted by a hedge fund. Non-Targeted quarters are the quarters where no hedge fund activist is involved. Panel A provide basic difference in means analysis. Panel B provides OLS regression results. All standard errors (in parentheses) are clustered by firm.

Panel A:

	Cumulative Abnormal Returns				
	1-day	3-day	5-day	10-day	30-day
Activist Targeted	3.06%	3.39%	3.91%	4.15%	5.33%
Non-Targeted	1.78%	2.19%	2.44%	2.85%	4.2%
Difference	1.28%***	1.2%***	1.47%***	1.3%*	1.13%

Panel B:

	(1)	(2)	(3)	(4)	(5)
	1 Day CARs	3 Day CARs	5 Day CARs	10 Day CARs	30 Day CARs
ACT_AFTER	0.013*	0.012*	0.015**	0.012	0.008
	(0.007)	(0.007)	(0.007)	(0.010)	(0.015)
FSIZE	-0.003***	-0.003***	-0.004***	-0.005***	-0.012***
	(0.001)	(0.001)	(0.001)	(0.002)	(0.003)
CASH	0.002***	0.002***	0.003***	0.003***	0.006***
	(0.000)	(0.001)	(0.001)	(0.001)	(0.001)
DIVYIELD	0.049	0.216***	0.180**	0.163	0.042
	(0.057)	(0.063)	(0.074)	(0.142)	(0.188)
MNHBAS	1.789**	2.698***	3.203**	2.735*	6.197*
	(0.781)	(1.000)	(1.346)	(1.656)	(3.351)
CRISIS DUMMY	0.004	0.008**	0.009**	0.011**	0.006
	(0.003)	(0.003)	(0.004)	(0.004)	(0.007)
Observations	3,190	3,191	3,191	3,185	3,153
R-squared	0.082	0.092	0.096	0.086	0.081

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

BEHAVIORAL BIASES AND OPEN MARKET REPURCHASES: DO OVERCONFIDENT MANAGERS REPURCHASE WELL?

3.1   Introduction

Decisions regarding how much cash (if any) a firm should give back to shareholders and whether or not that payment should be in the form of a cash dividend or a stock repurchase are highly important and can have important ramifications for firm value. Equally important is the decision regarding when to issue the cash distribution. In the case of stock repurchases, the preferred distribution method largely because of their higher flexibility, repurchasing when the stock is seemingly undervalued allows managers to distribute cash while allowing them to potentially increase their earnings per share and invest in themselves at a low price.[6] Conversely, firms who repurchase at prices that are too high are not spending their available cash as optimally as possible. While much literature exists suggesting that managers do attempt to time their purchases with price undervaluation, few papers analyze whether or not managers use their payout flexibility to repurchase at the *most* opportune times.[7] The most recent paper that analyzes payout flexibility, Bonaime et al (2013), claims that, in general, managers do a poor job of choosing when to repurchase stock. Their results suggests that managers tend to repurchase at prices that are too high, and propose that a simple payout plan that repurchases a set number of shares regularly outperforms the current repurchasing trends by almost 2%. Using their methodologies as a starting point, this paper incorporates known behavioral biases into the model

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[6] See Brav, Graham, Harvey, and Michaely 2005.
[7] Examples include: Stephens and Wiesbach (1998), Dittmar (2000), Brockman and Chung (2001) Ben-Rephael, Oded, and Wohl (2013)

and separates managers into differing managerial confidence types – moderately confident and overconfident. Many studies attribute significant bias to overconfidence and show large impacts upon corporate decision making and firm value including investment distortions (Malmendier & Tate, 2005a), increased managerial turnover (Campbell, Johnson, Rutherford, & Stanley, 2009), capital structure changes (Malmendier, Tate, & Yan, 2011), and increased merger and acquisition activity (Malmendier & Tate, 2008). I expand upon these findings by suggesting that biases arising from overconfidence also affect corporate payout policy and repurchasing behavior. Malmendier and Tate suggest that overconfident managers hold the personal belief that the market undervalues their ability to positively influence future firm value and as such these managers believe that the market systematically undervalues his or her firm. This skewed view regarding the proper firm valuation should naturally affect the repurchasing decision – overconfident managers should be more apt to repurchase at higher prices and repurchase less effectively than their peers because from the manager's perspective, stock underpricing is much more likely. Indeed this is exactly what I find. By comparing the average stock price in quarters where a repurchase was performed to the average stock price in quarters where a repurchase was not performed and taking the difference (thenceforth referred to as the repurchase efficiency spread) I observe that the average repurchasing quarter price is higher than the average non-repurchasing quarter price, especially for firms having overconfident managers. This suggests that if undervaluation is a strong repurchase motivator, then firms do a relatively bad job choosing when to repurchase. I perform my studies on a variety of confidence groups based upon Thomson Reuters' insider classes. My results differ across classes, however; the general trend implies that the more moderately confident (i.e. less overconfident) managers/insiders a firm has, the more efficiently they repurchase stock. Conversely, as a firm becomes more overconfident

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the price difference between repurchase quarters and non-repurchase quarters increases. Looking specifically at CEOs or CFOs, my results suggest that firms having either an overconfident CEO or an overconfident CFO have a repurchase efficiency spread that is greater than, and often double, the efficiency spread of firms having moderately confident managers. Looking at CEO and CFO overconfidence separately, though, is perhaps misleading because it is likely that firms having an overconfident CEO and a moderately confident CFO, or vice versa, are likely to exhibit some qualities of an overconfident firm despite being classified as a moderately confident firm. Merging these two samples and running a similar analysis still suggests that the efficiency spread increases with overconfidence, yet firms classified as moderately confident no longer have a significantly positive efficiency spread. These trends continue to exist upon including all corporate insiders – as the number of overconfident insiders increases, repurchasing efficiency decreases.

I analyze the impact of managerial overconfidence upon corporate payout policy by merging two data sources: a dataset of managerial confidence classifications based on the methodologies of Kolasinski and Li (2012) and a set of firms that repurchased stock in at least one quarter between 1993 and 2010. I examine repurchase effectiveness by comparing the within-firm stock prices and valuation ratios across repurchase quarters and non-repurchase quarters, similar to Bonaime et al (2013). However, I extend upon their results by further classifying my data into confidence groups and looking at the difference in the differences and are able to provide a highly intuitive result that is consistent with both the stock repurchase literature and behavioral theory and that helps explain Bonaime et al's finding that firms buy shares when they should not: Overconfident managers repurchase at prices that are significantly higher than their moderately confident peers and seem to be either poor at timing their

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repurchases or repurchase for reasons other than market timing. I conclude that the addition of these highly inefficient, non-market timing repurchases largely contribute to the findings that managers repurchase during periods when they should not.

My liquidity analysis is most similar to work done by Brockman and Chung (2001). They investigate the timing of open market share repurchase and the resultant impact on firm liquidity using actual repurchase data acquired from the Hong Kong Stock Exchange and find that repurchases decrease liquidity. Such findings are supported by the hypotheses of Barclay and Smith (1988) who suggest that the presence of informed managers can reduce secondary market liquidity. If it is believed that repurchasing firms have information suggesting that their firm is undervalued then one would expect liquidity to decrease. Accordingly, if overconfident managers consistently repurchase at prices that are too high, their likelihood to be considered informed decreases and I would expect to see less of a liquidity decrease or indeed increased liquidity as suggested by Cook, Krigman, and Leach (2004). Consistent with my findings suggesting overconfident firms poorly time the market, I find no decreases in liquidity amongst overconfident firms during repurchase quarters and confirm that repurchases actually increase liquidity. Moderately confident repurchases, however, are correlated with significant liquidity decreases further supporting the idea that they more successfully time their repurchases.

The basis for studying liquidity surrounding repurchase periods stems from Barclay and Smith's (2008) two opposing liquidity hypotheses. They suggest that regular repurchases boost competition for market makers and potentially make a firm's shares more liquid. By posting buy limit orders, managers can establish a lower bound stock price and consequently narrow the bid-ask spread. Alternatively, they also suggest that, as the market perceives the possibly of trading with an informed trader (the repurchasing corporation), spreads widen. By analyzing the stock

liquidity of repurchasing firms and segregating across confidence types I find that repurchases affect liquidity differently across types. My repurchase efficiency analysis suggests that moderately confident firms repurchase more efficiently and are more likely to be timing the market. As such, it is not unexpected that liquidity decreases as the market perceives these trades as informed. This is exactly what I find – bid-ask spreads during moderately confident repurchasing periods increase by almost 20%. In contrast, my repurchase efficiency analysis suggests that overconfident firms repurchase significantly less efficiently and are either repurchasing for reasons other than market timing or are poor market timers. Such findings suggest overconfident trades are likely less informed, or indeed uninformed, than those made by moderately confident managers. My analysis suggests this is true. Despite, a general increase in bid-ask spreads arising from having an overconfident CEO and CFO, I find that during repurchasing quarters bid-ask spreads decrease as much as 19%, overcoming the general overconfidence liquidity effect. These results can perhaps reconcile the differing results observed by Brockman and Chung (2001) and Cook, Krigman, and Leach (2004). Brockman and Chung (2001) investigate the timing of open market share repurchase and the resultant impact on firm liquidity using actual repurchase data acquired from the Hong Kong Stock Exchange and find that repurchases decrease liquidity. Alternatively, Cook, Krigman, and Leach (2004) focus on 64 American firms who voluntarily disclosed their repurchase history and conclude that open market repurchase contribute to market liquidity. The argument can be made these differing results may arise by analyzing sample populations with differing managerial confidence types.

I use the Kolasinski and Li (2012) overconfidence measure instead of the Malmendier and Tate (2005) *Longholder* overconfidence measure. While it is true that the Malmendier and Tate *Longholder* confidence measure is the most popular overconfidence measure, within this

context it limits us substantially. First, *Longholder* restricts us to looking solely at firms issuing managers employee stock options. Second, because I would be otherwise focusing on firms issuing employee stock options, the likelihood that firms are repurchasing stock to simply satisfy their option requirements increases and would probably bias my results. This bias arises from the fact that firms who issue a large number of employee stock options are likely to face future stock price dilution as the options exercise. To counter this dilution the firm may repurchase stock. By focusing my confidence measure on firms that issue employee stock options I risk focusing on a sample of firms who repurchase systematically differently from the overall population.

The remainder of this paper is organized as follows. Section 1 reviews previous literature and hypothesis development. Section 2 describes my data and provides summary statistics. Section 3 describes methodology and provides results. Section 4 concludes.

3.2 Literature Review and Hypothesis Development

The financial literature has designated considerable attention to the notions that firms time their financial decisions and that behavioral biases affect firm decision making. I merge these two ideas and investigate whether or not behavioral biases affect the repurchase quality. My novel contribution is showing that managerial overconfidence helps explain the observation that firms generally repurchase when they should not according to market timing theories.

3.2.1 Managerial Overconfidence

The finding that managerial overconfidence can account for corporate investment distortions is the driving factor behind this paper. The concept of managerial overconfidence is rooted in the social psychology concept coined the "better-than-average" effect. Research findings suggest that individuals tend to overestimate their own decision making prowess compared to the average individual (Alicke, 1985; Camerer & Lovallo, 1999; Larwood &

Whittaker, 1977; Svenson, 1981). Accordingly, overconfident individuals also appear to be more

likely to pass blame or to attribute negative outcomes to the actions of other individuals or

simply bad luck, while taking credit for all good, positive outcomes. (Miller & Ross, 1975).

Three primary factors have been associated with eliciting overconfidence: illusions of control, an

overzealous degree of commitment to good outcomes, and difficulty comparing performance

across individuals (Weinstein, 1982),(Alicke, Klotz, Breitenbecher, Yurak, & Vredenburg,

1995). Corporate CEOs should be particularly prone to overconfidence due to the nature of

corporate finance and executive responsibilities. Indeed, theoretical work by Goel and Thakor

(2008) suggests that the nature of the corporate hiring process is biased against hiring moderately

confident individuals and that managers in the corporate world's upper echelons should be

overconfident. It is important to mention though that while all CEOs may indeed be

overconfident compared to the average individual, overconfidence among CEOs can range from

under-confident (least overconfident CEOs) to overconfident (highly overconfident CEOs). My

confidence measures should be interpreted accordingly.

Malmendier and Tate's (2005a) finding that corporate investment is highly sensitive to

cash flow when managed by an overconfident CEO is this paper's behavioral foundation.

Overconfident managers believe the market incorrectly undervalues their firm due to its inability

to accurately gauge his or her ability to positively influence future earnings. Accordingly, the

manager believes the prevailing stock price is too low. Reliance upon equity as a source of

financing should naturally be affected. Specifically, from the overconfident manager's point of

view, reliance upon equity financing is less efficient as it will dilute current shareholder wealth.

Thus, overconfident managers rely more upon internal financing and corporate investment is

higher (lower) in periods where cash flow is higher (lower.) This should place strong pressure on

when and at what price to repurchase stock and, consequently, payout policy for firms with overconfident managers should differ systematically from payout policies for firms with moderately confident managers. This should become clear based on the traditionally held reasons for repurchasing stock.

3.2.2   Stock Repurchases

Dittmar (2000) analyzes the five traditionally held reasons for repurchasing stock. Of those mentioned in her paper, my hypotheses focus on two: Firms repurchase stock to disperse excess cash to shareholders and repurchase stock during times of market undervaluation to signal the market of the potential undervaluation and/or to capitalize upon the self-investment opportunity at a low price. Each of these reasons should be particularly affected by the acting managers' confidence types.

Jensen (1986) suggests high free cash flow can create substantial conflicts of interest between shareholders and management and result in high agency costs. By disbursing this cash flow to investors, either by paying a dividend or repurchasing stock, such problems can be potentially avoided. Open market repurchases are generally preferred by managers over dividend payments because of the increased flexibility afforded the firm. For example, firms who stop paying dividends are generally penalized by the markets while firms who fail to repurchase stock after an announcement, or who fail to complete a repurchase, are not (Bajaj & Vijh, 1990; Brav, Graham, Harvey, & Michaely, 2005; Denis et al., 1994; Kaplan & Reishus, 1990).

The flexible timing afforded repurchase plans can also account for their popularity. Unlike dividends, which often follow a schedule, repurchases can essentially be made whenever management deems advantageous. This allows the firm to potentially time their repurchases around periods of seeming market undervaluation. Differing levels of information between

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corporate insiders and investors may lead to price misevaluation, where the insiders (assumed to be more knowledgeable than the investors) believe the investors to incorrectly price company stock too low. The undervaluation hypothesis suggests that a firm repurchases stock as a way to signal the market of the undervaluation, or simply to invest in itself at a lower share price. To the extent that certain behavior distorts a manager's valuation of the firm, one would expect these behaviors to affect stock repurchases. Overconfident CEOs should be more prone to repurchase stock as a means to correct for undervaluation due to their higher propensity to believe the firm is undervalued. Furthermore, and of particular interest, is whether or not overconfident CEOs repurchase during points where their firm is actually undervalued and whether or not they purchase at the *best* price. If overconfident CEOs believe the market systematically undervalues the firm then one would expect them to make repurchases at higher prices than moderately confident CEOs. Indeed, as overconfidence increases, firms may repurchase stock at prices high enough that the equity repurchases actually lower firm value.

3.3 Data

3.3.1 Repurchase Data

I focus primarily on the U.S. firms in the merged CRSP/Compustat universe. My data collection methods are the same as those performed by Bonaime et al. (2013). In order to stay in the sample a firm must have made at least one repurchase over the period 1993-2010 and first enters the sample upon repurchasing an amount that is at least 0.1 percent of its market capitalization. Over the entire sample I am not able to look specifically at number of shares repurchased but rather calculate a dollar value spent on share repurchases as specified by the Compustat quarterly purchase of common and preferred stock. This variable is a year-to-date cumulative variable and as such I lag the variable across quarter and net out previous

repurchases. Banyi, Dyl, and Kahle (2008) describe this as the most accurate repurchase proxy when not relying upon 10-k/10-q SEC filings.

I divide the dollar repurchases by the firm's prior quarter-end market capitalization to express them as a percentage of shares outstanding. I further require firms to have a CRSP share code of 10 or 11 and remove any observation where the beginning-of-quarter stock price is less than or equal to $5. By including firms in my sample until they either delist, or reach 2010, I avoid any survivor or lookahead biases. Table 3.1 describes my repurchase sample.

3.3.3   Overconfidence Measures

Multiple confidence measures exist and while the Malmendier and Tate *Longholder* overconfidence measure is currently more popular in the literature, I choose the classification method used by Kolasinski and Li (2012). For a detailed description of the *Longholder* method and the other various methods used by Malmendier and Tate please see "Overconfidence and Early-Life Experiences: The Effect of Managerial Traits on Corporate Financial Policies" (2011). These confidence classification methods can require extensive and costly hand-collection and/or may restrict observation to only a subset of corporations (e.g. *Longholder* requires firms to issue employee stock options). In contrast, Kolasinski and Li's method is able to sweep through all firms easily, looking simply at personal insider company stock purchases. These purchases can be obtained from Thomson Reuters Insiders Information Table I. They identify as overconfident "those CEOs who purchase their own company's stock in the secondary market and who ex post earn a negative abnormal return over the next 180 days." By purchasing at prices that are too high, they reveal their belief that their own firm is undervalued and that they are overconfident.

I obtain my CEO insider purchase data from the Thomson Reuters Insiders Information database (Table I) and collect purchases made from 1993-2010. I then compute the abnormal returns over the following 180 day window after the insider purchase. Keeping with Kolasinski and Li (2012) I define the abnormal return as the buy-and-hold return to the CEO firm's stock less the buy-and-hold return of the CRSP value-weighted size decile index to which the CEO's firm belongs. Afterwards, I classify firm-year observations as having an overconfident CEO if, relative to the current year, the following two calendar years contain CEO purchases that have a negative 180 day abnormal return on average. Within my repurchase data set I classify an overconfident repurchase as one where the CEO has been determined to be overconfident at least once within my overconfidence set. Once a CEO has been declared overconfident at least once, he is declared overconfident for the remainder of my sample. Please note in instances where I refer to managers other than CEOs I have used the same overconfidence classification method but have simply substituted looking at CEO insider purchases with those of the manager type under scrutiny. See Appendix A for a complete listing of Thomson Reuters insiders codes and group classifications. Table 3.2 provides sample descriptive statistics classified by CEO overconfidence and repurchase status.

3.3.2   TAQ Liquidity Data

My liquidity data is taken from The Trade and Quote (TAQ) database which contains intraday transaction data for all securities listed on the New York Stock Exchange (NYSE), the American Stock Exchange (AMEX), Nasdaq National Market System (NMS), and SmallCap issues. For each firm quarter within the sample I calculate the average percentage bid-ask spread over the quarter. I first collect all quotes (filtered following the rules in Weston (2000)) during regular trading hours for each stock, and then calculate the average daily percentage spread. I

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then average across all trading days in the quarter to find the average quarterly bid-ask spread for each stock.

3.4   Methodology and Results

3.4.1   Open Market Repurchase Efficiency and Managerial Overconfidence

I now address the question of whether firms are efficient repurchasers. Like Bonaime et al (2013), I define repurchase efficiency such that a repurchase is more efficient than another repurchase if the estimated purchase price is closer to the price benchmarks or valuation ratios occurring in non-repurchase quarters. The further away the repurchase price (or valuation ratio) is from those of non-repurchasing quarters the lower the company's repurchase efficiency because the firm could have repurchased at a lower price had they repurchased in a different quarter.[8] This method differs from most existing studies that analyze only within-quarter or within-month repurchase quality.[9] Looking across quarters allows us to gauge how well companies repurchase over longer time periods, which I believe gives us a more complete market timing representation. For each firm, I calculate a series of price averages across the total number of trading days within the quarter. I average the minimum daily stock price, the daily closing price, and the maximum daily stock price. Efficiency measures using the minimum daily stock price can be seen as a best-case scenario, while the maximum daily stock price is a worst-case scenario. That is to say, by definition, since OMRs cannot be made at prices that are lower (higher) than the quarterly minimum (maximum) daily stock price, any repurchases made at those prices are the best (worst) possible repurchases during the quarter. The valuation ratios I use are a firm's quarterly sales-to-price ratio and its quarterly market-to-book ratio. Next I calculate the within-firm differences in prices and valuation ratios between repurchasing and

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[8] Of course, if a firm makes a repurchase at a price that is lower than the price benchmark, i.e. at a better price, I would declare that as a more efficient repurchase. The same is true for valuation ratios.
[9] See, for example, Ben-Rephael, Oded, and Wohl (2013)

non-repurchasing quarters. To give each firm equal weight within the sample, I then average the averages and the differences.

Table 3.3 provides my initial repurchase efficiency tests. Panel A splits the sample into repurchasing quarters or non-repurchasing quarters and further splits each category into repurchases made by an overconfident manager or a moderately-confident manager. Table 3.3 looks only at CEO and CFO confidence levels. As shown for both the CFO group and CEO group, overconfident managers appear to repurchase at prices that are higher and less efficient than their moderately confident peers. For example, CEO columns 11-13 provide the average, (log) minimum stock price for moderately confident and overconfident non-repurchasing quarters. Looking at column 11 I see that moderately confident non-repurchase quarters have a minimum stock price of 2.45 while overconfident non-repurchase quarters have a minimum stock price of 2.16. Column 12 shows the minimum stock prices during repurchase quarters (moderately confident (overconfident) CEOs repurchase at a minimum stock price of 2.56 (2.42), respectively). If I take the difference between repurchase and non-repurchase quarters (Column 13) I find that overconfident CEOs repurchase stock at a price that is roughly 12% higher than the prices they would have paid if they repurchased stock during the non-repurchase quarters, while moderately confident CEOs only overpay by 4.4%. Such differences suggest that both moderately confident CEOs and overconfident CEOs repurchase at prices that are high relative to surrounding quarters, but overconfident CEOs overpay almost three times higher than moderately confident CEOs. The other price benchmarks and valuation ratios provide similar results although the market-to-book ratios are statistically insignificant. Results are also similar in the case of CFOs however the efficiency differences are slightly smaller (e.g. moderately (overconfident) repurchases are made at a 6.2% (10.6%) premium.) Note in these instances it is

possible for a company to have an overconfident CEO and a moderately confident CFO, or vice versa, and be placed in the moderately confident group when in fact it may be affected by overconfident management. To avoid this problem I split the firm according to the overconfidence of both the CEO and the CFO, this can be seen at the top of Panel A. The results suggest that the presence of at least one overconfident manager significantly decreases repurchase efficiency across all efficiency measures, while having no overconfident manager suggests that repurchase premiums are statistically insignificant from zero. Panel B provides test statistics for difference-in-difference comparisons. The *All Moderately Confident* group is used as the control group and as shown all efficiency benchmarks, aside from the market-to-book ratio, suggest a statistically significant difference[10]. Table 3.4 extends the analysis to encompass all corporate insiders. I analyze four insider groups: *All Managers, Level-1, Level-2,* and *Level-3*. The Thomson Reuters Table I database assigns various relationship codes to corporate insiders, depending upon their roles within the company. Level 1 consists of the highest level insiders including the Chairman of the Board, the Chief Executive Office, the Chief Operating Officer, General Counsel, and the company President. Levels 2, 3, and 4 are comprised of insiders lower in the corporate hierarchy. Appendix A shows a list of all insider relationship codes. *All Managers* consists of all company insider codes available in the Thomson Reuters Table I database. *Levels 1, 2, 3* correspond to the level 1, 2, and 3 subcategories within the Table I database. Within each of these groups I split firms into quartiles based upon the firms' overconfidence level, 0 to 3. Firms in overconfidence quartile 0 have zero overconfident insiders, while firms in subsequent groups have more numerous overconfident insiders, 3 being the most overconfident firms. As shown, across all insider groups the repurchase price premium and

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[10] My analysis suggests that the large market-to-book quarters are adding noise to the sample. I do not remove those observations here for robustness, but in the later probit regressions I trim at the 90th percentile. My results remain similar without trimming.

hence the repurchase efficiency, increases/decreases, respectively. Moreover, firms having no-overconfident managers seem to repurchase at no statistically significant premium.[11] Similar to Table 3.3 there is no statistical significance shown from the market-to-book ratio.[12] Panel B provides difference-in-differences t-statistics using quartile 0 as the control variable. As shown across all quartiles and benchmark ratios, repurchase efficiency decreases as overconfidence becomes more prevalent.

Table 3.5 examines repurchase efficiency in a panel regression setting. The dependent variable is either (log) price benchmark or a valuation ratio. Based on reasons suggested in Table 3.3, I show only the regression results including both CEOs and CFOs. The independent variable is a dummy for repurchasing quarters, and I include firm and quarterly time fixed effects. As I can see from confidence groups 1 and 2, the single overconfident and dual overconfident manager groups, the price benchmark coefficients suggest there is a positive increase in repurchase propensity as prices increase. The valuation ratio regressions are largely insignificant although the coefficients show a similar linear increase. Looking at all repurchase efficiency benchmarks, moderately confident repurchases exhibit no statistically significant repurchase premium. However, if I look at repurchase over $10 million, like Bonaime et al. (2013), I still see higher price premiums with increased overconfidence, yet now moderately confident repurchases are also made at a premium. Table 3.6 extends upon Table 3.5 and includes all insiders. These results echo those provided in Table 3.5, however I see the average market-to-book ratio is 0.0677 lower in repurchasing quarters, and the difference is statistically significant (t = -2.96). All of the other coefficients are in a similar direction yet are statistically insignificant.

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[11] The level-1 confidence group suggests a statistically significant price premium according to the low price and high price benchmarks. I believe these results arise largely because the CEO is in level-1 and CFO is in level-2.
[12] Thomson Reuters has a level-4 insider category which is included in the *All Managers* group, however, the category alone does not have enough observations to provide robust regression results.

Overconfidence is still correlated with increased repurchase prices. Looking at the most overconfident quartile I see that (log) average closing prices are .0915 higher in repurchasing quarters and the difference is highly statistically significant (t = 5.58). Compared to the (log) average closing price in non-repurchasing quarters, 1.75, this .0915 increase represents an economically significant premium of approximately 5.2%. Interestingly, upon imposing the $10 million minimum repurchase size I find that all repurchase premiums, regardless of confidence type, increase from nearly 100% to 400%, thereby suggesting that large-scale repurchases may not be market-timing attempts, although overconfident premiums are still higher than moderately confident.

Finally I turn to the question of how repurchases affect the liquidity of the purchasing company. There are two popular opposing hypotheses both suggested by Barclay and Smith (1988). On the one hand, they suggest that regular repurchases may decrease the bid-ask spread by managers submitting buy limit orders thereby allowing the firm to establish a lower bound price for a stock and narrowing the spread. On the other hand, an asymmetric information effect may exist that widens spreads when investors realize the presence of informed traders. Due to the fact that corporate managers are likely more informed than the regular investors, I hypothesize that market timing attempts are more likely to be made by informed investors and as such a decrease in liquidity is to be expected. Conversely, poor market timing attempts or repurchases made for other reasons are likely to be accompanied with increased liquidity as the presence of informed traders may be lower. Table 3.7 provides my analysis. As shown in column (1), repurchases in general are correlated with a 19% increase in the average bid-ask spread, and because my included categorical variables use moderately confident non-repurchase quarters as the control group I conclude that moderately confident repurchases decrease liquidity.

Interestingly, the presence of a single overconfident CFO or CEO doesn't appear to affect firm liquidity, however having both an overconfident CEO and an overconfident CFO increases bid-ask spreads by 16%. Looking at the interaction between the *Repi* variable and overconfidence I see that overconfident repurchases actually decrease bid-ask spreads, by 15% for a *Single Overconfident* manager and 19% for *Dual Overconfident* managers. In total, the effect of the positive *Repi* coefficient and the negative D*ual-Repi* coefficient suggest that overconfident repurchases increase liquidity enough such that only the spread increase associated with having two overconfident managers exists. Looking at column (2) I see similar results for all insiders. Rather than splitting confidence groups into quartiles I use an *Overconfident* dummy that is 1 if at least one manager is overconfident. The results suggest that moderately confident repurchases increase spreads by 12% while overconfident repurchases decrease spreads by roughly 10%. Such results intuitively support the idea that moderately confident firms repurchase based on private information in an attempt to repurchase at abnormally low prices.[13] Investors realize this and liquidity drops. In contrast, overconfident managers either poorly time the market or repurchase for other reasons, and thereby increase liquidity.

3.5   Conclusion

This study is motivated by the observations that behavioral biases like managerial overconfidence can have great impact on many corporate decisions. Open market stock repurchases continue to be a major wealth distribution vehicle among corporations and as such the need for continued analysis regarding how well managers repurchase is strong. There is much evidence that suggest that managers attempt to time their repurchases with period of stock price undervaluation, but whether or not these managers utilize the flexibility offered them by open market repurchases is still an open-ended question. Furthermore, there is disagreement

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[13] Splitting the *Overconfident* dummy into 4 quartiles, as done in earlier tables, yields similar results.

amongst researchers regarding how repurchases affect secondary market liquidity following the repurchase. There is evidence that suggests that repurchase both increase and decrease market liquidity.

I attempt to shine light onto these subjects by incorporating managerial confidence types into the world of stock repurchases. Given the different biases attributed to overconfidence it is reasonable to expect managers of differing confidence levels to repurchase differently. Overconfident managers are prone to believe their stock is undervalued and as such they should be more likely to repurchase at higher prices, even when attempting to time the market. In contrast, I would expect more moderately confident managers to repurchase at lower prices and during stock price undervaluation periods. By looking at open market repurchases made between 1993 and 2010 and comparing the repurchase price to average prevailing prices in non-repurchasing quarters, what I call the repurchase efficiency spread, I can formulate an idea of how well managers repurchase. Furthermore, using the confidence classification system of Kolasinski and Li (2012) I am able to examine how overconfidence affects these repurchases.

In general, I find that overconfidence can explain previous findings that managers choose when to repurchase poorly. Overconfident managers repurchase much less efficiently than their more moderately confident peers. My results suggest that the presence of an overconfident CEO or CFO can increase the repurchase price premium by almost 10% and over 12% if both the CEO and CFO are overconfident. In contrast, I find no statistically significant price premium paid by moderately confident CEOs. If I extend my overconfidence classification system to include more corporate insiders within the sample, not just CEOs or CFOs, I see the same general pattern – as overconfidence amongst insiders increases firms repurchase less efficiently.

In regard to how open market repurchases affect secondary market liquidity I find that overconfidence can also account for the observed differences repurchases have on liquidity. I decompose bid-ask spreads and find evidence that only moderately confident managers impose additional liquidity costs on the firm, while overconfident managers actually decrease liquidity costs. These findings are consistent with my previous findings that moderately confident managers seem to time the market better. According to the asymmetric-information hypothesis, liquidity should decrease as investors perceive the presence of informed traders. As successfully timed repurchases are likely to arise because of additional information, seeing a decrease in liquidity is expected. This is exactly what I find. Additionally, I find that repurchases made by overconfident managers actually increase liquidity by 19%.

Ultimately, I conclude that overconfident managers repurchase in a very different fashion than their more moderately confident peers. Moderately confident managers repurchase at efficiency levels more consistent with market timing attempts and increase liquidity costs, while overconfident managers repurchase significantly less efficiently, decrease liquidity costs, and are either poor at timing the market or repurchase for other reasons.

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Table 3.1: Share Repurchase Descriptive Statistics

This table presents quarterly summary statistics describing the magnitude and frequency of repurchases made by sample firms. Unclassified firms are those firms where the company CEO made zero personal purchases of company stock within the sample period 1993-2010. In accordance with the Kolasinski and Li overconfidence measure (2012) CEOs are classified as moderately confident if they have an average non-negative 180 day abnormal return following the insider purchase. CEOs are classified as overconfident if, following the insider purchase; they have an average negative 180 day abnormal return.

Panel A: Unclassified

VARIABLES	N	Mean	Standard Deviation	Percentiles 10th	50th	90th
Repurchases (millions $)	168,524	20.85	178.8	0	0	16.85
Repurchases greater than $0 (millions $)	61,438	58.80	287.8	0.0490	2.550	106
Repurchases (% of Market Capitalization)	163,963	1.629	572.3	0	0	0.0139
Repurchases if greater than 0% (% of market capitalization)	60,978	4.396	938.4	0.000218	0.00554	0.0337
Repurchase greater than 0.1%	48,209	5.560	1,055	0.00186	0.00846	0.0406
Repurchase greater than 0.1% (Firm-level mean)	3,173	16.54	719.2	0.0151	0.0307	0.0996

Panel B: Moderately Confident

VARIABLES	N	Mean	Standard Deviation	Percentiles 10th	50th	90th
Repurchases (millions $)	27,372	18.36	200.6	0	0	23.90
Repurchases greater than $0 (millions $)	11,488	44.32	307.6	0.0790	3.446	83.70
Repurchases (% of Market Capitalization)	27,064	0.107	16.75	0	0	0.0189
Repurchases if greater than 0% (% of market capitalization)	11,456	0.258	25.74	0.000251	0.00694	0.0368
Repurchase greater than 0.1%	9,290	0.318	28.59	0.00197	0.0102	0.0422
Repurchase greater than 0.1% (Firm-level mean)	860	0.169	3.487	0.0149	0.0277	0.0766

Panel C: Overconfident

VARIABLES	N	Mean	Standard Deviation	Percentiles 10th	50th	90th
Repurchases (millions $)	38,906	13.98	294.9	0	0	9.946
Repurchases greater than $0 (millions $)	14,622	38.82	476.1	0.0490	1.831	48.50
Repurchases (% of Market Capitalization)	38,618	0.00439	0.162	0	0	0.0146
Repurchases if greater than 0% (% of market capitalization)	14,585	0.0181	0.139	0.000194	0.00555	0.0352
Repurchase greater than 0.1%	11,496	0.0228	0.157	0.00184	0.00851	0.0424
Repurchase greater than 0.1% (Firm-level mean)	1,094	0.0582	0.180	0.0138	0.0282	0.0951

Table 3.2: Summary Statistics across Confidence Type and Repurchase Quarters
This table presents quarterly summary statistics on basic balance sheet and cash flow entries. Unclassified firms are those firms where the company CEO made zero personal purchases of company stock within the sample period 1993-2010. In accordance with the Kolasinski and Li overconfidence measure (2012) CEOs are classified as moderately confident if they have an average non-negative 180 day abnormal return following the insider purchase. CEOs are classified as overconfident if, following the insider purchase, they have an average negative 180 day abnormal return. Panel A presents quarterly summary statistics according to confidence type. Panel B presents quarterly summary statistics according to confidence type and whether or not the firm repurchased stock with a total dollar cost that was at least 1% of the quarterly market capitalization.

Panel A:

VARIABLES	Unclassified			Moderately Confident			Overconfident		
	N	mean	sd	N	mean	sd	N	mean	sd
Total Assets	167,347	5,947	48,307	27,274	5,605	55,484	38,800	6,178	57,687
Total Liabilities	167,276	4,687	45,196	27,243	4,565	50,918	38,768	5,199	52,201
Shares Outstanding	166,431	107.6	1,114	27,228	73.27	224.6	38,754	75.47	295.6
Short-term Debt	156,795	949.9	13,636	25,580	439.7	9,236	36,770	499.0	9,848
Long-term Debt	165,786	1,460	22,226	26,945	811.5	6,856	38,468	1,037	9,429
Dividends	167,806	0.717	20.32	27,330	0.356	11.10	38,819	0.955	38.80
Goodwill	44,202	883.8	3,805	18,094	520.1	2,885	25,559	411.5	2,747
Net Income	167,751	39.09	534.3	27,310	20.46	466.9	38,790	16.63	282.2
Earnings Per Share	150,281	0.336	57.73	27,195	0.302	1.558	38,744	0.150	0.984
Retained Earnings	160,781	844.7	5,234	26,587	260.8	4,336	38,121	339.8	3,045
Stockholders' Equity	167,308	1,223	5,131	27,241	1,023	5,504	38,771	962.0	5,985

Panel B:

VARIABLES	Unclassified				Moderately Confident				Overconfident			
	Non-Repurchasing		Repurchasing		Non-Repurchasing		Repurchasing		Non-Repurchasing		Repurchasing	
	N	mean	N	mean	N	mean	N	mean	N	mean	N	mean
Total Assets	212,619	5,650	188,149	6,281	173,684	4,625	87,011	8,474	175,888	4,676	96,333	8,357
Total Liabilities	212,493	4,487	188,070	5,000	173,562	3,724	86,968	6,760	175,764	3,777	96,291	6,725
Shares Outstanding	211,612	98.14	187,232	106.7	172,676	79.51	86,965	127.6	174,881	79.88	96,286	122.4
Short-term Debt	199,579	815.5	176,361	934.0	163,235	497.3	81,490	1,333	165,429	508.0	90,486	1,247
Long-term Debt	210,636	1,329	186,349	1,428	171,978	1,149	86,166	1,488	174,197	1,164	95,470	1,477
Dividends	213,157	0.711	188,604	0.721	174,260	0.689	87,025	0.652	176,462	0.726	96,312	0.790
Goodwill	74,612	667.3	57,445	840.3	67,339	503.4	38,610	893.7	68,480	487.1	44,934	804.6
Net Income	213,061	32.04	188,541	39.74	174,171	14.61	86,990	66.40	176,367	14.91	96,274	60.00
Earnings Per Share	195,436	0.294	171,065	0.336	161,653	0.255	81,762	0.384	163,851	0.250	91,113	0.322
Retained Earnings	205,064	697.7	181,206	819.1	167,674	390.7	84,402	1,151	169,873	405.1	93,737	1,065
Stockholders' Equity	212,526	1,130	188,102	1,244	173,593	873.0	86,968	1,679	175,795	870.6	96,296	1,599

Table 3.3: Repurchase Quality and Overconfidence – CEOs and CFOs
This table presents the within-firm averages and differences in the split-adjusted quarterly closing stock price in repurchasing quarters and non-repurchasing quarters across managerial confidence type. I require firms to have at least one closing stock price and at least on non-repurchasing quarter to be included within the calculation. I define repurchasing quarters as quarter where the firm repurchases a dollar amount that is at least .01 percent of its market capitalization. The average closing price is the natural log of the Compustat reported quarterly closing price. Firms are classified as overconfident based on the Kolasinski and Li (2012) classification method. Firms deemed "unclassified" are those firms whose managers do not meet the necessary criteria to be classified as either moderately confident or overconfident. All price variables are winsorized at the 1st and 99th percentiles.

Panel A : Average Differences across Non-repurchasing Quarters and Repurchasing Quarters

				Average across firm Quarters												
CEO & CFO		M/B$_t$			S/P$_t$			Closing Price			Low Price			High Price		
	N	Non.	Rep.	Diff.	Non.	Rep.	Diff.		Non.	Rep.	Diff.	Non.	Rep.	Diff.	Non.	Rep.	Diff.
Confidence Type	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
All Moderately Confident	1281	2.75	2.67	-0.08	0.40	0.35	-0.05 *	2.78	2.81	0.03	2.54	2.61	0.07	2.96	3.00	0.04
Single Overconfident	2021	2.26	2.37	0.11	0.52	0.39	-0.13 ***	2.49	2.65	0.16 ***	2.25	2.47	0.22 ***	2.69	2.85	0.16 ***
All Overconfident	1272	2.08	2.15	0.07	0.54	0.39	-0.15 ***	2.33	2.55	0.22 ***	2.10	2.36	0.26 ***	2.54	2.75	0.21 ***

				Average across firm Quarters												
CEO		M/B$_t$			S/P$_t$			Closing Price			Low Price			High Price		
	N	Non.	Rep.	Diff.	Non.	Rep.	Diff.		Non.	Rep.	Diff.	Non.	Rep.	Diff.	Non.	Rep.	Diff.
Confidence Type	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
Moderately Confident	2044	2.56	2.54	-0.02	0.44	0.37	-0.07 ***	2.68	2.75	0.07 *	2.45	2.56	0.11 ***	2.87	2.95	0.08 ***
Overconfident	2530	2.17	2.27	0.10	0.54	0.39	-0.15 ***	2.40	2.60	0.20 ***	2.16	2.42	0.26 ***	2.61	2.80	0.19 ***

				Average across firm Quarters												
CFO		M/B$_t$			S/P$_t$			Closing Price			Low Price			High Price		
	N	Non.	Rep.	Diff.	Non.	Rep.	Diff.		Non.	Rep.	Diff.	Non.	Rep.	Diff.	Non.	Rep.	Diff.
Confidence Type	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
Moderately Confident	2539	2.52	2.53	0.01	0.47	0.37	-0.10 ***	2.62	2.73	0.11 ***	2.39	2.54	0.15 ***	2.82	2.92	0.10 ***
Overconfident	2035	2.14	2.22	0.08	0.53	0.40	-0.13 ***	2.17	2.40	0.23 ***	2.17	2.40	0.23 ***	2.40	2.59	0.19 ***

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

Panel B: Repurchase Price Difference Comparison Across Confidence Types

CEO & CFO	Difference-in-Differences t-stastistics				
Confidence Type	M/B_t	S/P_t	Average Closing Price	Low Quarterly Stock Price	Hi Quarterly Stock Price
All moderately Confident	0.00	0.00	0.00	0.00	0.00
Single Overconfident	1.42	-2.81	4.81	4.96	4.30
Overconfident	0.99	-3.58	6.45	6.17	6.09

CEO	Difference-in-Differences t-stastistics				
Overconfidence Quartile	M/B_t	S/P_t	Average Closing Price	Low Quarterly Stock Price	Hi Quarterly Stock Price
Moderately Confident	0.00	0.00	0.00	0.00	0.00
Overconfident	1.06	-3.6	5.6	5.57	4.96

CFO	Difference-in-Differences t-stastistics				
Confidence Type	M/B_t	S/P_t	Average Closing Price	Low Quarterly Stock Price	Hi Quarterly Stock Price
Moderately Confident	0.00	0.00	0.00	0.00	0.00
Overconfident	0.46	-1.32	3.59	3.20	3.78

Table 3.4: Repurchase Quality and Overconfidence – All Insiders

This table presents the within-firm averages and differences in the split-adjusted quarterly closing stock price in repurchasing quarters and non-repurchasing quarters across managerial confidence type. I require firms to have at least one closing stock price and at least on non-repurchasing quarter to be included within the calculation. I define repurchasing quarters as quarter where the firm repurchases a dollar amount that is at least .01 percent of its market capitalization. The average closing price is the natural log of the Compustat reported quarterly closing price. Firms are classified as overconfident based on the Kolasinski and Li (2012) classification method. Firms deemed "unclassified" are those firms whose managers do not meet the necessary criteria to be classified as either moderately confident or overconfident. All price variables are winsorized at the 1st and 99th percentiles.

Panel A : Average Differences across Non-repurchasing Quarters and Repurchasing Quarters

All Managers	N	M/B_t Non.	Rep.	Diff.	S/P_t Non.	Rep.	Diff.		Average Closing Price Non.	Rep.	Diff.		Low Price Non.	Rep.	Diff.		High Price Non.	Rep.	Diff.	
Overconfidence Quartile	(1)	(2)	(3)	(4)	(5)	(6)	(7)		(8)	(9)	(10)		(11)	(12)	(13)		(14)	(15)	(16)	
0	1449	2.96	2.77	0.19	0.37	0.33	0.04		2.85	2.84	0.01		2.62	2.64	-0.02		3.01	3.02	-0.01	
1	1492	2.65	2.89	-0.24	0.43	0.34	0.09	***	2.64	2.72	-0.08	***	2.42	2.54	-0.12	***	2.83	2.92	-0.09	***
2	1356	2.17	2.25	-0.08	0.48	0.38	0.10	***	2.51	2.64	-0.13	***	2.29	2.46	-0.17	***	2.72	2.84	-0.12	***
3	1651	1.93	2.04	-0.11	0.58	0.411	0.17	***	2.35	2.59	-0.24	***	2.13	2.4	-0.27	***	2.58	2.79	-0.21	***

Level - 1	N	M/B_t Non.	Rep.	Diff.	S/P_t Non.	Rep.	Diff.		Average Closing Price Non.	Rep.	Diff.		Low Price Non.	Rep.	Diff.		High Price Non.	Rep.	Diff.	
Overconfidence Quartile	(1)	(2)	(3)	(4)	(5)	(6)	(7)		(8)	(9)	(10)		(11)	(12)	(13)		(14)	(15)	(16)	
0	1178	2.66	2.61	0.05	0.36	0.32	0.04		2.81	2.87	-0.06		2.59	2.68	-0.09	*	2.99	3.06	-0.07	*
1	1890	2.18	2.34	-0.16	0.49	0.37	0.12	***	2.51	2.65	-0.14	***	2.3	2.47	-0.17	***	2.72	2.84	-0.12	***
2	886	2.05	2.17	-0.12	0.55	0.42	0.13	***	2.38	2.57	-0.19	***	2.15	2.38	-0.23	***	2.59	2.76	-0.17	***
3	515	2.16	2.38	-0.22	0.67	0.43	0.24	***	2.32	2.61	-0.29	***	2.08	2.41	-0.33	***	2.55	2.81	-0.26	***

Level - 2	N	M/B_t Non.	Rep.	Diff.	S/P_t Non.	Rep.	Diff.		Average Closing Price Non.	Rep.	Diff.		Low Price Non.	Rep.	Diff.		High Price Non.	Rep.	Diff.	
Overconfidence Quartile	(1)	(2)	(3)	(4)	(5)	(6)	(7)		(8)	(9)	(10)		(11)	(12)	(13)		(14)	(15)	(16)	
0	1885	2.94	2.81	0.13	0.39	0.34	0.05	***	2.78	2.78	0.00		2.55	2.58	-0.03		2.95	2.98	-0.03	
1	930	2.59	2.82	-0.23	0.45	0.36	0.09	***	2.65	2.74	-0.09	*	2.43	2.55	-0.12	***	2.85	2.93	-0.08	*
2	1821	2.13	2.22	-0.09	0.48	0.37	0.11	***	2.52	2.67	-0.15	***	2.29	2.49	-0.20	***	2.73	2.87	-0.14	***
3	1249	1.91	2.08	-0.17	0.58	0.41	0.17	***	2.33	2.58	-0.25	***	2.11	2.39	-0.28	***	2.56	2.77	-0.21	***

Level - 3	N	M/B_t Non.	Rep.	Diff.	S/P_t Non.	Rep.	Diff.		Average Closing Price Non.	Rep.	Diff.		Low Price Non.	Rep.	Diff.		High Price Non.	Rep.	Diff.	
Overconfidence Quartile	(1)	(2)	(3)	(4)	(5)	(6)	(7)		(8)	(9)	(10)		(11)	(12)	(13)		(14)	(15)	(16)	
0	1202	2.76	2.75	0.01	0.43	0.37	0.06		2.8	2.83	-0.03		2.57	2.64	-0.07		2.97	3.02	-0.05	
1	1858	2.31	2.43	-0.12	0.49	0.36	0.13	***	2.53	2.68	-0.15	***	2.3	2.5	-0.20	***	2.73	2.88	-0.15	***
2	876	2.07	2.03	0.04	0.49	0.4	0.09	***	2.54	2.7	-0.16	***	2.32	2.52	-0.20	***	2.75	2.9	-0.15	***
3	371	1.75	1.93	-0.18	0.66	0.45	0.21	***	2.44	2.69	-0.25	***	2.22	2.51	-0.29	***	2.66	2.87	-0.21	***

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

Panel B: Repurchase Price Difference Comparison Across Confidence Types

All Managers

Overconfidence Quartile	M/B_t	S/P_t	Difference-in-Differences t-stastistics		
			Average Closing Price	Low Quarterly Stock Price	Hi Quarterly Stock Price
0	0.00	0.00	0.00	0.00	0.00
1	2.37	-2.48	3.95	4.27	3.84
2	1.39	-2.82	5.29	5.37	4.88
3	1.97	-5.37	9.21	9.06	8.83

Level - 1

Overconfidence Quartile	M/B_t	S/P_t	Difference-in-Differences t-stastistics		
			Average Closing Price	Low Quarterly Stock Price	Hi Quarterly Stock Price
0	0.00	0.00	0.00	0.00	0.00
1	1.50	-2.90	2.99	3.03	2.48
2	1.09	-2.85	4.43	4.36	3.94
3	1.44	-5.79	6.37	6.22	6.10

Level - 2

Overconfidence Quartile	M/B_t	S/P_t	Difference-in-Differences t-stastistics		
			Average Closing Price	Low Quarterly Stock Price	Hi Quarterly Stock Price
0	0.00	0.00	0.00	0.00	0.00
1	1.87	-2.06	3.25	3.07	2.83
2	1.39	-2.71	6.59	6.64	6.56
3	1.79	-4.56	8.84	8.57	8.14

Level - 3

Overconfidence Quartile	M/B_t	S/P_t	Difference-in-Differences t-stastistics		
			Average Closing Price	Low Quarterly Stock Price	Hi Quarterly Stock Price
0	0.00	0.00	0.00	0.00	0.00
1	0.87	-3.04	4.43	4.36	4.28
2	-0.25	-1.56	3.93	3.71	3.81
3	0.93	-4.16	5.12	4.84	4.79

Table 3.5: Repurchase Efficiency and Overconfidence – CEOs and CFOs

This table presents firm fixed effect probit regressions of split-adjusted stock price and valuation ratios on repurchase quarter dummies and quarterly time dummies separated across confidence quartiles and includes only CEOs and CFOs. My overconfidence measure is based upon the Kolasinski and Li (2012) confidence scale. Confidence group 0 consists of firm quarters where both the CEO and CFO are moderately confident. Confidence group 1 consists of firm quarters where either the CEO or the CFO is overconfident. Confidence group 2 consists of firm quarters where both the CEO and CFO are overconfident. My repurchase dummy equals one if total stock repurchases made within the quarter are at least 0.1 percent of market capitalization or 0.1 percent of market capitalization and $10 million, as noted. Average closing price is the natural log of mean daily closing price. Minimum closing price is the natural log of the minimum daily closing price. Maximum closing price is the natural log of the maximum daily closing price. M/B is the market capitalization divided by the value of common equity and is trimmed at the 5$^{\text{th}}$ and 90$^{\text{th}}$ percentile. S/P is the total quarterly sales divided by quarterly market capitalization. A variable with subscript t is measured at the end of the current quarter. All standard errors are clustered by permno.

CEOs and CFOs

Confidence Group	Dependent Variable	Average Closing Price		Minimum Closing Price		Maximum Closing Price		M/B_t		S/P_t	
0	Repurchase > 0.1%	-0.00383		0.0270		0.0117		-0.200		2.04e-05	
		(-0.137)		(0.931)		(0.473)		(-1.358)		(0.00110)	
	Repurchase > 0.1% and $10 million		0.0458*		0.0628**		0.0561**		0.0761		-0.0206
			(1.740)		(2.344)		(2.325)		(0.426)		(-1.234)
	Constant	3.707***	3.665***	3.419***	3.391***	3.864***	3.827***	3.841***	3.587***	0.122*	0.140**
		(37.81)	(37.64)	(34.65)	(35.34)	(38.69)	(38.41)	(9.823)	(9.050)	(1.858)	(2.029)
	N	4,638	4,638	4,638	4,638	4,638	4,638	4,624	4,624	4,620	4,620
	R-squared	0.790	0.791	0.794	0.795	0.792	0.792	0.630	0.629	0.713	0.713
1	Repurchase > 0.1%	0.0583**		0.0886***		0.0568**		-0.128		-0.0105	
		(2.535)		(3.661)		(2.582)		(-1.352)		(-0.541)	
	Repurchase > 0.1% and $10 million		0.140***		0.173***		0.132***		0.108		-0.0375***
			(5.252)		(6.130)		(5.185)		(0.926)		(-2.875)
	Constant	3.462***	3.467***	3.272***	3.280***	3.693***	3.697***	2.870***	2.845***	0.265***	0.265***
		(36.46)	(36.80)	(35.20)	(35.64)	(38.29)	(38.72)	(9.032)	(8.908)	(6.399)	(6.392)
	N	9,424	9,424	9,424	9,424	9,424	9,424	9,414	9,414	9,413	9,413
	R-squared	0.730	0.731	0.729	0.731	0.726	0.727	0.643	0.642	0.699	0.699
2	Repurchase > 0.1%	0.0613***		0.0842***		0.0600***		-0.155**		-0.0111	
		(3.250)		(4.228)		(3.383)		(-2.089)		(-1.123)	
	Repurchase > 0.1% and $10 million		0.129***		0.152***		0.134***		0.00362		-0.0331***
			(5.013)		(5.598)		(5.364)		(0.0296)		(-3.364)
	Constant	3.063***	3.054***	2.884***	2.877***	3.371***	3.360***	1.546***	1.497***	0.338***	0.342***
		(50.66)	(51.74)	(49.27)	(50.42)	(57.53)	(58.87)	(6.060)	(5.899)	(9.695)	(9.724)
	N	14,084	14,084	14,084	14,084	14,084	14,084	14,052	14,052	14,043	14,043
	R-squared	0.726	0.727	0.728	0.729	0.722	0.723	0.492	0.491	0.657	0.657

Robust t-statistics in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 3.6: Repurchase Efficiency and Overconfidence – All Insiders

This table presents firm fixed effect probit regressions of split-adjusted stock price and valuation ratios on repurchase quarter dummies and quarterly time dummies separated across confidence quartiles and includes all corporate insiders. My overconfidence measure is based upon the Kolasinski and Li (2012) confidence scale. Confidence group 0 consists of firm quarters where all corporate insiders are moderately confident. The number of overconfident insiders increases as the confidence group number increases. Confidence group 3 consists of firm quarters with the largest number of overconfident insiders. My repurchase dummy equals one if total stock repurchases made within the quarter are at least 0.1 percent of market capitalization or 0.1 percent of market capitalization and $10 million, as noted. Average closing price is the natural log of mean daily closing price. Minimum closing price is the natural log of the minimum daily closing price. Maximum closing price is the natural log of the maximum daily closing price. M/B is the market capitalization divided by the value of common equity and is trimmed at the 5th and 90th percentile. S/P is the total quarterly sales divided by quarterly market capitalization. A variable with subscript t is measured at the end of the current quarter. All standard errors are clustered by permno.

All Insiders

Confidence Group	Dependent Variable	Average Closing Price		Minimum Closing Price		Maximum Closing Price		M/B_t		S/P_t	
0	Repurchase > 0.1%	-0.0261		-0.00233		-4.52e-05		-0.0677***		0.0152	
		(-1.511)		(-0.127)		(-0.00275)		(-2.956)		(1.025)	
	Repurchase > 0.1% and $10 million		0.102***		0.136***		0.119***		0.0765**		-0.0163
			(4.920)		(6.126)		(6.160)		(2.250)		(-1.425)
	Constant	2.326***	2.318***	2.057***	2.051***	2.571***	2.566***	1.967***	1.956***	0.134***	0.136***
		(605.0)	(677.7)	(511.0)	(571.8)	(716.8)	(787.3)	(292.7)	(295.7)	(31.09)	(34.36)
	N	13,338	13,338	13,338	13,338	13,338	13,338	13,338	13,338	13,322	13,322
	R-squared	0.739	0.740	0.728	0.730	0.737	0.739	0.568	0.568	0.669	0.669
1	Repurchase > 0.1%	0.0180		0.0502***		0.0318**		-0.000439		-0.0240**	
		(1.072)		(2.722)		(1.987)		(-0.0180)		(-2.257)	
	Repurchase > 0.1% and $10 million		0.150***		0.199***		0.151***		0.162***		-0.0460***
			(8.628)		(10.59)		(9.018)		(4.656)		(-5.282)
	Constant	2.835***	2.823***	2.603***	2.589***	3.070***	3.058***	1.081***	1.065***	1.053***	1.055***
		(847.5)	(832.1)	(496.1)	(494.5)	(905.8)	(865.6)	(194.9)	(178.9)	(231.0)	(231.4)
	N	16,140	16,140	16,140	16,140	16,140	16,140	16,140	16,140	16,105	16,105
	R-squared	0.714	0.716	0.684	0.687	0.712	0.714	0.579	0.581	0.630	0.630
2	Repurchase > 0.1%	0.0434**		0.0814***		0.0491***		0.0275		-0.0262**	
		(2.263)		(3.987)		(2.821)		(1.099)		(-2.062)	
	Repurchase > 0.1% and $10 million		0.189***		0.238***		0.176***		0.204***		-0.0597***
			(9.080)		(10.61)		(8.922)		(5.330)		(-3.778)
	Constant	2.535***	2.532***	2.305***	2.303***	2.822***	2.820***	1.931***	1.926***	0.228***	0.228***
		(659.4)	(643.8)	(545.7)	(542.2)	(804.8)	(811.4)	(324.9)	(327.3)	(54.11)	(56.48)
	N	16,471	16,471	16,471	16,471	16,471	16,471	16,471	16,471	16,447	16,447
	R-squared	0.685	0.687	0.671	0.674	0.686	0.689	0.519	0.522	0.556	0.557
3	Repurchase > 0.1%	0.0915***		0.124***		0.0923***		0.0626***		-0.0272**	
		(5.576)		(7.069)		(5.979)		(2.860)		(-2.191)	
	Repurchase > 0.1% and $10 million		0.199***		0.242***		0.206***		0.165***		-0.0481***
			(9.648)		(11.03)		(10.43)		(4.648)		(-4.503)
	Constant	2.687***	2.735***	2.475***	2.540***	2.892***	2.940***	3.016***	3.049***	0.0951***	0.0810***
		(319.1)	(880.4)	(271.5)	(719.0)	(364.8)	(1,008)	(254.5)	(653.9)	(11.63)	(17.52)
	N	21,524	21,524	21,524	21,524	21,524	21,524	21,524	21,524	21,504	21,504
	R-squared	0.682	0.684	0.664	0.665	0.682	0.683	0.467	0.468	0.643	0.643

Robust t-statistics in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 3.7: Liquidity and Overconfidence – All Insiders

This table presents regressions of average bid-ask spreads on a stock repurchase dummy and various overconfidence measures. *Repi* is my quarterly repurchase dummy and equals 1 if repurchases made during the quarter are at least 0.1 percent of market capitalization. *Single Overconfident* is a dummy variable equal to 1 if only the CEO or CFO is overconfident. *Dual Overconfident* is a dummy variable equal to 1 if both the CEO and CFO are overconfident. *Overconfident* is a dummy variable equal to one if at least one insider is deemed overconfident by the Kolasinski and Li (2012) confidence scale. *Fsize* is the natural log of firm total assets. *Close* is the natural log of the average daily closing stock price. *Volume* is the natural log of total shares traded during the quarter. *Volatility* is the natural log of the standard deviation of quarterly stock returns. All standard errors are clustered by permno.

Panel A: Repurchase Liquidity Effects

	CEO and CFO	All Insiders
VARIABLES	(1)	(2)
Repi	0.19***	0.12***
	(0.048)	(0.038)
Single Overconfident	0.03	
	(0.050)	
Dual Overconfident	0.16***	
	(0.048)	
Single*Repi	-0.15**	
	(0.061)	
Dual*Repi	-0.19***	
	(0.056)	
Overconfident		0.11***
		(0.035)
Overconfident*Repi		-0.10**
		(0.040)
Fsize	0.13***	0.10***
	(0.018)	(0.021)
Close	-0.23***	-0.22***
	(0.020)	(0.019)
Volume	-0.43***	-0.40***
	(0.011)	(0.020)
Volatility	6.32***	6.35***
	(0.549)	(1.024)
Constant	4.84***	
	(0.190)	
Observations	29,712	58,707
R-squared	0.55	0.93

Robust standard errors in parentheses

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

CHAPTER 4

DOES MANAGERIAL OVERCONFIDENCE AFFECT THE TIMING OF SEOS?

4.1   Introduction

Previous studies have considered whether managers time their equity offers to follow high stock returns. The general consensus is that management strongly considers recent stock prices when deciding on whether or not to offer a season equity offering (SEO) and purposefully issues equity during periods of high stock returns to maximize offer proceeds. However, as the behavioral finance field has continued to develop, researchers note that managers affected by certain behavioral biases are likely to view stock prices differently than unbiased managers. Many corporate finance studies have not included managerial behavior traits within their models, and thus do not fully capture how well stock price influences a manager's equity issuance decision.

In this paper, I take a closer look at underlying managerial behavior patterns and find that certain managers are more prone to issue equity in reaction to market overvaluations than others. In particular, I observe whether high stock prices are more likely to trigger equity issues when the firm's Chief Executive Officer (CEO) is classified as moderately confident or overconfident based on their insider trading history. I do the same for Chief Financial Officers (CFOs). A simple comparison of firm characteristics yields similar results as previous studies: firms led by overconfident managers tend to be larger and place a greater reliance on internal financing and non-equity financing. This observation, along with other analysis, has led to the general

conclusion that overconfident firms avoid funding future investment using additional equity. The main contribution of this paper is differentiating between equity offerings that may be motivated more by a need for additional financing and those that are motivated more to capitalize on cheap financing due to temporary stock price overvaluations. I find overconfident CEOs are no less likely to issue equity than their moderately confident peers when company stock returns are lower than average and market timing incentives are small. The probabilities diverge with moderately confident managers being more prone to offer equity as stock returns increase, and holds true for both shelf-offerings and non-shelf offerings.

I begin my analysis by calculating managerial confidence levels for CEOs and CFOs over the 1993 to 2013 time period. In contrast to much of the managerial overconfidence research, I use a classification system that does not revolve around employee stock option exercise patterns, but rather focuses on their insider stock trades. This method, first created by Kolasinski and Li (K&L, 2012), analyzes insider purchases and their subsequent returns. I define an overconfident manager as one who purchases his or her own company's stock in the secondary market and who ex post earns a negative abnormal return over the next 180 days. Essentially by purchasing their company's stock at a price that is too high they reveal that they believe the firm is currently undervalued and are overconfident that the stock price will increase. This approach provides many benefits. Firstly, I am able to expand my sample size because the data is more readily available and the classifications do not require costly hand-collection. Secondly, I do not have to focus solely upon firms issuing large employee stock option packages. It can be argued that by focusing on these firms researchers bias their results in such a way that SEOs are offered less often not because the manager is more or less overconfident but because the exercise of a large employee stock option package accompanying an SEO may threaten to dilute earnings per share

and potentially lower company stock prices further. By using the K&L overconfidence measure I do not eliminate firms with employee stock options but I do not limit my sample to only those firms who do have employee stock options and potentially avoid this bias. Finally, the managers within my sample make insider stock purchases multiple times over the course of the sample period. Accordingly, I am able to create a dynamic overconfidence measure and do not have to make the assumption that once a manager is overconfident, then he or she will always be overconfident.

My initial analysis focuses on whether or not overconfident managers are more or less likely to pursue an SEO when stock prices are higher than average. Overconfident managers are thought to view equity financing as unduly expensive due to the fact that they perceive that stockholders undervalue the firm. The overconfident manager overestimates his or her ability to positively influence the company's future success and, because the manager believes investors to be uninformed regarding the manager's ability, views the stock as undervalued. Consequently, overconfident firms should issue equity less often and rely more heavily on internal financing and debt. I build upon this argument and provide a more complete result. Overconfidence does not simply lessen the incentive to issue additional equity when needed, but rather it distorts the manager's market timing perceptions. When a moderately confident manager would view her stock as overvalued and thus an opportune time to pursue an SEO, an overconfident manager would not perceive the overvaluation and thereby not issue an SEO. However, if an SEO is to be issued for reasons other than market timing reasons (e.g. if funding is important for pursuing investment projects) then the discrepancy between moderately confident and overconfident propensities to offer an SEO should diminish. This is exactly what I find. I first compare the probabilities of performing an SEO across confidence types after placing each firm quarter into

one of five quintiles sorted on either company stock returns or company stock returns lagged one quarter. I do find that the probability of an SEO filing increases for both moderately confident and overconfident CEOs for companies in the highest lagged stock return quintile compared to those in the lowest. However, the filing probability across confidence type is not significantly different until the highest return quintile, in which case moderately confident managers are roughly a third more likely to issue an SEO compared to overconfident managers. Moreover, if I sort firm-quarters into quintiles based on current (no lag) stock returns I find that the probability to file an SEO no longer increases with stock return for overconfident managers, but moderately confident managers continue to file SEOs with greater probabilities. In the highest stock return quintile moderately confident managers are twice as likely to file an SEO while in the other four quintiles there is no statistically significant difference. These patterns are echoed in the shelf SEO analysis as well. I follow up on these results with a more robust time fixed-effect probit regression analysis and confirm these results for both CEOs and CFOs although the results differ across SEO type. Consistent with the above discussion, there appears to be little difference in the propensity to file a non-shelf SEO based on overconfidence alone. Interacting overconfidence with current and lagged stock returns suggests that as stock returns increase the probability that an overconfident manager files a non-shelf SEO decreases when compared to their moderately confident peers. Indeed in one regression, overconfident CFOs appear to be generally more likely than moderately confident CFOs to file a non-shelf SEO. The results differ for shelf SEOs. Overconfident CEOs appear to be generally less likely to file shelf SEOs than moderately confident CEOs, although the trend that overconfident managers only repurchase less often when stock prices are high does continue when looking at overconfident CFOs and shelf offerings.

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Next I turn my attention to the stock returns surrounding the announcement of an SEO and to the returns surrounding the actual SEO offering. It is well known that SEO announcements have a negative impact upon stock prices. My results confirm that this is still true; however, there is a statistically significant stock price increase for overconfident firms during the day following the announcement. This may be due to the fact that if overconfident firms do indeed prefer to avoid issuing equity, then pursuing an SEO may strongly signal the market of increased future company investment opportunities.

The basis for analyzing stock returns surrounding the SEO offer date is to observe whether or not the equity is being offered at a price peak. If the company successfully times the offering to coincide with abnormally high stock prices we should expect to see an eventual correction, or decrease, in stock price following the offer. A continual increase in the stock price should signal one of two things: 1.) either the company has done a relatively poor job of timing the market and the price peak has yet been reached, or 2.) the company is offering the SEO for motives other than simply timing the market. If indeed the company has mistimed the market and simply offered the equity too early we would still expect to see an eventual correction, just at a later date. I check for this eventual correction by analyzing cumulative abnormal returns (CARs) following the initial offer date for up to fourteen trading days, and analyze buy-and-hold abnormal returns for up to two years following the offer date.[14] My results support the notion that overconfident CEOs issue equity for reasons other than simply timing the market. During the following fourteen trading days after the SEO offering cumulative abnormal returns are 4.5% higher than moderately confident firms, statistically significant at the 95th percentile. This increase in abnormal positive returns is sustained over the next 185 trading days, during which

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[14] Use of CARs for long periods of time has been noted to be high susceptible to econometric errors and so I rely solely upon BHARs for long analysis.

the BHARs reach almost 12%. Such returns are not observed for shelf offerings although that is not necessarily surprising. Due to the fact that shelf offerings are preapproved long before they are actually offered it is reasonable to assume that they may be filed for reasons other than non-shelf offerings and overconfidence offer no explanatory information. Though not statistically significant, short-term abnormal returns are generally in the same direction for overconfident CFOs; however, long-term BHARs for shelf offerings issued by overconfident CFOs are significantly negative for periods over a single year. Ultimately, this paper shines further light on the topic of managerial overconfidence and provides further evidence that overconfidence distorts a manager's perception of company value.

The remainder of this paper is organized as follows. In Section I, I discuss previous overconfidence and SEO research. In Section II, I develop the main hypotheses. In Section III, I discuss the data and present summary statistics. In Section IV, I analyze how managerial overconfidence affects the propensity to issue SEOs. In Section V, I present an event study analysis of returns around SEO announcement dates and SEO offer dates. Finally, Section VI concludes.

4.2   Previous Research

4.2.1   Social Psychology

The motivation for this research stems from social psychology and behavioral finance research claiming that certain individuals, in particular corporate managers, are prone to overconfidence and that confidence levels directly impact their decision making. The psychology literature builds upon an idea coined the "better-than-average" effect. These findings suggest that individuals tend to overestimate their ability to discern outcomes with respect to the average individual (Larwood & Whittaker, 1977),(Svenson, 1981),(Alicke, 1985). Experimental evidence

suggests this also applies to economic decision making (Camerer & Lovallo, 1999).

Overconfident individuals, due to their own preconceived biases regarding personal ability, also appear to be more likely to pass blame or to attribute negative outcomes to other individuals' actions or simply bad luck, while attributing all successful, good outcomes to their own prowess (Miller & Ross, 1975). Three main factors have been associated with eliciting overconfidence: illusions of control, an overzealous degree of commitment to good outcomes, and difficulty comparing performance across individuals due to abstract reference points and/or framing difficulties (Weinstein, 1982),(Alicke et al., 1995). Due to the nature of corporate finance and executive responsibilities, corporate executives should be particularly prone to elicit overconfident behavior.

4.2.2   *Managerial Overconfidence*

Theoretical research by Goel and Thakor (2008) suggests that hiring bodies who observe managerial ability indirectly through investment project results will tend to hire overconfident managers. This is due to the fact that managerial ability and project risk both tend to increase project payoffs. Hence, the riskier overconfident manager is likely to have higher investment payoffs than his co-workers and will be (perhaps mistakenly) hired. Accordingly, all confidence levels in this paper should be viewed on relative terms. A manager deemed moderately confident may in fact be considered overconfident when compared to the general population, but is not when compared to his peers.

Empirical research by Malmendier and Tate (2005a, 2005b) controls for various firm-level effects and shows that overconfident managers are more likely to overinvest when available internal funds are high and underinvest when external financing is required. They suggest that overconfident managers believe their ability to increase firm value is not valued by the stock

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market and, consequently, the market undervalues their firm. The notion that overconfident managers believe the market undervalues their firm has strong implications for equity issues and the market timing arguments and is the foundation for their study; however this paper focuses more specifically on how overconfident managers time their equity offerings.

CEO overconfidence seems to have explanatory power for the seemingly abundant inefficient merger and acquisition behavior. Malmendier and Tate (2008) find that overconfident CEOs are 65% more likely to make an acquisition and that the market has a significantly more negative reaction to those acquisitions rather than acquisitions announced by a moderately (over)confident CEO (-90 basis points compared to -12 basis points, resp.,)[15]. CEO confidence levels also seem affect the particular CEO's career—empirical results suggest that excessively overconfident and excessively diffident CEOS tend to be forced out of office 67% (97% resp.) more often than those CEOs with a moderate level of confidence (Campbell et al., 2009).

While it may seem that there exists an abundance of negativity surrounding the idea of CEO overconfidence all is not bad. Overconfident CEOs appear to have greater innovative success per dollar of R&D expenditure than non-overconfident CEOs in innovative industries (Hirshleifer, Teoh, & Low, 2010) and firms managed by overconfident CEOs tend to obtain more patents and patent citations than peer companies ((Hirshleifer et al., 2010), (Galasso & Simcoe, 2011).)

Work done by Malmendier, Tate, and Yan (MTY, 2011) and Boulton and Campbell (Working Paper) are perhaps the most closely related to this study. MTY use a variety of overconfidence classification measures to describe CEO confidence level and then analyze the effects overconfidence has upon corporate financing decisions including capital structure and the

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[15] Over $220 Billion dollars were lost at the announcement of merger bids from 1980 to 2001 (Moeller, SChlingemann, and Stulz, 2005)

reliance upon external financing. In regard to external financing they find that overconfident

managers use less external financing, and conditional on accessing external financing, observe

that overconfident managers are more likely to rely on debt issues more than equity at a ratio of

roughly three dollars of debt financing for every dollar of equity financing. They do not however

look specifically at when the equity is issued, only whether or not equity is issued. By focusing

on the prevailing stock prices surrounding the equity offerings I believe I am able to get a better

glimpse at how overconfidence affects the equity issuance decision. Additionally, by relying

upon the Kolasinski and Li (2012) overconfidence measure I can potentially avoid any bias that

may arise from focusing solely upon employee stock option (ESO) issuing companies.[16]

Boulton and Campbell (Working Paper, 2013) analyze the timing of SEOs and

managerial overconfidence in relation to the initial primary offering (IPO) date. They argue that

overconfident managers purposefully underprice their IPO with the idea of immediately issuing

an SEO to benefit from the high short-term stock returns occurring after the IPO. My study

differs in many ways. Firstly, we differ in our concept of "timing the market." I focus solely on

how a firm times their SEOs around stock prices that are generally not impacted by the firm's

IPO (the majority of my firms have issued an IPO in the distant past compared to the SEOs under

scrutiny.) I avoid such a measure primarily because findings by Malmendier and Tate (2011)

suggest that overconfident firms tend to be larger and older firms, and so by focusing only on

IPO issuing firms I run the risk of introducing a selection bias within my sample. Secondly,

Boulton and Campbell define an overconfident manager in one of three ways: 1) A measure

based on a firm's industry adjusted capital expenditures, 2) A multi-faceted overconfidence

measure that uses the ratio of shares retained to shares sold at the IPO, the CRSP value-weighted

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[16] Malmendier, Tate, and Yan (2011) use multiple overconfidence measures which are described in their study. *Longholder* is the most popularly used confidence classification measure and relies solely upon ESO issuing companies. Their non-ESO overconfidence measures result in a substantial loss of observations.

index over the 22 trading days immediately prior to the IPO issue date, and the age of the IPO firm, and 3) a text-analysis overconfidence measure. I choose to rely upon the K&L (2012) overconfidence measure for several reasons. Firstly firms with high levels of investment are naturally more likely to issue an SEO to provide capital to fund the investment. Similarly firms that retain many shares are also more likely to issue an SEO closer to the IPO date simply as a way to decrease excess shares retained. Finally, to the extent that managers have differing confidence levels as their careers progress, a dynamic overconfidence measure is perhaps more useful. Using the K&L (2012) overconfidence measure allows me to avoid these potential issues.

4.2.3   Seasoned Equity Offerings

Loughran and Ritter (1995) and Speiss and Affleck-Graves (1995) analyze SEO returns and are the first to suggest that SEOs tend to underperform in the long-run. Loughran and Ritter (1995) suggest that despite an initial price increase pre-issuance, the falling returns more than offset the return increases. In their 1997 follow-up Loughran and Ritter note significant operating improvements prior to SEO offerings and deteriorating performance post issuance. Clarke, Dunbar, and Kahle (2004) observe that SEOs consisting entirely of already existing shares do not underperform when not sold by insiders. Those sold by insiders do underperform. Finally, a strong indicator that firms do try and time their equity offerings is presented by Graham and Harvey. Their 2001 study provides survey evidence that indicates stock price performance is a very strong factor affecting the equity issuance decision.

These results taken together suggest that managers seem to issue their SEOs during a sort of "window of opportunity," a time when stock prices are abnormally high. After the window closes, the stock prices fall below the original SEO offer price. This paper directly relates to such

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an argument – for overconfident CEOs who believe their firm is undervalued this window of opportunity should either be very small or indeed non-existent.

Research by Alti and Sulaeman (2011) suggest that market timing effects impact the equity issuance decision only when markets are receptive. They define a receptive market as one where equity can be issued at prices similar to prevailing stock prices – that is no significant price decrease results from the issue. When combining the concept of market reception, using institutional investor holdings as a proxy, with market timing factors they find strong evidence that market timing factors influence the equity issue decision only when market reception is high. To the extent that managerial overconfidence may also bias a manager's view of market receptiveness it should also bias how prone they are to time the market. In much the same way that overconfident manager's are believed to perceive company valuation as too low they might also be likely to believe the market is less receptive of the SEO for similar reason. Conequently, market timing factors may be even less influential in the equity issuance decision.

Finally, while much of the literature mentioned above focuses upon fundamental financial information and firm characteristics little attention has been given to the underlying behavioral aspects that affect the manager's decision making processes. In this paper I aim to shed light on whether or not managerial confidence types affect market timing tendencies and whether or not significant differences in SEO underpricing exist across firm types. To the best of my knowledge this is the first paper to address this issue.

4.3   Hypotheses

This paper specifically focuses on how overconfidence affects the equity issuance decision. A consistent finding within the SEO literature is that managers highly consider company stock prices when deciding whether or not to offer additional equity. Consequently,

any behavioral trait that systematically distorts a manager's stock price perception should also affect his or her equity issuance decision. Up until now, the general consensus is that overconfident managers prefer to not issue equity and therefore are generally less likely to do so. The focus of this paper is to further explore this idea and suggest a more detailed explanation: overconfidence is not responsible for a general decrease in the propensity to issue equity, but rather it diminishes market timing incentives such that high stock prices are less likely to prompt an overconfident manager to offer additional equity. A manager's propensity to offer additional equity to fund investment projects should not be affected by overconfidence.

Higher stock prices during an equity offering result in cheaper financing because the marginal benefit from issuing additional equity is higher. It is not surprising, then, that firms greatly consider prevailing stock prices when deciding whether to offer additional equity and are more likely to do so when prices are high. In contrast, lower stock prices make equity financing relatively more expensive, and thus should prompt managers to offer equity less often. However, to say that stock prices alone are the sole SEO motivator is to vastly oversimplify the decision. The need for financing also plays a large role. Regardless of prevailing stock prices, should a company need external financing, then the propensity to offer additional equity should increase. It is here that one should see the effect managerial overconfidence has on the equity issuance decision. Unless overconfident managers have smaller financing needs, a result that has not yet been proven, they should be no less likely to offer equity based strictly upon their needs than moderately confident managers. However, as timing factors are introduced into the offer decision we should see a divergence in equity offering propensities.

One should expect the propensity to time the market with high stock prices to decline as managers become overconfident. The reason why depends on how overconfident managers

actually perceive overvaluation. I identify two overvaluation theories: 1) either overconfident managers believe the market systematically undervalues their company's stock price such that at all stock prices, even when the stock actually is overvalued, the manager still believes it is undervalued; in which case market timing incentives should provide little motivation for equity financing.[17] Or 2) an overvaluation price exists (subsequently referred to as an overvaluation threshold) for the overconfident manager, but it is sufficiently high that such a price only occurs when stock prices are exceptionally overvalued – in which case market timing incentives exist only when stock prices are exceptionally high. Moderately confident managers, because they do not perceive the market to systematically undervalue their firm may still have an overvaluation threshold, but it should be generally lower than an overconfident manager's and thus market timing factors should play a larger role in the equity offering decision process.

It is easier to define an SEO as "un-timed" rather than timed. When stock prices are low, and perhaps more prone to actual undervaluation, one can more confidently claim that any SEOs offered are done so less for market timing purposes and more out of a need for financing. It is important to note, that an SEO being offered during high stock prices does not necessarily suggest it is a timed offering. It is easily possible that a need for additional financing and higher stock prices are positively correlated. However, it is certainly fair to suggest that as stock prices rise so too does the probability that an SEO is timed. And so, within this paper, I refer to timed SEOs as those that occur during periods of high stock returns, even when they may in fact not necessarily be timed SEOs.

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[17] If this is the case, it is incorrect to say that managers are not influenced by higher market prices, but rather such managers will always wait because they believe future stock prices will always be higher, even if they in fact won't be.

4.4 Data

The main resources for data collection for this project were the Thompson Financial Network insider Filing Data ("Insiders Table 1") and Thompson Reuter's SDC Platinum. The Insiders database provides information on executives' insider transactions which the S.E.C. requires public corporations to report on Forms 3, 4, 5, and 144.[18] This study focuses on Chief Executive Officer (CEO) and Chief Financial Officer (CFO) insider purchases of company stock in order to classify each manager as overconfident or moderately confident as specified by the Kolasinski and Li (2012) overconfidence classification method. This method analyzes insider purchases and their subsequent returns. I define an overconfident manager as one who purchases his or her own company's stock in the secondary market and who ex post earns a negative abnormal return over the next 180 days. Abnormal returns are calculated as raw stock returns minus the equal-weighted average return the benchmark portfolio's average return assigned to the stock. The benchmark portfolio used for each stock is constructed by sorting all firms into 10 size portfolios based on market capitalization at the beginning of the quarter. All stock price data is collected from the Center for Research in Security Prices (CRSP). The initial overconfidence data set is composed of 24771 CEO firm-quarter observations and 16789 CFO firm-quarter observations over the period 1993-2013. Table I provides summary statistics based upon overconfidence classifications. Panel A in Table I shows that overconfident CEOs tend to come from larger, cash-rich firms with less equity outstanding and higher retained earnings, a finding that agrees with much of the earlier literature. CFO overconfidence is less prevalent within the literature, however, the sample statistics are largely similar to the CEO statistics, however overconfident firms appear to be smaller with lower retained earnings.

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[18] Form 3 reports initial beneficial ownership of shares, Form 4 reports changes in beneficial holdings, Form 5 reports annual beneficial ownership changes, and Form 144 declares insider intentions to sell restricted shares.

All SEO data is taken from Thomson Reuters SDC Platinum. Firms having multiple announcement dates, but only a single offer date have only the single largest issue included within the sample (In most cases only one instance actually has shares filed as being offered and the others are simply dropped.) I restrict the sample to exclude spinoffs, unit offers, and rights offerings and differentiate between shelf offerings and non-shelf offerings. My initial completed SEO sample consists of 6440 shelf offerings and 6953 non-shelf offerings. I further require my sample observations to be contained in both the Standard and Poor's COMPUSTAT quarterly fundamentals database as well as CRSP and exclude all financial firms and utility companies (SIC 6000-6999 and 4000-4999, resp.) SEO sample statistics are shown in Table II. Looking specifically at non-shelf SEOs, firms issuing SEOs tend to be smaller in every category. This is not necessarily surprising as younger firms are more likely to have a need to additional external financing and are less likely to rely on retained earnings. This size gap greatly diminishes however if looking at shelf SEOs, a motivating factor for examining both shelf SEOs and non-shelf SEOs separately.

Merging this data set with the overconfidence sample results in a final CEO dataset composed of 33,399 firm-quarter non-shelf observations with 498 SEO quarters and 33,400 firm-quarter shelf observations with 264 SEO quarters. The final CFO dataset has 23,926 firm-quarter non-shelf observations with 359 SEO quarters and 23,925 firm-quarter shelf observations with 173 SEO quarters.

4.5   SEO Propensity Analysis

I first analyze the propensity to offer an SEO consistent with market timing effects and how managerial overconfidence affects such propensities. I define a timed SEO as one in which management specifically offers the equity to coincide with overvalued stock prices in order to

obtain cheaper financing. While I am unable to specifically differentiate between a timed SEO and a non-timed SEO, by definition the probability of a timed SEO being conducted during periods of high stock returns is much higher than SEOs being conducted during periods of low stock returns. As such I use stock return in quarter t and quarter t-1 as a proxy for whether or not the SEO is timed.

4.5.1   Univariate Analysis

I begin my analysis by separating firms into quintiles based on the quarter's raw stock return. I then calculate the percentage of firm-quarters within the quintile in which an SEO was announced during the quarter. I do this for three samples: All firm-quarters, moderately confident managers, and overconfident managers. Tables III and IV show the results for non-shelf SEOs and SEOs, resp. Focusing on Table III Panel A one should notice that, consistent with SEO theory as stock returns increase so too does the propensity to issue an SEO, for the overall sample the propensity that the quarter is one during which an SEO was offered is .88%. The highest return quintile sees an offer probability of 1.41%, a difference of 53 basis points and statistically significant at the 10th percentile. Upon controlling for managerial overconfidence this trend becomes more exaggerated for moderately confident managers and actually diminishes for overconfident managers. Moderately confident managers are over twice as likely to offer an SEO during the highest return quintile compared to the lowest quintile (2.01% versus .76%), statistically significant at the 99th percentile. In comparison, there is no statistically significant difference across the high and low return quintile for the overconfident manager. Furthermore, if I compare each return quintile across confidence types I only see significant differences in offer propensity when looking at the highest return quintile. Within this quintile overconfident managers are less than half as likely to offer equity as moderately confident managers (.82%

versus 2.01%, significant at the 99th percentile). During all other return quintiles there are no statistically significant differences, thereby suggesting that overconfident managers are no less prone to offer equity than their moderately confident peers in general. Panel B provides less conclusive results. In all three categories the propensity to offer an SEO increases significantly as stock returns increase, but there is no significant difference across confidence types. This is likely due to one of two reasons. Firstly, the extent that CFOs are involved within the SEO process varies across firm and simple univariate analysis is unlikely to account for such differences. Secondly, CEO overconfidence levels may influence the CFO results and as a result it is possible to have a moderately confident CFO sample with many overconfident CEOs and vice versa. Table IV provides results for shelf offerings. Interestingly we see no general trend among CEOs regarding their propensity to time their SEO offers with high stock market returns. However, in Panel A the results still suggest that overconfident managers are approximately half as likely to offer SEOs during higher stock return periods than their moderately confident peers and not significantly less likely to offer SEOs when stock returns are lower. Panel B shows the results for shelf SEOs. The results differ starkly from Panel A, but again they are subject to the same potential problems as Panel A in Table III. Here we see that regardless of confidence type managers are more likely to issue equity during high stock return periods and there is no statistically significant difference between overconfidence types.

It can be argued that focusing on current stock returns does not adequately reflect a manager's propensity to time the market because managers are more likely to look at past stock performance than present stock performance. Tables V and VI present a similar analysis using the previous quarter's stock return as opposed to the current quarter's. Table V Panel A analyzes the propensity to time non-shelf SEOs and CEO overconfidence. Like Table III Panel A

Moderately confident managers are still prone to issue equity at higher stock returns, unlike Table III however, the results now suggest that overconfident managers are also likely to time their repurchases alongside high stock returns. Importantly though, is the fact that overconfident managers are almost a third less likely to offer equity during the highest return quintile (1.15% versus 3.14%) while be no less prone to issue equity than in the other four return quintiles. Again, this suggests that overconfidence does not generally decrease the propensity to offer equity, but rather diminishes market timing incentives. Panel B echoes the result that SEO likelihood increases with stock return, but there is no statistical difference between moderately confident and overconfident managers across all quintiles. Table VI takes a similar look at shelf SEOs and the results mirror Table V's.

4.5.2 Multivariate Probit Analysis

It is unlikely that CEOs and CFOs play the same role in the SEO decision making process across all firms. Additionally, multiple factors other than simply (lagged and non-lagged) stock returns and confidence type, affect the propensity to issue equity. Consequently, I reran the above analysis using a fixed-effect probit model including firm fixed-effects and quarterly fixed-effects to better capture the effect managerial overconfidence may have on SEO offer propensity. Table VII provides the results for non-shelf SEOs while Table VIII provides results for shelf SEOs.

Looking at Table VII one should immediately notice the non-significant coefficients associated with *Overconfident*, a dummy variable equal to one if the CEO/CFO is overconfident and zero otherwise. If overconfident managers are generally less likely than their moderately confident peers then one would expect these coefficients to be significantly negative. Since this is not the case, one cannot confidently conclude that overconfidence does in fact cause managers

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to be any more wary of issuing equity than other managers. Interestingly, column 3, suggests that overconfident CEOs are actually more likely to offer equity. Looking at $Return_t$ and $Return_{t-1}$, continuous variables for the current and lagged stock return, respectively, suggests that increased stock returns are correlated with an increased SEO offer probability and that market timing likely occurs. Columns 1 and 2 and 4 and 5 look at how current and lagged stock returns affect CEO and CFO (respectively) offer propensity individually while column 3 and 6 includes both current and lagged returns. It should not be surprising given previous literature that all coefficients are positive and highly significant. For example column 3 suggests that a one percent increase in a company's stock return is correlated with an almost .89% increased offer probability in the same quarter and over a two percent increase in the following quarter. If one were to compare this to the overall average SEO offer probability across all five quintiles (1.33% in Table 3 panel A and 1.32% in Table 5 panel A) a one percent increase in stock price is correlated with offer probabilities that are one and a half times as high in the current quarter, and almost twice as high in the second quarter.

Interacting stock return with confidence types gives the main variable of interest. Should overconfidence decrease the propensity to issue equity alongside periods of high stock returns, one should expect the interaction term to have a negative coefficient. Indeed this is largely what occurs. Except for columns 4 and 6, in which case two of the interaction coefficients are insignificant, all of the interaction coefficients are negative and highly significant. Looking at column 1 the .7% decrease in timing propensity associated with overconfidence more than makes up for the .685% increase associated with a 1% increase in stock price. Columns 2, 3, 5, and 6 support the observations in Tables III-VI that both moderately confident and overconfident managers are likely to time the market. However, on average an overconfident manager is

almost half as like to issue equity during a high stock return quarter as a moderately confident

manager. The other coefficients within the model seem to have intuitive explanations. For

example, *CapEx*, a company's annual capital expense level, is statistically significant but in

order for the offer propensity to increase for any given quarter a substantial amount there must be

a large increase in capital expenditures. Interestingly, there are mixed results for how *Total*

Assets (the natural log of a firm's total assets), *Net Income* (the natural log of a firm's total

assets), and *Total Debt* (the natural log of a firm's debt outstanding) affect the propensity to offer

equity across managerial type. For example increased earnings are correlated with a lower CEO

offer probability and appear largely uncorrelated with CFO offer probability. In contrast,

increased debt levels are correlated with decreased CFO offer probabilities and are largely

uncorrelated with CEO offer probability. Such results may signal differences in thought

processes among CEOs and CFOs.

Table VIII performs the same regression analysis on shelf SEOs with interesting results.

The *Overconfident* coefficients are all negative (with at least 10% significance) in columns 1-3,

suggesting that overconfident CEOs may be generally less likely to offer shelf SEOs. However,

this difference, though statistically significant, is not particularly substantial – according to

column 3 overconfident CEOs are only .12% less likely to issue an SEO each quarter. The

interaction effects for CEOs are statistically insignificant although there is strong evidence that

shelf offerings are also affected by market timing incentives as $Return_t$ and $Return_{t-1}$ are both

positive and highly significant. Looking at CFOs, again there appears to be no general difference

in offer probabilities across confidence types; however, the interaction effects do suggest that

overconfident CFOs are less likely to time their SEOs. The other coefficient within the model

again suggest that CEOs and CFOs may consider different factors when choosing to offer an

SEO and surprisingly many of the coefficients that are statistically significant for CFOs are insignificant for CEOs.

4.6   Event Study Analysis

I first analyze cumulative abnormal stock returns (CARs) surrounding the SEO announcement date as a way to measure market receptivity. It is commonly known that the announcement of an SEO tends to decrease stock prices. By definition, a more receptive market is one where the underlying stock price during the actual SEO offer is closer to the prevailing stock price before the announcement was made. Daily abnormal returns are calculated using the Carhartt Four-Factor model. Additionally I analyze CARs surrounding the actual offer date. If SEOs are in fact issued during periods of market overvaluation we would expect a self-correcting market to eventually realize this fact and move accordingly, thereby resulting in eventual negative abnormal returns around the SEO offer date. Due to the fact that there exist known econometric issues with using CARs over longer periods of time I also calculate buy-and-hold abnormal returns and look at longer time periods surrounding the offer date.

4.6.1   CARs Surrounding Announcement Dates

Event study results surrounding SEO announcement dates are reported in Table IX. Columns 1-3 regress CARs on various CEO company variables for the three days surrounding the SEO announcement, the following 60 days after the announcement effect (conditional on the SEO being offered within 60 days of announcement), and the overall period from announcement to offer, respectively. Columns 4-6 provide similar coefficients for CFO company variables. The positive and significant coefficient in columns 1 and 4 suggest that the immediate effect of an SEO announcement is actually positive for overconfident firms. If overconfident firms are indeed wary of relying upon additional equity to finance investment projects an SEO

announcement may signal the market of large future investment projects within the firm and thereby increase stock returns. However, over the sixty days following the announcement and during the announcement to offer period, there appears to be no statistically significant difference across confidence types. Included within the CAR analysis are other variables that may affect the market response to an announcement. It is not surprising that the coefficient *Return$_{t-1}$* and *SEO Offer Size* (the natural log of the total number of shares issued) are negative as they may signal the market realizes attempts to time SEOs around overvaluation periods. Additionally, *CapEx* and *Net Income* having positive coefficients may suggest that the market interprets the SEO announcement as a need to fund value-enhancing investment projects.

4.6.2 *CARs Surrounding SEO Offer Dates*

Event study results (CARs) surrounding SEO offer dates are reported in Table X. Columns 1-4 show the various *Overconfident* coefficient as determined by regressing sample CARs on the variables *Overconfident*, *Total Assets*, and *Net Income* over the three trading days surrounding the SEO offer, the three trading days following the offer, the seven trading days following the offer, and the 14 trading days following the offer. The regression is performed on CEO and CFO samples and for Non-shelf SEOs and Shelf SEOs. The results further confirm earlier statements that overconfident managers are unlikely to time their SEO offers with periods of market overvaluation. If the market were overvaluing the company when overconfident managers offered their SEOs one would expect to see significant negative coefficients. However, as Table X shows CARs for up to 14 days following the offering remain positive. Shelf offering results and results for non-shelf SEOs by CFOs are inconclusive.

4.6.3 *BHARs Surrounding SEO Offer Dates*

Event study results (BHARs) surrounding SEO offer dates are reported in Table XI.

BHARs have been shown to be less affected by econometric problems than CARs when

analyzing abnormal returns over longer horizon periods. I do, however, analyze the seven trading

days following the offer simply (column 1) to show that short-term BHAR calculations are

highly similar to the CAR analysis. Table X suggests that short-term abnormal returns following

the SEO offer date are positive for CEOs offering non-shelf SEOs, thereby suggesting they do

not time their offerings with abnormally high stock returns. However, one could argue that they

do time their SEOs with increased stock returns they just do so poorly. That is they aim to issue

the SEO at a stock price maximum price, but end up offering the SEO too early. If this were the

case seeing positive abnormal returns in the immediate future might be possible but abnormal

returns in the more distant future should be negative as the market corrects the overvaluation.

Columns 2-5 in table XI provide such an analysis. This table consists of the *Overconfident*

coefficient taken from a fixed-effect regression of BHARs including industry fixed-effects and

quarterly fixed-effects on managerial overconfidence, firm size, and company net income.

Looking specifically at overconfident CEOs one will notice that overconfident SEO offerings are

associated with highly positive and statistically significant abnormal returns that continue for the

two quarters following the SEO offer. Under the assumption of a self-correcting market one

would expect negative abnormal returns to eventually appear to correct the overvaluation. This

does not occur; in fact, there are no statistically significant negative abnormal returns over the

next two trading years.

Similar to Table X, the regression results are largely insignificant for shelf SEO

offerings. Interestingly overconfident shelf offerings, though showing now statistically

significant difference during periods shorter than one year appear to underperform significantly over the general two year period. I would argue that such a result does not provide evidence that CFO shelf offerings are timed with stock price overvaluation simply because such an argument would suggest that the market is very slow to correct itself. Rather such results may suggest that over the long run overconfident firms might suffer from value destroying decisions as suggested by much of the previous overconfidence literature. Nevertheless, further analysis is outside the scope of this paper.

4.7   Conclusion

A general analysis of managerial overconfidence and its effect on company investment financing may suggest that overconfident managers prefer not to rely on offering external equity financing. However, such an analysis oversimplifies the equity issuance decision and fails to incorporate market timing incentives and how they are affected by overconfidence. Earlier research has shown that management attempts to time its SEOs around periods of high stock price overvaluation as a way to capture cheap financing opportunities. Due to the fact that overconfident managers believe the market systematically undervalues their firm, one should expect that market timing incentives play less of a role in the equity issuance decision than their moderately confident peers. This study supports the claim. Analysis of quarterly SEO offer probabilities suggest that during quarters where market timing incentives are less probable, because of low stock prices, there is no difference between overconfident and moderately confident offer behavior. However, as stock prices increase and thus market timing probabilities increase I find that overconfident managers are nearly half as likely to time as their moderately confident peers. A fixed-effect probit analysis confirms this is true for both CEOs and CFOs issuing non-shelf SEOs. The results vary for shelf offerings. Overconfident CEOs appear to be

generally less likely to offer shelf SEOs while Overconfident CFOs appear no less likely to offer them but are less likely to time them alongside high stock returns.

Further analysis of abnormal returns surround the SEO announcement date and the SEO offer date further support the notion that overconfident CEOs are less influenced by market timing incentives when deciding to issue equity. In conclusion, this paper adds further evidence regarding how managerial confidence levels affect corporate decision making and further supports that argument that behavioral finance needs to be incorporated into more corporate finance models.

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Table 4.1: Overconfidence Summary Statistics

This table presents descriptive statistics for the same of managers used on the overconfidence sample. Results encompass the 1993-2013 time period. Managerial overconfidence is determined using the Kolasinski and Li (2012) confidence classification system. Company fundamentals are gather from Standard and Poor's Compustat Quarterly Fundamentals database. Panel A focuses on company Chief Executive Officers (CEOs). Panel B focuses on company Chief Financial Officers (CFOs).

Panel A: CEOs	Moderately Confident					Overconfident			
	(1) N	(2) Mean	(3) Std.	(4) Median		(5) N	(6) Mean	(7) Std.	(8) Median
Total Assets	41,875	3,420	39,902	261.6		39,906	3,650	49,510	167.2
CapEx	37,554	43.93	310.6	2.417		36,286	39.21	346.9	1.550
Cash	41,825	254.6	4,589	18.88		39,880	357.1	7,318	13.30
Shares Outstanding	41,845	55.51	260.8	17.59		39,819	52.94	337.8	14.10
Goodwill	20,138	260.4	2,347	2.628		18,034	356.3	3,584	0.950
Total Debt	41,863	2,824	36,464	132.1		39,885	3,073	44,982	77.25
Net Income	43,816	9.172	286.1	0.887		42,103	13.15	658.9	0.455
Closing Stock Price	40,569	16.01	18.59	11.51		38,346	14.67	17.95	9.990
Retained Earnings	40,393	214.4	2,817	4.512		38,874	221.1	3,866	1.218
Stockholders' Equity	41,867	577.3	3,697	81.38		39,886	560.9	4,990	55.45

Panel B: CFOs									
	(1) N	(2) Mean	(3) Std.	(4) Median		(5) N	(6) Mean	(7) Std.	(8) Median
Total Assets	28,959	3,413	33,672	286.0		26,168	2,096	17,765	200.7
CapEx	26,003	38.69	270.9	2.756		24,090	32.68	226.0	1.941
Cash	28,941	205.6	2,338	20.94		26,166	213.5	3,883	15.33
Shares Outstanding	28,806	53.46	217.3	17.34		26,051	51.21	261.0	15.76
Goodwill	13,622	244.9	1,834	2.950		11,685	222.4	1,542	2.715
Total Debt	28,947	2,800	30,820	144.4		26,151	1,618	15,998	92.69
Net Income	30,592	6.861	434.7	1.123		28,010	8.990	162.7	0.617
Closing Stock Price	27,777	16.70	17.69	12.50		24,820	15.59	15.81	11.27
Retained Earnings	28,054	194.2	2,058	8.784		25,447	114.6	2,397	2.329
Stockholders' Equity	28,949	589.3	3,751	89.97		26,151	465.7	2,724	65.51

Table 4.2: Descriptive statistics of Seasoned Equity Offering Firms

This table presents summary statistics of company fundamentals during quarters in which an SEO was offered and during quarters in which an SEO was not offered during the 1993-2013 time period. Company fundamental data is taken from Standard and Poor's Compustat Quarterly Fundamentals database. All SEO data is gathered from Thomson Reuter's SDC Platinum database. All stock price data comes from the Center for Research in Security Prices.

| | Non-Shelf SEO Sample | | | | | | Shelf SEO Sample | | | | | |
| | Non-SEO Quarters | | | SEO Quarters | | | Non-SEO Quarters | | | SEO Quarters | | |
	N	Mean	Std	N	Mean	Std	N	Mean	Std	N	Mean	Std
Total Assets	269,098	3,474	18,577	2,600	723.5	2,431	270,237	3,448	18,491	1,476	3,289	18,626
Cash	267,920	341.5	1,927	2,594	84.66	185.5	269,053	339.5	1,922	1,476	253.0	1,066
Shares Outstanding	261,827	102.1	393.2	2,595	34.59	62.55	262,964	101.4	391.5	1,472	109.4	361.8
Goodwill	122,199	640.4	2,885	629	162.2	527.1	121,615	640.4	2,887	1,228	384.5	1,716
Total Debt	268,855	2,118	13,479	2,600	426.2	1,749	269,995	2,101	13,400	1,475	2,175	16,074
Net Income	268,530	47.33	378.9	2,599	4.387	97.50	269,668	47.05	378.0	1,476	22.85	168.6
Retained Earnings	255,688	837.5	6,196	2,524	34.06	737.5	256,933	833.0	6,179	1,289	154.3	2,915
Stockholders' Equity	268,958	1,311	6,197	2,600	292.3	828.6	270,098	1,302	6,181	1,475	1,070	3,085
CapEx	260,725	128.0	871.2	2,559	33.78	192.5	261,829	126.9	867.9	1,470	167.4	723.9
Closing Quarterly Stock Price	269,098	41.28	1,189	2,600	39.79	601.9	270,237	41.35	1,188	1,476	26.64	18.54
Average Quarterly Stock Return	248,837	0.0219	0.103	2,476	0.0397	0.112	249,946	0.0220	0.103	1,381	0.0429	0.113

Table 4.3: Propensity to Time Non-Shelf SEOs – Univariate Analysis

This table presents quarterly probabilities to announce a non-shelf SEO across managerial overconfident levels and quarterly stock returns. Stock return quintiles are based on company raw stock returns during the quarter in which the SEO was announced. The *High*/*Low* return quintiles are the quintiles in which firm-quarters with the highest/lowest quarterly stock returns are placed. Managerial overconfidence types are classified using the Kolasinski and Li (2012) overconfidence measure. My sample of potential SEO announcers consists of 33399 CEO firm-quarters over the period 1993-2013 (Panel A) and 23926 CFO firm-quarters over the period 1993-2013 (Panel B). The t-statistics reported in parentheses are adjusted using New-West correction for heteroskedasticity and serial correlation.

Panel A: Univariate sort on stock return - CEO

	Low	2	3	4	High		
			Return Quintile				
Average Stock Return							
SEO Issuance Probability						High Minus Low	
All Observations	0.88	1.34	1.5	1.53	1.41	0.53	(-1.82)
Moderately Confident	0.76	1.37	1.37	1.69	2.01	1.25	(-2.48)
Overconfident	1	1.32	1.64	1.36	0.82	-0.18	(0.64)
Over Minus Moderate	0.24	-0.05	0.27	-0.33	-1.19		
	(-0.84)	(0.12)	(-0.59)	(0.67)	(2.35)		

Panel B: Univariate sort on stock return - CFO

	Low	2	3	4	High		
			Return Quintile				
Average Stock Return							
SEO Issuance Probability						High Minus Low	
All Observations	1.95	1.1	1.24	1.41	1.7	-0.25	(0.31)
Moderately Confident	2.39	0.91	0.84	1.6	1.67	-0.72	(-0.26)
Overconfident	1.51	1.25	1.66	1.22	1.72	0.21	(0.49)
Over Minus Moderate	-0.88	0.34	0.82	-0.38	0.05		
	(0.56)	(-1.05)	(-1.61)	(0.91)	(0.07)		

Table 4.4: Propensity to Time Shelf SEOs – Univariate Analysis

This table presents quarterly probabilities to announce a shelf SEO across managerial overconfident levels and quarterly stock returns. Stock return quintiles are based on company raw stock returns during the quarter in which the SEO was announced. The *High*/*Low* return quintiles are the quintiles in which firm-quarters with the highest/lowest quarterly stock returns are placed. Managerial overconfidence types are classified using the Kolasinski and Li (2012) overconfidence measure. My sample of potential SEO announcers consists of 33400 CEO firm-quarters over the period 1993-2013 (Panel A) and 23925 CFO firm-quarters over the period 1993-2013 (Panel B). The t-statistics reported in parentheses are adjusted using New-West correction for heteroskedasticity and serial correlation.

Panel A: Univariate sort on stock return - CEO

	Return Quintile						
	Low	2	3	4	High		
Average Stock Return							
SEO Issuance Probability						High Minus Low	
All Observations	0.74	0.57	1	1.1	1.3	0.56	(-1.62)
Moderately Confident	0.97	0.68	1.34	1.45	1.66	0.69	(-1.14)
Overconfident	0.5	0.46	0.66	0.75	0.94	0.44	(-1.32)
Over Minus Moderate	-0.47	-0.22	-0.68	-0.7	-0.72		
	(0.95)	(0.84)	(2.17)	(1.79)	(1.51)		

Panel B: Univariate sort on stock return - CFO

	Return Quintile						
	Low	2	3	4	High		
Average Stock Return							
SEO Issuance Probability						High Minus Low	
All Observations	0.36	0.79	0.82	0.98	1.41	1.05	(-3.12)
Moderately Confident	0.5	0.96	0.92	1.25	1.37	0.87	(-1.80)
Overconfident	0.22	0.62	0.73	0.72	1.44	1.22	(-2.63)
Over Minus Moderate	-0.28	-0.34	-0.19	-0.53	0.07		
	(0.97)	(0.97)	(0.61)	(1.30)	(-0.11)		

Table 4.5: Propensity to Time Non-Shelf SEOs – Lagged Univariate Analysis

This table presents quarterly probabilities to announce a non-shelf SEO across managerial overconfident levels and lagged quarterly stock returns. Stock return quintiles are based on company raw stock returns during the quarter prior to the SEO announcement. The *High*/*Low* return quintiles are the quintiles in which firm-quarters with the highest/lowest quarterly stock returns are placed. Managerial overconfidence types are classified using the Kolasinski and Li (2012) overconfidence measure. My sample of potential SEO announcers consists of 33399 CEO firm-quarters over the period 1993-2013 (Panel A) and 23926 CFO firm-quarters over the period 1993-2013 (Panel B). The t-statistics reported in parentheses are adjusted using New-West correction for heteroskedasticity and serial correlation.

Panel A: Univariate sort on lagged stock return - CEO

	Low	2	3	4	High	High Minus Low	
Average Stock Return							
SEO Issuance Probability							
All Observations	0.71	0.65	1.14	1.51	2.56	1.85	(-4.93)
Moderately Confident	0.92	0.74	1.30	1.56	3.14	2.22	(-3.48)
Overconfident	0.50	0.56	0.99	1.46	1.99	1.49	(-3.84)
Over Minus Moderate	-0.42	-0.18	-0.31	-0.10	-1.15		
	(0.83)	(0.63)	(0.83)	(0.23)	(2.12)		

(Return Quintile spans Low, 2, 3, 4, High)

Panel B: Univariate sort on lagged stock return - CFO

	Low	2	3	4	High	High Minus Low	
Average Stock Return							
SEO Issuance Probability							
All Observations	0.55	0.87	1.06	1.06	3.08	2.54	(-5.06)
Moderately Confident	0.63	0.93	1.28	1.17	2.98	2.35	(-4.57)
Overconfident	0.46	0.81	0.83	0.95	3.18	2.72	(-3.15)
Over Minus Moderate	-0.17	-0.12	-0.46	-0.23	0.20		
	(0.57)	(.26)	(1.00)	(0.69)	(-0.21)		

(Return Quintile spans Low, 2, 3, 4, High)

Table 4.6: Propensity to Time Shelf SEOs – Lagged Univariate Analysis

This table presents quarterly probabilities to announce a Shelf SEO across managerial overconfident levels and lagged quarterly stock returns. Stock return quintiles are based on company raw stock returns during the quarter prior to the SEO announcement. The *High/Low* return quintiles are the quintiles in which firm-quarters with the highest/lowest quarterly stock returns are placed. Managerial overconfidence types are classified using the Kolasinski and Li (2012) overconfidence measure. My sample of potential SEO announcers consists of 33399 CEO firm-quarters over the period 1993-2013 (Panel A) and 23926 CFO firm-quarters over the period 1993-2013 (Panel B). The t-statistics reported in parentheses are adjusted using New-West correction for heteroskedasticity and serial correlation.

Panel A: Univariate sort on lagged stock return - CEO

	Return Quintile						
	Low	2	3	4	High		
Average Stock Return							
SEO Issuance Probability						High Minus Low	
All Observations	0.52	0.56	0.86	1.26	1.65	1.13	(-3.71)
Moderately Confident	0.51	0.66	1.16	1.75	2.06	1.55	(-3.21)
Overconfident	0.54	0.47	0.56	0.77	1.24	0.70	(-1.93)
Over Minus Moderate	0.03	-0.19	-0.60	-0.97	-0.83		
	(-0.12)	(0.69)	(1.73)	(2.26)	(1.51)		

Panel B: Univariate sort on lagged stock return - CFO

	Return Quintile						
	Low	2	3	4	High		
Average Stock Return							
SEO Issuance Probability						High Minus Low	
All Observations	0.30	0.49	0.88	1.31	1.26	0.96	(-3.97)
Moderately Confident	0.30	0.27	1.15	1.63	1.55	1.25	(-3.44)
Overconfident	0.30	0.71	0.61	1.00	0.97	0.67	(-2.11)
Over Minus Moderate	0.00	0.44	-0.54	-0.62	-0.58		
	(0.01)	(-1.63)	(1.35)	(1.23)	(1.27)		

Table 4.7: Propensity to Time Non-Shelf SEOs – Multivariate Probit Regression

This table presents a fixed-effect multivariate probit regression including industry fixed-effects and quarterly fixed-effects on the variable *SEO* which equals 1 if the quarter is one during which the company offers a non-shelf SEO and 0 otherwise. *Overconfident* is a dummy variable equal to 1 as determined by the Kolasinski and Li (2012) confidence classification method and 0 otherwise. *Return$_t$* and *Return$_{t-1}$* are the raw stock returns occurring during the quarter and quarter prior to the SEO offer, resp. *CapEx*, *Total Assets*, *Cash*, and *Net Income* is the level of annual capital expenditures, total assets, cash, and earnings as reported on the company balance sheet (all in millions) during the SEO offer quarter, resp. All company data is taken from Standard and Poor's Compustat Quarterly Fundamentals or CRSP. All standard errors are clustered by firm.

	CEOs			CFOs		
	(1)	(2)	(3)	(4)	(5)	(6)
Overconfident	0.00733	0.0158	0.0370	0.0654	0.0903*	0.0813
	(0.0379)	(0.0425)	(0.0438)	(0.0450)	(0.0502)	(0.0517)
Return $_t$	0.685***		0.893***	0.706***		0.620**
	(0.190)		(0.226)	(0.261)		(0.302)
Return $_{t-1}$		2.049***	2.067***		1.849***	1.823***
		(0.223)	(0.220)		(0.246)	(0.245)
Overconfident x Return $_t$	-0.700***		-0.869***	-0.156		0.167
	(0.262)		(0.319)	(0.321)		(0.385)
Overconfident x Return $_{t-1}$		-0.755***	-0.767***		-0.801**	-0.778**
		(0.282)	(0.281)		(0.357)	(0.355)
CapEx	0.000225**	0.000183**	0.000182**	0.000414**	0.000452**	0.000452**
	(8.94e-05)	(8.63e-05)	(8.56e-05)	(0.000174)	(0.000179)	(0.000179)
Total Assets	-3.80e-05	-1.93e-05	-1.73e-05	-0.000220***	-0.000210**	-0.000201**
	(4.10e-05)	(4.19e-05)	(4.12e-05)	(7.13e-05)	(8.68e-05)	(8.57e-05)
Cash	0.000235***	0.000223**	0.000222**	0.000344***	0.000358***	0.000344***
	(8.83e-05)	(9.20e-05)	(9.22e-05)	(0.000102)	(0.000118)	(0.000116)
Shares Outstanding	-0.000586	-0.000761	-0.000755	-0.000344	-0.000586	-0.000555
	(0.000438)	(0.000514)	(0.000508)	(0.000300)	(0.000838)	(0.000802)
Net Income	-3.87e-05	-0.000185**	-0.000194**	5.66e-05	2.04e-05	-1.52e-05
	(2.43e-05)	(7.97e-05)	(7.79e-05)	(0.000230)	(0.000273)	(0.000273)
Constant	-1.848***	-2.282***	-2.261***	-1.623***	-2.644***	-2.652***
	(0.521)	(0.723)	(0.693)	(0.587)	(0.562)	(0.567)
Observations	29,812	26,207	26,207	21,331	18,736	18,736

Robust standard errors in parentheses

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

Table 4.8: Propensity to Time Shelf SEOs – Multivariate Probit Regression
This table presents a fixed-effect multivariate probit regression including industry fixed-effects and quarterly fixed-effects on the variable *SEO* which equals 1 if the quarter is one during which the company offers a shelf SEO and 0 otherwise. *Overconfident* is a dummy variable equal to 1 as determined by the Kolasinski and Li (2012) confidence classification method and 0 otherwise. *Return$_t$* and *Return$_{t-1}$* are the raw stock returns occurring during the quarter and quarter prior to the SEO offer, resp. *CapEx*, *Total Assets*, *Cash*, and *Net Income* is the level of annual capital expenditures, total assets, cash, and earnings as reported on the company balance sheet (all in millions) during the SEO offer quarter, resp.. All company data is taken from Standard and Poor's Compustat Quarterly Fundamentals or CRSP. Standard Errors are clustered by firm.

	CEOs			CFOs		
	(1)	(2)	(3)	(4)	(5)	(6)
Overconfident	-0.140**	-0.133**	-0.121*	0.00642	0.0569	0.0417
	(0.0590)	(0.0605)	(0.0631)	(0.0730)	(0.0795)	(0.0792)
Return$_t$	0.727**		0.960***	0.566		0.592*
	(0.307)		(0.306)	(0.352)		(0.343)
Return$_{t-1}$		1.088***	1.104***		1.388***	1.389***
		(0.250)	(0.245)		(0.297)	(0.293)
Overconfident x Return$_t$	-0.312		-0.502	-0.234		0.291
	(0.379)		(0.387)	(0.394)		(0.500)
Overconfident x Return$_{t-1}$		-0.507	-0.505		-1.188***	-1.164***
		(0.370)	(0.363)		(0.351)	(0.348)
CapEx	8.84e-05	8.46e-05	8.49e-05	0.000175**	0.000176**	0.000170**
	(5.43e-05)	(5.44e-05)	(5.38e-05)	(7.18e-05)	(7.07e-05)	(7.02e-05)
Total Assets	-1.49e-05	-2.09e-05	-1.95e-05	-0.000208***	-0.000225***	-0.000217***
	(1.36e-05)	(1.50e-05)	(1.44e-05)	(5.57e-05)	(5.88e-05)	(5.77e-05)
Cash	-5.29e-05	-4.57e-05	-4.48e-05	0.000217**	0.000232**	0.000228**
	(5.14e-05)	(4.67e-05)	(4.75e-05)	(8.80e-05)	(9.22e-05)	(9.18e-05)
Shares Outstanding	0.000142	0.000148	0.000163	-3.24e-05	-8.44e-05	-8.86e-05
	(0.000150)	(0.000155)	(0.000156)	(0.000135)	(0.000171)	(0.000174)
Net Income	-9.90e-05**	-6.86e-05	-7.56e-05*	-0.000111	-6.95e-05	-7.44e-05
	(4.82e-05)	(4.39e-05)	(4.42e-05)	(0.000154)	(0.000144)	(0.000142)
Constant	-2.102***	-2.359***	-2.382***	-1.805***	-1.647***	-1.653***
	(0.466)	(0.575)	(0.572)	(0.449)	(0.418)	(0.420)
Observations	22,639	26,357	26,357	13,854	18,175	18,175

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 4.9: Event study Analysis – CARs surrounding SEO Announcement Date
This table presents the results of a fixed-effect multivariate OLS regression of company CARs on various corporate factors. CARs are taken from an event study analysis of abnormal returns surrounding the announcement date of a non-shelf SEO. These returns are calculated using the Carhartt Four-Factor model using the 115 trading days prior to the event window as the control sample. *Overconfident* is a dummy variable equal to 1 as determined by the Kolasinski and Li (2012) confidence classification method and 0 otherwise. *Return$_{t-1}$* is the raw stock return occurring during the quarter prior to the SEO offer. *SEO Offer* Price is the initial SEO offer price at issuance. *CapEx*, *Total Assets*, and *Net Income* is the level of annual capital expenditures, total assets, and earnings as reported on the company balance sheet (all in millions) during the SEO offer quarter, resp. Industry fixed-effects and quarterly fixed-effects are included. Standard Errors are clustered by firm.

	Panel A: CARs following SEO Announcement, CEOs					
	CEOs			CFOs		
	(1)	(2)	(3)	(4)	(5)	(6)
	Announcement Effect (-1,+1)	Anouncement (+2,+61)	Announcement (+2,Offer)	Announcement Effect (-1,+1)	Anouncement (+2,+61)	Announcement (+2,Offer)
Overconfident	0.015*	0.031	-0.001	0.020*	-0.079	0.008
	(0.008)	(0.061)	(0.032)	(0.012)	(0.087)	(0.052)
Return $_{t-1}$	0.032	-1.186***	-0.311**	0.053	-1.492***	-0.365
	(0.049)	(0.419)	(0.154)	(0.068)	(0.394)	(0.256)
SEO Offer Price	0.001**	-0.008***	0.001	-0.000	-0.012***	0.000
	(0.000)	(0.003)	(0.002)	(0.000)	(0.004)	(0.002)
Total Assets	0.000	-0.000	-0.000	0.000	-0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
CapEx	0.002	0.055**	0.021	0.010**	0.072**	0.024
	(0.004)	(0.025)	(0.016)	(0.005)	(0.031)	(0.019)
Net Income $_t$	-0.000	0.002*	0.001	-0.000	0.005**	0.002
	(0.000)	(0.001)	(0.001)	(0.000)	(0.002)	(0.002)
Constant	0.069*	0.616***	0.166*	-0.183***	-0.480	-0.255*
	(0.040)	(0.207)	(0.090)	(0.038)	(0.462)	(0.145)
Observations	456	419	354	314	298	252
R-squared	0.233	0.366	0.222	0.318	0.466	0.304

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 4.10: Event study Analysis – CARs surrounding SEO Offer Date
This table presents the results of a fixed-effect multivariate OLS regression of company CARs on various corporate factors. CARs are taken from an event study analysis of abnormal returns surrounding the SEO offer date. These returns are calculated using the Carhartt Four-Factor model using the 115 trading days prior to the event window as the control sample. *Overconfident* is a dummy variable equal to 1 as determined by the Kolasinski and Li (2012) confidence classification method and 0 otherwise. *Total Assets*, and *Net Income* is the total assets and earnings as reported on the company balance sheet (millions) during the SEO offer quarter, resp. Industry fixed-effects and quarterly fixed-effects are included. Standard Errors are clustered by firm. For brevity only *Overconfident* coefficients are reported.

Panel A: CARs following SEO Offer, CEOs				
	(1)	(2)	(3)	(4)
	(-1,+1)	(+1,+3)	(+1,+7)	(+1,+14)
CEO Non-shelfs	0.015**	0.027***	0.028**	0.045**
	(0.007)	(0.009)	(0.014)	(0.019)
CFO Non-shelfs	0.009	0.003	-0.004	0.009
	(0.008)	(0.011)	(0.015)	(0.020)
CEO Shelfs	-0.001	-0.000	-0.005	-0.006
	(0.009)	(0.014)	(0.021)	(0.025)
CFO Shelfs	0.010	0.014	-0.010	-0.023
	(0.014)	(0.018)	(0.026)	(0.038)

Table 4.11: Event study Analysis – BHARs surrounding SEO Offer Date

This table presents the results of a fixed-effect multivariate OLS regression of company BHARs on various corporate factors. BHARs are taken from an event study analysis of abnormal returns surrounding the SEO offer date. These returns are calculated using the Carhartt Four-Factor model using the 115 trading days prior to the event window as the control sample. *Overconfident* is a dummy variable equal to 1 as determined by the Kolasinski and Li (2012) confidence classification method and 0 otherwise. *Total Assets*, and *Net Income* is the total assets and earnings as reported on the company balance sheet (millions) during the SEO offer quarter, resp. Industry fixed-effects and quarterly fixed-effects are included. Standard Errors are clustered by firm. For brevity only *Overconfident* coefficients are reported.

Panel A: Long-Term BHARs following SEO offer, CEOs					
	(1)	(2)	(3)	(4)	(5)
	(+1,+7)	(+1,+90)	(+1,+185)	(+1,+365)	(+1,+730)
CEO Non-shelfs	0.029**	0.113***	0.114*	-0.062	-0.182
	(0.014)	(0.043)	(0.069)	(0.098)	(0.129)
CFO Non-shelfs	-0.001	0.005	0.029	-0.082	-0.159
	(0.015)	(0.064)	(0.112)	(0.120)	(0.245)
CEO Shelfs	-0.001	0.005	0.029	-0.082	-0.159
	(0.015)	(0.064)	(0.112)	(0.120)	(0.245)
CFO Shelfs	-0.005	-0.110	-0.137	-0.257*	-0.496**
	(0.021)	(0.067)	(0.099)	(0.148)	(0.248)

CHAPTER 5

CONCLUSION

This dissertation studies three important areas related to the timing of corporate finance decisions. The first essay analyzes the impact hedge fund activist investors have on stock repurchase decisions. The results suggest that, prior to being targeted, firms repurchase stock less often and in smaller amounts. After being targeted the propensity to repurchase increases and the timing of the repurchases are generally worse. The second essay documents the impact managerial overconfidence has on the stock repurchase decision. Moderately confident managers repurchase at lower prices than overconfident managers and at prices that are closer to the quarterly low stock price. Additional liquidity analysis suggests that moderately confident repurchases are attempts to time the marker, while overconfident repurchases are not. Ultimately, the results point to managerial overconfidence as evidence explaining the observation that managers tend to repurchase poorly. Finally, the third essay studies the impact of managerial overconfidence on a company's propensity to time equity offerings alongside high stock prices. I find that overconfident managers are generally no less likely to offer equity than their moderately confident peers. Rather, they are less likely to offer equity simply as a way to capture abnormally high stock prices. Propensity to offer an SEO is not significantly different during periods of low stock returns across managerial types; however the results suggest that as returns increase moderately confident managers are significantly more likely to offer equity. Abnormal return analysis around SEO announcement dates and SEO offering dates further confirms this.

Appendix A
Thomson Reuter Relationship Code Definitions
Level 1 (highest): CB, CEO, CO,
GC, P
Level 2: AC, AF, CC, CFO, CI, CT, D, DO, EC, FC, GP, H, M, MC, MD, O, OB, OD, OP, OS, OT,
OX, S, SC, TR, VC
Level 3: AV, C, EVP, OE, GM, LP, SVP, T, VP
Level 4: AI, B, BC, BT, CP, DS, F, FO, IA, R, SH, UT, VT, X

Classification	Code	Description
Directors	CB	Chairman of the Board
	D	Director
	DO	Director and Beneficial Owner of more than 10% of a Class of Security
	H	Officer, Director and Beneficial Owner
	OD	Officer and Director
Committees	AC	Member of the Advisory Committee
	CC	Member of the Compensation Committee
	EC	Member of the Executive Committee
	FC	Member of the Finance Committee
	MC	Member of Committee of Advisory Board
	SC	Member of the Science/Technology Committee
Officers	AV	Assistant Vice President
	CEO	Chief Executive Officer
	CFO	Chief Financial Officer
	CI	Chief Investment Officer
	CO	Chief Operating Officer
	CT	Chief Technology Officer
	EVP	Executive Vice President
	O	Officer
	OB	Officer and Beneficial Owner of more than 10% of a Class of Security
	OP	Officer of Parent Company
	OS	Officer of Subsidiary Company
	OT	Officer and Treasurer
	OX	Divisional Officer
	P	President

	S	Secretary
	SVP	Senior Vice President
	VP	Vice President
Affiliates	AF	Affiliated Person
	AI	Affiliate of Investment Advisor
	GC	General Counsel
	IA	Investment Advisor
Beneficial Owners	B	Beneficial Owner of more than 10% of a Class of Security
	BC	Beneficial Owner as Custodian
	BT	Beneficial Owner as Trustee
Other	C	Controller
	CP	Controlling Person
	DS	Indirect Shareholder
	F	Founder
	FO	Former
	GM	General Manager
	GP	General Partner
	LP	Limited Partner
	M	Managing Partner
	MD	Managing Director
	OE	Other Executive
	R	Retired
	SH	Shareholder
	T	Trustee
	TR	Treasurer
	UT	Unknown
	VT	Voting Trustee
	X	Deceased (not included within sample)