University of Glasgow

Ph.D. THESIS

Three Essays on Corporate Finance

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A thesis submitted to the University of Glasgow for the degree of Doctor of Philosophy in Finance

April 2021

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Abstract

The primary objective of this thesis is to empirically investigate and offer behavioral explanations to two distinct areas of corporate decision-making: (i) mergers and acquisitions and (ii) corporate cash holdings. Based on the premise that it's the retail investors who primarily trade during the overnight period, the first empirical study proposes absolute overnight returns (AOR) as a proxy for retail investor attention. AOR plays a vital role in the context of one of the largest and most significant corporate events - merger announcements. The study finds that AOR positively affects the acquirer abnormal returns and abnormal trading volumes. The short-term overreaction is corrected by price reversals in the post-announcement period. The set of results are strongest for bidders with low institutional ownership and bidders that are hard to value. The results further hold for the overreaction hypothesis related to stock swap deals while rejecting the notion that our proxy AOR captures investor sentiment. The second study empirically examines the role of CEO connectedness, the relative position of a CEO in the social network hierarchy on the corporate cash holdings. The study finds that cash holdings are on average higher firms for the firms managed by network-powerful CEOs. Lending support to the CEO power hypothesis the positive association is stronger for firm-year observations with investment spikes, greater financial constraint, weaker corporate governance, low institutional monitoring, and raising cash regimes. The results are robust to a series of tests and alternative explanations. The third study empirically examines the role of CEO connectedness on the value of cash and finds that cash holding is on average less valuable for the firms managed by network-powerful CEOs. In economic terms, a network-powerful CEO on board is associated with a value loss of 44 cents in every $1.00 of cash holdings. Providing support to the CEO power hypothesis the negative association is stronger for firm-year observations with investment spikes, weaker corporate governance, low institutional monitoring, and distributing cash regimes. The results are robust to a series of tests and alternate explanations.

I declare that, except where explicit reference is made to the contribution of others, that this dissertation is the result of my own work and has not been submitted for any other degree at the University of Glasgow or any other institution.

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Acknowledgment

I express my gratitude towards the people without whom the completion of this thesis would have been incomplete. I would like to express my deepest gratitude towards my principal supervisor Dr. Evangelos Vagenas-Nanos for his academic suggestions and life lessons throughout this journey. Working under the guidance of Evangelos has made me a better person, if not a better researcher. Next, I would like to convey my deepest appreciation to Professor Serafeim Tsoukas for his suggestions for his invaluable comments to improve the quality of the thesis.

The journey towards my thesis submission would be incomplete if I don't mention my daughter Antarleena, who has arrived in this world at the peak of the pandemic and made this journey extra-special. I would forever be indebted to my wife, Tahsina, who supported me in this journey from the day I started applying for Ph.D. funding to the day I am submitting this thesis. Tahsina and towards the end of the journey Antarleena have been my constant source of aspiration. I would like to show my deepest gratitude towards my mother Jinnatun Nur Egnis, and my father Muhammad Hilaluddin, without their sacrifices I would not have come thus far. Moreover, I would also like to give special mentions to my brother Pranjal, nephew Supran and lastly Rabeya Apu for their contribution to my overall well-being. Thank you for everything. I would also like to say special thanks to all my friends and colleagues from North South University and the University of Glasgow.

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Chapter 1: Introduction

The extant literature in corporate finance primarily delves into the financial contracts and investment decisions involving the investors and the managers. The neoclassical and behavioral theories in corporate finance primarily differ based on how the beliefs and preferences of these two sets of agents are interpreted in the research context. Statman (1999) mentions several studies that played a vital role in establishing the neoclassical school of finance. In particular, Statman (1999) mentions the portfolio optimization theory by Markowitz (1952), the capital structure theorem by Modigliani and Miller (1958), the asset pricing models by Sharpe (1964) and Lintner (1965), the efficient market hypothesis by Fama (1970) and the options pricing model by Black and Scholes (1973). These studies put forward the notion that the financial market, in general, is efficient and the deviations from the equilibrium prices are short-lived at best. Additionally, the neoclassical school of thought inherently assumes that both the managers and investors make unbiased and rational forecasts regarding future outcomes. Investors believe that financial managers take decisions that maximize shareholders' wealth whereas managers believe that they operate in an efficient market where the price reflects all the available information.While the contribution of the neoclassical stream of literature in finance is undeniable, it fails to corroborate several market anomalies with the efficient market hypothesis.

Contradicting the assumptions of broad rationality of the financial market participants, the behavioral school of finance allows the market participants to be affected by different cognitive and behavioral biases. To describe how behavioral school of research differs from traditional finance, Statman (1999) mentions “people are rational in standard finance; they are normal in behavioral finance”. Black (1986) narrates these irrational investors as noise traders, the investors who do not trade based on the available firm fundamentals, rather show herding behavior by blindly following the market trends, contributing to the systematic overreaction or underreaction in the market. Lee et al. (1991) provide further evidence that trades by the noise traders influence market prices. The extant literature in behavioral corporate finance makes two distinct assumptions (Baker et al., 2007; Baker and Wurgler, 2013) in explaining how the violation of broad rationality in the financial market may eventually affect the financial outcomes. The first assumption emphasizes that investors are less than fully rational in their decision-making whereas the rational managers time their financing and investment decisions as a response to the market mispricing. The second approach assumes that managers are not fully rational and the less-than-standard

behavior and biases by the managers significantly alter the corporate decision outcomes. In this thesis, we contribute to both these assumptions by empirically investigating different investor- and manager-specific distortions affecting two distinct areas in corporate decision making: (i) mergers and acquisitions and (ii) corporate cash holdings.

The studies focusing on the decision mechanism of irrational investors, primarily focus on the decision implications on the financial structures, security issues, or corporate announcements. For instance, Baker and Wurgler document a series of evidence regarding corporations timing their equity issuance and dividend payment decisions based on the prevailing investor sentiment in the market (Baker and Wurgler, 2000, 2004). Similarly. Shleifer and Vishny (2003) argue that the market misevaluations drive the decisions related to the timing of the M&A announcements and method of payments. Another stream of literature particularly looks into the irrational trading behavior of individual investors and the outcomes. In particular, Elton et al. (2004) find that retail traders often invest in high-fee with predictable inferior performance. Benartzi and Thaler (2002) examine investors' autonomy in the context of portfolio choice decisions and conclude the investor autonomy does not result in superior decision making. Barber and Odean investigate the trading pattern of the individual investors and conclude that excessive trading by the individual investors results in inferior returns (Barber and Odean 1999, 2000; Odean 1999), contributing these findings to retail investor overconfidence. Barber and Odean (1999) and Shefrin and Statman (1985) further posit that retail traders are vulnerable to the disposition effect: investors hold on to loser portfolios and sell the winner portfolios.

Chapter 2 builds on the irrational investors-rational manager framework to investigate the role of retail investor attention in the context of bidder announcement returns. In particular, it revisits the behavioral notion that attention paid by equity investors is a scarce resource (Barber and Odean, 2008; Kahneman, 1973). The capacity theory of attention considers that individuals have limited ability to carry out multiple activities at the same time and hypothesizes that the total amount of attention that an individual can assert at any time is limited (Kahneman, 1973). When the supply of attention does not meet the demand then the performance of the task falters even fails. Similarly, when the equity investors are bombarded with too many options, stocks that grab the attention of the investors, are more likely to be selected. On the other hand, stocks that don't attract the attention of investors

are more likely to be ignored. As the retail traders tend to invest as a group, their attention-driven collective investments may have a substantial impact on the pricing of the securities. Based on the premise that, that it's primarily the retail investors who are subject to a cognitive bias like short-term attention span (Barber and Odean, 2008; Berkman et al., 2012; Lou and Sun, 2010; Odean, 1999), chapter 2 proposes the mean absolute overnight returns (AOR) as a proxy for the equity investors' attention and empirically tests whether extreme overnight returns before the acquisition announcement affect the bidders' cumulative abnormal announcement returns (CARs).

The motivation for selecting absolute overnight returns (AOR) as a measure of investor attention stems from the recent findings on overnight returns in the fields of psychology and behavioral finance. For example, Kraemer et al. (2000) document that an individual's ability to give attention may vary based on time of day, and the peak in attention often coincides when the stock market is closed in the overnight period. In a recent study, Evans et al. (2017) further posit that compared to the intraday period, individuals are more vulnerable to cognitive biases in the overnight period. The evidence from human psychology is further backed by the recent findings on the overnight returns in finance. In particular, Berkman et al. (2012) find that retail investors who are more likely to be affected by cognitive biases, actively trade in the overnight period. Similarly, Lou et al. (2019) give concrete evidence of investor heterogeneity driving the opposite returns pattern witnessed between the overnight and intraday periods. Aboody et al. (2018) suggest overnight returns as a proxy for firm-specific sentiment and the association is more prominent for the retail investors. Moreover, when the retail investors place orders outside the trading hours in the overnight period, they seldom worry about liquidity or the price impact of the orders (Lou et al., 2019). Keeping these findings as our backdrop, we posit that the retail traders are more likely to place orders in the overnight period for the stocks that have grabbed their attention, especially when the significance of the news is such that these trades are too costly to delay.

It is intuitive to believe that, compared to the normal period, retail investors' attention is more likely to be grabbed in the bid period leading to the announcement. Hence, to proxy for investor attention faced by US bidders, we estimate the average AOR from -20 to -3 days leading to the takeover announcement. AOR has several advantages over previous proxies

of investor attention[1]. For example, unlike extreme daily returns and trading volumes that are susceptible to the trades of institutional investors, AOR primarily captures the attention-driven trades of the retail investors (Aboody et al., 2018; Berkman et al., 2012; Lou et al., 2019). Moreover, AOR does not focus on the investors' attention on a particular day, rather it incorporates any systematic variation in the investor attention from 20 days before the announcement. Lastly, unlike data for Google search volume index (SVI) which is often unavailable for comparatively less known bidders, AOR can be constructed for all the publicly traded bidders.

Results from both the univariate and multivariate analyses confirm that AOR affects bidder CARs primarily through the channel of investor attention. In the multivariate framework, after controlling for the known bidder-, deal-, and macro-level factors, the coefficient of AOR is positive and statistically significant (1%) in explaining acquirer abnormal returns around the merger announcements. Next, we analyze the differential market response to high AOR for stock swap announcements and find that following high AOR, the market reacts more negatively to public stock swaps and more positively to private stock swaps. The results are in line with the investor inattention framework by Louis and Sun (2010) that when the investors are inattentive, the reaction for public stock swaps is less negative and the reaction for private stock swaps is less positive.

We also make a series of predictions related to the economic mechanisms driving the positive association between AOR and bidder CARs. We find that the positive association between AOR and acquirer abnormal returns is strongest for the sub-section of small bidders, young bidders, and private targets. Second, we test whose attention AOR is capturing. The results further show that the positive association between AOR and acquirer abnormal returns is stronger in the subsection of acquirers with lower institutional investor holdings. Lastly, we find that the coefficients on the interaction variable involving AOR and private stocks are more positive for the sub-sample of small bidders, young bidders, low top 5

[1] Previous proxies of investor attention include extreme daily returns, abnormal trading volume (Barber and Odean, 2008), Friday announcements (Louis and Sun, 2010) and google search attention (Da et al., 2011).

institutional ownership, and low blockholder ownership. On the contrary, for the same sub-sample of firms, we find the coefficients on the interaction variables of AOR and public stocks to be more negative.

Our results also hold for a series of robustness tests. First, the association between AOR and bidder cumulative abnormal returns (CARs) holds the different windows of CARs and alternate proxies of AOR. Moreover, results from the propensity score matching (PSM) alleviate the concern that potential selection bias by the retail investors may drive our overall results. Lastly, to address the potential issue that omitted variables may drive our results, we perform a two-stage instrument variable (IV) analysis by taking the percentage of home-broadband users in the US provided by the PEW research center as the instrumental variable. The results from the second stage of the IV regression confirm that the instrumented AOR remains positive and statistically significant.

This empirical study in chapter 2 contributes to different strands of literature. First, it contributes to the behavioral finance literature by reporting an association beyond the already found relationship between investor attention and the stock market performance reported by Barber and Odean (2008) and Berkman et al. (2012). The study uncovers AOR as a new determinant showing a short-term positive association with bidder abnormal returns followed by a reversal in the post-announcement periods. The results further contribute to the emerging literature on the contrasting returns pattern witnessed between overnight returns and intraday reversals resulting from that two distinct clienteles: retail investors in the overnight periods and daytime arbitrageurs in the intraday periods (Akbas et al., 2020; Lou et al., 2019). While the previous proxies of investor attention either do not differentiate between the two distinctive groups of investors or do not capture the attention of the investors in the long period leading to the announcement, we find that the dispersion of the investors between the overnight and intraday periods affects the bidder abnormal returns. Hence, understanding the dynamics between the night traders and day-time arbitrageurs in the context of acquisition announcements is of great significance given the importance of acquisition activity in creating value for the bidders.

Chapter 3 employs the irrational manager-rational investor framework to investigate one of the most strategically important decisions taken by the managers: corporate cash

holdings. The systemic increase in corporate cash holdings by U.S. firms has been the focal point of discussion among the press, policymakers, and academics (Bates et al., 2009). Even though the current literature in corporate finance offers different explanations regarding the motives and firm-specific determinants of corporate cash holdings[2], this increase in the secular trend in the aggregate cash level means the role of the managers in cash management is under scrutiny more than ever. In particular, CEOs may either invest the money wisely to create value for the shareholders or take advantage of the excess cash to enjoy additional benefits, excessive salaries and invest in projects that maximize their utility. Besides, various studies following the irrational manager framework document that different managerial attributes and biases such as age (Serfling, 2014), gender (Liang et al., 2018), CEO risk-taking propensity (Liu and Mauer, 2011), insider debt (Liu et al., 2014), optimism (Huang-Meier et al., 2016) and overconfidence (Deshmukh et al., 2018) can significantly affect corporate liquidity policy. In particular, these studies corroborate the behavioral notion that different manager-specific attributes may influence the managers to hold cash at a level that is not aligned with the shareholders' wealth maximization motivation. Our second study contributes to this behavioral line of inquiry by examining the influence of CEO connectedness, the relative position of a CEO in the social network hierarchy, on corporate cash holdings.

We follow the extensive literature in graph theory (Bonacich, 1972; Freeman, 1977; Proctor and Loomis, 1951), to construct the network centrality measure CEO connectedness (degree centrality): the total number of direct connections a CEO has with other members in the social network The more connections a CEO has in his network, the more centrally positioned the CEO is in his or her network realm. Therefore, CEO connectedness also signifies a CEO's overall ability to access and utilize the information from the network participants, lead others and influence the outcome of different corporate decisions (Banerjee et al., 2012; Hanneman and Riddle, 2005; Jackson, 2010; Padgett and Ansell, 1993).

[2] For example, financial constraint status (Faulkender and Wang, 2006), growth opportunities (Denis and Sibilkov, 2010), corporate governance (Pinkowitz et al., 2006; Dittmar and Mahrt-Smith 2007; Kalcheva and Lins, 2007).

There is an increasing debate on the role of the CEO's social network hierarchy in shaping the outcomes of different firm-level decisions. The recent studies find compelling evidence that depending on how CEOs use their privileged position in the social network, the choices made by them can result in both value-enhancing or value-destructive outcomes for the firms[3]. Consequently, the predicted relationship between CEO connectedness and corporate cash holding is not clear ex-ante. The CEO social network hierarchy can influence decisions related to corporate finance through four distinct mechanisms: trust, the flow of information, the ability to punish and reward, the ability to alter preferences (Ferris et al., 2017). Depending on which of these mechanisms dominate, the moderating role of CEO connectedness may have two completely opposite outcomes on the corporate cash holdings. Consequently, this study proposes two alternate hypotheses in predicting the role of CEO connectedness on corporate liquidity management : (i) reduced information asymmetry hypothesis, (ii) CEO power hypothesis.

The reduced information asymmetry hypothesis focuses on the increased trust and information dissemination dimensions of social capital. Researches that focus on this trust dimension (Dasgupta, 1988; Fukuyama, 1995) posit that increased trust among the network members lowers the risk of incomplete transactions (Grossman and Hart, 1986). Personal connections, in the spectrum of social networks, works as an effective channel for exchanging information, ideas, knowledge, suggestions, and even private information. Moreover, the primary benefit of increased social ties that it creates an environment of enhanced trust and moral values for the participants within that network. Hence, the more centrally connected CEOs through their increased trust and effective information dissemination within the network members should have easier excess to external finance, which in turn reduces the precautionary need for corporate cash holdings. Consequently, the

[3] Increased social ties improve economic efficiency and coordination within the participants resulting in better loan deals, fewer covenant restrictions, higher R&D expenditures with more patent citations (Engelberg et al., 2012; Faleye et al., 2014; Fogel et al., 2018). On the other hand, the privileged position in the social network hierarchy may come in the way of efficient corporate governance and rational decision-making, leading to weakened board monitoring, higher CEO compensation, low pay-performance sensitivity, increased fraudulence, and poor M&A performances (Chidambaran et al., 2011; El-Khatib et al., 2015; Farcassi and Tate, 2012)

reduced information asymmetry hypothesis predicts that increased CEO connectedness results in reduced corporate cash holdings.

On the other hand, the CEO power hypothesis uses the theoretical framework of the approach inhabitation theory of power (Keltner et al., 2003) and agency theory of corporate cash holdings (Jensen, 1986). In the interconnected web of the social network, the power of the CEOs is not randomly distributed. A CEO positioned higher the social network hierarchy is considered more powerful having more direct links (nodes) with other executives, institutional agents, suppliers, and stakeholders. Subsequently, this power also grows once a CEO gains more influential connections in his network while gaining greater access to exclusive information, resources, investment opportunities, or even insider information (Rowley, 1997). According to the approach inhabitation theory of power (Keltner et al., 2003), the behavioral cognition process of powerful CEOs is fundamentally different from that of the CEOs positioned lower in the social network hierarchy. Elevated power triggers the behavioral approach inhabitation system which is responsible for instilling the positive attitudes and emotions within the individuals that facilitate the pursuit of different goals and rewards (Sutton and Davidson, 1997). On the contrary, in the absence of power, less connected CEOs are more likely to focus more on achieving others' goals while avoiding punishments and risky ventures.

Agency cost theory of cash holding argues that cash is like free cashflow, which gives managers the freedom to invest according to their will. In other words, by holding excess cash, managers can have more control over the firm's overall assets while giving them the flexibility to pursue their own goals (Jensen, 1986). Similarly, network-powerful CEOs showing increased attentiveness to individual rewards instead of maximizing shareholder's wealth can create agency costs for the shareholders (Jensen, 1986). Additional cash increases the level of assets that CEOs control allowing them the flexibility to pursue their objectives. Moreover, holding extra cash managers aid the network-powerful managers to avoid the external disciplinary mechanism of the financial markets. Hence, according to the CEO power framework, this study predicts network-powerful CEOs keep more cash at their disposal compared to that of the less connected CEOs.

The empirical in chapter 3 report that controlling for the known determinants of cash holdings, the high CEO connectedness increases corporate cash holdings. The positive and statistically significant coefficients on the CEO connectedness support the CEO power hypothesis and at the same time reject the reduced information hypothesis. Proving further validation to the CEO power hypothesis, the positive association between CEO connectedness and corporate cash holdings is stronger in the firm-year observations with low investment regimes, increased financial constraint, weak corporate governance mechanism, low institutional investor monitoring, and raising cash regimes.

The baseline results in chapter 3 hold for a series of robustness tests. First, the results from the matched sample of the PSM analysis confirm that the positive association between CEO connectedness and the cash holdings remains persistent and robust, implying that the baseline estimations do not suffer from functional misspecification biases. Second, the study further checks the association between CEO connectedness and level of cash holdings by taking alternate proxies of cash holdings. For the third robustness test, the study uses alternate definitions of CEO connectedness. Fourth, to address the potential criticism that baseline estimations might be driven by the unobserved firm-specific heterogeneity, the study further controls for firm-fixed effects. Fifth, to rule out the possibility that CEO connectedness may capture other unobserved CEO specific factors which may ultimately drive the association between CEO connectedness and the cash holdings, we control for a series of managerial attributes such as the managerial ability, CEO gender, CEO pay slice, CEO duality, CEO age, and CEO tenure.

Chapter 3 makes several contributions to the existing literature. First, we document that CEO connectedness is an additional determinant that increases corporate cash holdings. Second, we contribute to the growing debate on the literature regarding the key question, Are firms better off with well-connected CEOs? Intuitively, a strategically important decision like cash holdings provides an important platform to study to role of CEO connectedness as liquidity management plays a direct role in shaping other crucial corporate decisions like mergers (Almeida et al., 2011; Harford, 1999), R&D expenditures (Brown et al., 2009; Brown and Petersen, 2011) entries to new markets (Fresard, 2010; Morellec et al., 2013) and investments in general (Almeida et al., 2004; Fazzari et al., 1988). We borrow the theoretical predictions from the approach inhabitation theory of power by Keltner et al.

(2003) to give a behavioral explanation of the less than standard cash holdings by the network-powerful managers. Third, our study further contributes to the literature of different motives behind corporate cash holdings. Network-powerful CEOs showing increased attentiveness to individual rewards and hoarding excess cash supports the agency motive of cash holdings (Jensen, 1986). Fourth, this study contributes to the literature related to CEO power and financial outcomes as well. Our study contributes to this line of literature by showing network-powerful CEOs create agency problems for the firms by hoarding excess cash.

Chapter 4 extends the role of CEO connectedness in explaining the marginal value of cash, the value that the market assigns to each additional dollar of cash holding by the managers (Faulkender and Wang, 2006; Pinkowitz et al., 2006). How shareholders would react to the changes in corporate liquidity policy is primarily shaped by two related factors: i) What influences the managers to increase the liquidity position? ii) What is the value of the increased cash holdings for the corporation's investors? In a frictionless market when CEOs and investors both share a similar belief, and the marginal value of a dollar in cash for shareholders should be exactly $1, implying that the cost of holding an additional dollar should equal its forecasted benefit. Following the growing stream of literature that shows the importance of CEO connectedness on different corporate-level decisions, this paper further investigates how the cross-sectional variations in the CEO connections influence the value of cash. More specifically, this study asks if one additional dollar held by a more centrally connected CEO translates to value addition or destruction for the shareholders.

Similar to the predictions made in chapter 3, we consider both the reduced information asymmetry hypothesis and CEO power hypothesis in predicting the moderating role of CEO connectedness on the marginal value of cash. To construct the estimates of our main dependent variable value of cash, we follow the methodology introduced by Faulkender and Wang (2006). For each fiscal year t, the dependent variable captures a stock i's excess return over the stock i's benchmark return portfolio. Following the works of Grinblatt and Moskowitz (2004) and Daniel and Titman (1997), we take benchmark portfolios as the Fama-French (1993) 25-value-weighted portfolios constructed by the univariate sorting of the stocks based on the firm size and book-to-market value measures. The empirical results support the CEO power hypothesis. Controlling for the known

determinants of the marginal value of cash in Faulkender and Wang (2006), the results from the baseline multivariate regression models confirm that increased CEO connectedness negatively affects the value of cash. In economic terms, each additional dollar held by the network-powerful CEOs results in a loss of 44 cents for the shareholders compared to the firm managed by less-connected peers.

To give further validation to the CEO power hypothesis, this study also makes predictions related to the economic mechanisms driving this negative association between CEO connectedness and the value of cash. First, we find the negative coefficient on the CEO connectedness is more profound for the value-destroying investments made by the network powerful CEOs during the investment spikes. Next, we find the personal goal-driven value destructive behavior of the network powerful CEOs is stronger for the firms with weak corporate governance. Besides, we report that in the absence of active monitoring by the strong institutional owners, managers are more likely to get away with raising additional cash for the value-destructive investments. Finally, we find that the negative effect of network-powerful CEOs on the value of cash is strongest in distributing cash regimes.

Next, we do several robustness tests to validate the findings. First, we recognize that network-powerful CEOs in different corporations may not be distributed randomly. The results from the PSM analysis confirm the negative effect of the CEO connectedness on the marginal value of cash is not driven by any functional form misspecification biases. Second, to address the potential critique that our results in the baseline regression models are driven by unobserved firm heterogeneity we include the firm-fixed effect in the baseline regression models. Third, to control for the possibility that our main independent variable high CEO connectedness can capture other unobserved CEO-specific factors that may ultimately drive the negative association between CEO connectedness and the value of cash, we control for a series of managerial attributes. We also control for an alternate valuation model of the value of cash and alternate specification of CEO connectedness. Finally, we control for firm-level exposure to credit risk and total risk.

Chapter 4 also makes meaningful contributions to the existing literature. First, it contributes to the enriched literature of corporate cash holdings and the marginal value of cash. After controlling for the majority of the known determinants of marginal value of cash,

we document that increased CEO connectedness negatively affects the marginal value of cash. For the managers, shareholder wealth maximization is only a choice, and they are not obligated to do so. This is especially true when managers have substantial decision-making power over other board members and have incentives to see firms grow as it increases resources under their control (Murphy, 1985). We report that, in the presence of agency rift, the network powerful fails to create any value for investors with the excess cash held by them. Lastly, how firms grow has always been a fundamental query in corporate finance as it sheds light on the overall mechanism of the competitive process, strategic learning, the changes in the market structure, and aggregate economy (Carpenter and Petersen, 2002). This study directly contributes to knowledge of how network-powerful CEOs treat cash holding as a separate strategy in an attempt to grow their firm and reap personal benefits in the process.

The remainder of this thesis is organized as follows: Chapter 2 empirically investigates how AOR affects the bidder announcement returns. Chapter 3 investigates the role of CEO connectedness on corporate cash holdings. Chapter 4 examines the moderating role of CEO connectedness on the marginal value of cash. Chapter 5 gives the concluding remarks, main findings, and contributions.

Chapter 2: Attention in the overnight period and bidder abnormal returns

2.1 Introduction

In this study, we revisit the premise that attention paid to the acquiring firm is a scarce resource and substantially affects the quality of the decision-making by the investors (Barber and Odean, 2008; Kahneman, 1973)[4]. Investors are exposed to an abundance of new information in the stock market yet have very little time to process and integrate the information into their decision-making. When there are many options for the investors, stocks that grab the attention of the investors, are more likely to be selected. On the other hand, stocks that don't attract the attention of investors are more likely to be ignored. The studies on investor attention concur that it's primarily the retail investors who are subject to cognitive bias like short-term attention span that instigates them to trade at prices not justified by market fundamentals[5].

Barber and Odean (2008) in their pioneering study on investor attention propose that the trading behavior of the retail investors or individual investors is fundamentally different from that of the professional investors. In particular, the authors propose that attention as a cognitive bias mainly affects the stock purchasing decision of the individual investor as they seldom short sells. On the contrary, institutional investors, such as hedge funds, routinely short sell based on more sophisticated sell criteria. For these sophisticated professional investors, the sell decisions are as important as the purchase decisions. Moreover, attention is not a scarce resource for professional investors as they devote significant time in searching the relevant information to buy or sell securities by utilizing more sophisticated databases than do most retail investors. This notion is further supported by Lee (1991) who finds that small individual investors and professional/institutional traders systematically differ in reacting to earnings announcements.

[4] The term "attention" refers to the aspect of amount and intensity towards a task or activity (Kahneman, 1973). The capacity theory of attention considers that individuals have limited ability to carry out multiple activities at the same time and hypothesizes that the total amount of attention that an individual can assert at any time is limited (Kahneman, 1973). It also assumes that this limited capacity can be allocated with considerable freedom among concurrent activities. When the supply of attention does not meet the demand then the performance of the task falters or even fails.

[5] Please see Odean (1999), Barber and Odean (2008), Lou and Sun (2010), Berkman et al. (2012).

As the retail traders tend to invest as a group, their attention-driven collective investments may have a substantial impact on the pricing of the securities. However, behavioral finance empiricists still face a great challenge to measure investor attention as it is not directly observable. In the context of the corporate announcements, DellaVigna and Pollet (2009) propose that Friday announcements as the proxy for investor inattention. Previous studies also take extreme daily returns, abnormal trading volume, news, advertising expense, and google search volume index as the different proxies of investor attention (Barber and Odean, 2008; Chemmanur and Yan, 2009; Da et al., 2011; Gervais et al., 2001; Grullon et al., 2004; Hou et al., 2009). Although investor attention as a behavioral bias should be more pronounced for the retail investors than the institutional investors, most of the proxies of investor attention do not consider the systematic dispersion between the two sets of investors empirically. To address this issue, we propose mean absolute overnight returns (AOR) as a proxy for the equity investors' attention and test whether high AOR before the acquisition announcement affects the bidders' abnormal announcement returns.

The motivation for selecting AOR as a measure of investor attention stems from the recent findings in the fields of psychology and behavioral finance. For example, Kraemer et al. (2000) document that an individual's ability to give attention may vary based on time of day, and the peak in attention often coincides when the stock market is closed in the overnight period. In a recent study, Evans et al. (2017) further posit that compared to the intraday period, individuals are more vulnerable to cognitive biases in the overnight period. These studies from human psychology are further complemented by the recent findings on overnight returns. For instance, Lou et al. (2019) suggest that investor heterogeneity drives the contrasting returns pattern between the overnight and intraday periods. Similarly, Berkman et al. (2012) document that the retail investors who are more likely to be affected by cognitive biases, prefer to trade at the night period and wait for the trades to be executed at the market open. Aboody et al. (2018) on the same premise that retail investors are more likely to be affected by sentiment, propose overnight returns as a proxy for firm-specific investor sentiment. Moreover, when the retail investors place orders outside the trading hours in the overnight period, they seldom worry about liquidity or the price impact of the orders (Lou et al., 2019). Besides, over the years more and more firms are disclosing company-specific information after the market closes (Barclay and Hendershott, 2003; Santosh, 2016). Consequently, it is getting more likely that investors are more actively

making trade decisions during the overnight periods. Although these announcements may grab the attention of all sorts of investors, it is the retail investors who are more likely to act upon the news and put orders outside the regular trading hours.

We take the mean of the "absolute" overnight returns to proxy for investor attention as it should capture both the extreme positive and negative returns before an announcement. Barber and Odean (2008) posit that important news or announcements about a firm often results in significant positive or negative returns. There could be news that is difficult for the investors to interpret systematically may result in insignificant price changes. But if there are extreme movements, in the stock prices, either positive or negative, it is likely that events that moved the share price also grabbed the investors' attention. The attention can be grabbed even if the price is reacting strongly to private information, rumors related to the announcements that are yet to be made public. This notion is further supported by Lee (1992) who examines the trading activity around earnings announcements and finds that small retail traders are the net buyers of stocks having both positive and negative earnings surprises. Lee (1992) explains the result by stating that the buy and sale processes of the small investors are different from that of the large investors. In particular, the purchase decisions by the individual investors are driven by news events that bring the security to their attention, while sell decisions are more complicated. Similarly, Hirshleifer et al. (2008) and Odean (1999) also conclude that retail investors are the net buyers following both positive and negative earnings surprises and stocks having greater absolute price change. All these findings concur that it's not the content of the news rather the attention paid to the news, the triggers the purchasing decision of the small individual traders. Consequently, the mean AOR captures the attention-driven trades by the retail traders, who are more likely to place orders in the overnight period for the stocks that have grabbed their attention, especially when the significance of the news is such that these trades are too costly to delay (i.e., merger announcement) resulting in extreme overnight returns (both positive and negative).

To investigate our empirical predictions related to the AOR, we choose merger announcements as the testing platform for the following reasons: (i) Mergers are one of the most important and complex corporate investments which help the acquiring firms to create value and achieve growth. To successfully create wealth for the shareholders, acquirers hope that there is enough attention from the investors around the announcement days. (ii) Unlike

the other forms of corporate announcements (i.e., earnings announcements and dividend announcements) that are more frequent with anticipated announcement days, the M&A announcements are rather infrequent and complex. Consequently, the lack of attention from the market agents means it will take longer for the stock market to incorporate this new announcement information (Louis and Sun, 2010). (iii) The information content of a merger announcement is such that it takes significantly longer for the investors to process the news and act on it. (iv) The market value of the bidder is more susceptible to the subjective valuations by the investors around the bid period compared to normal periods. Thus, investor attention should affect the way equity investors value the bidder stocks and in turn affect the announcement returns.

There is also extant research explaining the moderating effect of attention on different corporate announcements including M&As. DellaVigna and Pollet (2009) find that abnormal returns are muted during the announcements made on Fridays when the investor attention is lower. Louis and Sun (2010) document similar findings for merger announcements. Similarly, Hirshleifer et al. (2009) find evidence that the stock market's reaction to earnings surprises is weak on days during which multiple firms give similar announcements. Adra and Barbopoulos (2018), find that limited investor attention allows overvalued bidders to engage in stock-financed acquisitions without experiencing great wealth loss. The authors find that, in the presence of limited investor attention, bidders acquiring public targets with stock payments do not experience significant loss around announcements. On the contrary, bidders with high attention, experience more negative abnormal returns in the announcement of acquiring public targets acquired by stocks. Reyes (2018) investigates the relationship between google attention and merger performance reporting that investors' attention to a merging firm increases as the announcement date approaches, peaks on the announcement day, and remains high in the post-announcement days as well. The increased attention captured by google coupled with high news coverage leads to high abnormal returns.

Within our framework of M&A announcements, investors' attention may be grabbed long before the actual announcement as the rumors and uncertainties surrounding potential merger activities infiltrate the market regularly. Shiller (2003) argues that intrinsic animal spirits within the investors increase their propensity to take investment decisions even under

uncertainties. In an attempt to reduce the information asymmetry, retail investors who actively trade on these private signals, go through different means like interviewing managers, verifying rumors, analyzing the firm performances from financial statements, etc. (Daniel et al., 1998). Moreover, these investors remain more confident about the precision of the attention-grabbing signals that they get or generate first-hand (Odean 1999). If the private signals about the upcoming merger grab the attention of the individual investors, they are likely to place orders of the stocks of the acquiring firms irrespective of the price or liquidity in the overnight period. These attention-driven trades, primarily by the retail traders, results in extreme overnight returns (both positive and negative) leading to the takeover announcement. Primarily because the extreme returns, negative or positive, more often are associated with the news of the corresponding bidders. The news driving the extreme overnight returns will catch the attention of some of the investors, while the extreme return itself may grab the attention of the others, especially, in the absence of official announcements. Consequently, we propose that the high AOR of the bidders' stocks in the period leading to the takeover announcement date means retail investors as a group are actively paying attention to the news of the impending acquisition.

It is intuitive to believe that, compared to the normal period, retail investors remain more active in this period leading to the announcement. Hence, to proxy for investor attention faced by US bidders, we estimate the average AOR from -20 to -3 days leading to the takeover announcement. Our proxy AOR is different from the previous proxies of investor attention such as, extreme daily returns, abnormal trading volume (Barber and Odean, 2008), Friday announcements (Louis and Sun, 2010) and google search attention (Da et al., 2011) in the following ways: (i) Unlike extreme daily returns and trading volumes that are susceptible to the trades of institutional investors, our proxy of attention AOR should primarily capture the attention driven trades of the retail investors. (ii) We are not only focusing on the investors' attention on a particular day, rather we incorporate the overnight attention starting from 20 days before the announcement. (iii) The data for Google search volume index (SVI) is often unavailable for comparatively less known bidders whereas our proxy for attention remains valid for all the publicly traded bidders.

To investigate the impact of attention on the acquisition returns, we use a sample of US M&A deals announced between January 1993 and December 2018. Bidder CARs are

calculated for the 3 days event window starting from 1 day before the announcement date to 1 day after the announcement. We begin our empirical analysis by directly investigating, what do overnight returns capture in the context of M&As? Is it sentiment or attention? It is particularly difficult to differentiate between the attention-driven and sentiment-driven returns as both share similar returns distributions such as long-run returns reversals, a stronger association for firms more retail investors, and a stronger reaction for harder to arbitrage stocks ((Baker and Wurgler, 2007; Danbolt et al., 2015). To distinguish between the two empirically, following Aboody et al. (2018) we also construct mean overnight returns (OR) estimated -20 to -3 days before the takeover announcement and see if OR as a proxy for firm-specific sentiment can explain the bidder abnormal returns.

The attention framework of Barber and Odean (2008) document that individual investors are the net purchasers of attention-grabbing stocks resulting in temporary positive price pressure. The rationale behind the proposition is that, when individual investors are buying, they have to choose from a large set of available stocks. On the contrary, when they are selling, they can only sell from what they already own. Keeping the findings of Barber and Odean (2008) as our framework, we expect that high AOR on average positively affects the acquirer short-run abnormal returns around the merger announcement. Similarly, in the context of investor sentiment, Danbolt et al. (2015) propose that in the presence of sentiment, investors are likely to overestimate the synergy from the impending merger while underestimating the risk, resulting in a positive market overreaction during the announcement. Consequently, in the context of our study, albeit through two different mechanisms, both the AOR as a proxy of attention and OR as the proxy of sentiment predicts a positive association with bidder abnormal returns.

The results from both the univariate and multivariate analyses give us the initial confirmation that our proxy of retail investor attention, AOR positively affects the bidder abnormal returns whereas there is no evidence of an association between OR and bidder CARs. In the univariate framework, we divide our sample of bidder CARs across the 10 portfolios of OR and AOR. We find that the mean CARs following the highest portfolio of AOR (4.7 %) is more than four times the mean CARs of the overall sample. Furthermore, the difference in mean CARS between the highest and lowest AOR groups is both statistically significant and economically meaningful. On the contrary, the difference in

mean CARs following the highest and lowest portfolios of OR is insignificant and economically very small. In the multivariate framework, after controlling for the known bidder-, deal-, and macro-level factors, the coefficient of AOR is positive and statistically significant (1%) in explaining acquirer abnormal returns around the merger announcements. The results show that a percentage point increase in bidder AOR is associated with a 0.428 percentage point increase in the three-day bidder cumulative abnormal returns. The economic magnitude of such an increase in the AOR coefficient translates into a $796 million value increase for our sample average bidder with a market value of $ 1.19 billion. On the contrary, the coefficients on OR don't show any explanatory power on the bidder abnormal returns.

Next, we analyze the differential market response to high and AOR for stock swap announcements., The stock-swap deals give us a unique research setting to further distinguish between attention and sentiment. Under the framework of investor inattention, Louis and Sun (2010) document that when the investors are inattentive, the reaction for public stock swaps is less negative and the reaction for private stock swaps is less positive. Similarly, in our case, high AOR should lead to an overreaction of negative abnormal returns for public stock swaps and positive abnormal returns for private stock swaps. However, for the coefficient on OR capturing investor sentiment, we don't expect the association with bidder CARs to vary by public and private stock swap deals. Supporting our conjecture, multivariate results show that following high AOR, the market reacts more negatively to public stock swaps and more positively to private stock swaps. Moreover, the coefficients on OR remain statistically insignificant. These findings further invalidate the concern that sentiment is the mechanism through which overnight returns affect acquirer CARs.

For the next set of analyses, we make predictions related to the economic mechanisms driving the positive association between AOR and bidder CARs. Unravelling the potential channels would give us further validation that investor attention is the main driver behind our reported results. First, we predict that attention-driven overreaction should be stronger for the acquiring firms with greater information asymmetry and harder to value or arbitrage (Baker and Wurgler, 2007; Berkman et al., 2012; Daniel et al., 1998; Zhang, 2006). In our attention framework, investors' subjective valuation varies with the level of information uncertainty in the stock market. In such cases, retail investors tend to

overestimate their ability to generate accurate information, particularly in cases where they personally collected the data (Odean, 1999). To test these predictions, we take small bidders, young bidders, and acquisitions of private targets as our three proxies for hard-of-value acquires and deals. Keeping in line with our assumption, we find that the positive association between AOR and acquirer abnormal returns is strongest for the sub-section of small bidders, young bidders, and private targets.

Second, we test whose attention does AOR capture? According to Da et al. (2011) and Berkman et al. (2012), attention-driven purchasing behavior is more pronounced in firms with less institutional investors, since small retail investors as a group are more likely to be affected by attention. Whereas institutional investors are less likely to be affected by attention since they have access to far better information gathering sources like Reuters or Bloomberg (Da et al., 2011). To test these predictions, following Buchanan et al. (2018), we construct two measures of institutional ownership: i) Top 5 institutional ownership and ii) Block holder ownership. Next, we construct two dummy variables as a proxy for the firms with high retail traders: i) Low institutional ownership, a dummy variable equals 1 if top 5 institutional ownership is lower than the 25^{th} percentile and 0 otherwise; ii) Low blockholder ownership: a dummy variable equals 1 if blockholder ownership variable is less than the 25^{th} percentile value of our sample and 0 otherwise. Supporting our conjecture, the results show that the positive association between AOR and acquirer abnormal returns is stronger in the subsection of acquirers with lower institutional investor holdings.

Third, we posit that attention-driven positive overreaction for the private stocks and negative overreaction of public stocks should be more pronounced under the moderating effect of deal complexity and institutional ownership. Confirming our prediction, we find that the coefficients on the interaction of AOR and private stocks are more positive for the sub-sample of small bidders, young bidders, low top 5 institutional ownership, and low blockholder ownership. On the contrary, for the same sub-sample of firms, we find the coefficients on the interaction of AOR and public stocks to be more negative.

Our results hold for a series of robustness tests. First, we confirm that our results are not driven by any particular window of bidder abnormal returns. The association between AOR and bidder CARs holds for three different windows of bidder abnormal returns.

Second, to address the concerns regarding the capacity of the AOR to capture retail investor attention, we take two alternate measures of AOR. The coefficients on the alternate proxies of AOR remain statistically and economically significant in explaining both bidder CARs. Third, we further confirm that all the variants of AOR remain positive and significant in explaining abnormal trading volumes as well.

Next, we investigate the influence of AOR on acquirer abnormal returns between the merger (bid) and normal (pre-bid) period. Previous literature (i.e., Barber and Odean, 2008) primarily explores the relationship between attention and market returns in the normal trading period. However, in this context of takeover announcements, compared to the pre-bid period, the relation between AOR and bidder abnormal return should be stronger around the bid period when the bidder stock is more exposed to the subjective valuation by the equity investors. For the bid period, we keep the calculation windows exactly like our main multivariate test. For the pre-bid period, the dependent variable is the CARs calculated -22 to -20 days before the merger announcement and the main independent variable is the mean AOR calculated -40 to -24 days before the announcement. These alternate windows of pre-bid AOR and pre-bid abnormal returns ensure that we can explore the association between them in the normal trading period that is likely to be free from the potential impact of the upcoming merger. Supporting our conjecture, the results show that the association between AOR and bidder abnormal return is only significant in the bid period. Furthermore, the difference between the AOR coefficients in the bid and pre-bid period is also statistically significant. This finding also gives further justification for taking takeover announcements as our research setting.

The positive coefficient on AOR is consistent with the retail investor attention hypothesis suggested by Barber and Odean (2008). On the contrary, it can be the case that the positive coefficient on AOR is simply reflecting the favorable bidder and deal-specific fundamentals captured through the high AOR before the official announcement. Da et al. (2011) propose a way of disentangling the overlapping findings between investor attention and the information-based hypothesis by testing the returns reversal. If the positive market reaction is due to the nature of the acquirer and deal-specific fundamentals, then the positive reaction will continue as the news of the successful acquisition gradually gets incorporated into the acquirer stock price. However, if the temporal price pressure is due to the attention-

driven acquirer stock purchase behavior, then we should expect the positive market reactions to be followed by price reversals in the post-announcement periods. Supporting the latter prediction, our results show that overnight attention-driven overreaction is followed by price reversals in the post-announcement days.

Next, we recognize that while retail investors' attention might be grabbed for a multitude of reasons, the nature of acquires and deals that grab their attention more easily may not be randomly distributed. For example, it is more likely that retail investors pay more attention to renowned bidders or public targets. Thus, the bidders that get more attention are likely to differ in terms of several characteristics relative to the bidders that get less attention. If the propensity to get attention is related to the bidder's abnormal returns, then we cannot conclude that AOR affects the bidder CARs. Thus, to reinforce the validity of our prior findings, we perform a propensity score matching (PSM) analysis to control for the firm and deal-level characteristics that could potentially lead to the selection bias in our empirical tests. In particular, we follow the method suggested in Druker and Puri (2005) and construct a sample of bidders that experienced high retail investor attention (the treatment group) with similar characteristics to the low-investor attention bidders (the control group). To match the firms, we use size, book leverage, market–to–book, return on assets (ROA), past returns, firm age, firm volatility, target public status, and stock payment. The impact of the AOR on bidder CARs and the abnormal trading volume for the matched sample remains positive and statistically significant at 1% level of significance, alleviating the concern that potential selection bias by the retail investors may drive our overall results.

Lastly, to address the potential issue that omitted variables may drive our results, we perform a two-stage instrument variable (IV) analysis. For this procedure, we take the percentage of home-broadband users in the US provided by the PEW research center as the instrumental variable. Barber and Odean (2002) find that the availability of the internet in US homes changed the way retail investors trade in the market. Due to the availability of online trading facilities, retail investors are trading more actively, more speculatively, and earning less profit in the long run (Barber and Odean, 2002). In the context of our study, the percentage of home-broadband users should affect our independent variable AOR, however, unlikely to influence the bidder abnormal returns. Supporting our conjecture, we find that access to the home-internet has a statistically significant association with retail investor

attention. More importantly, the post estimation results from the first-stage regression show that the Kleibergen–Paap rk Wald F statistic for the weak identification test is higher than the critical value prescribed in Stock and Yogo (2002). Besides, the results from the second stage of the IV regression confirm that the instrumented AOR remains positive and statistically significant in explaining both bidder abnormal returns and abnormal trading volumes.

This study contributes to the different strands of literature. First, we contribute to the behavioral finance literature. While previous studies in the field of behavioral finance show that the attention driven trading by retail investors create temporary price pressure in the stock market (Barder and Odean, 2008; Berkman et al., 2012; Da et al., 2011), this paper extends the analysis in the context of M&As and concludes that retail investor attention is a valid predictor of bidder abnormal returns. We further develop different hypotheses based on the findings of the previous behavioral literature and conclude that the association between AOR and bidder announcement returns is stronger for acquirers with the percentage of low institutional investors, private targets, and harder to arbitrage stocks. Besides, as bidder CARs are calculated over the regular market returns, our results indicate an association beyond the already found relationship between investor attention and the stock market performance in Barber and Odean (2008) and Berkman et al. (2012).

Second, our results further contribute to the emerging literature on the contrasting returns pattern witnessed between overnight returns and intraday reversals resulting from that two distinct clienteles: retail investors in the overnight periods and daytime arbitrageurs in the intraday periods (Akbas et al., 2020; Lou et al., 2019). We extend these findings in the context of M&As by empirically validating that the dispersion of the investors between the overnight and intraday periods affects the bidder abnormal returns. While previous proxies of investor attention either do not differentiate between the two distinctive groups of investors or do not capture the attention of the investors in the long period leading to the announcement, AOR specifically captures the attention of the retail investors, up to 18 days period leading to the announcement. Moreover, unlike the Google search volume index (SVI), data for which can be area restricted and more infrequent for comparatively less available bidders, AOR can be constructed for all the publicly available stocks for the desired period. Even though AOR shows many of the characteristics of firm-specific investor

sentiment, by using the testing platform of stock swap deals we show that AOR indeed captures retail investor attention, not investor sentiment.

Third, we contribute to the literature on the determinants of bidder abnormal returns. Prior literature shows that a large pool of factors such as target public status (Agrawal et al., 1992; Higson and Elliott, 1998; Jarrell and Poulsen, 1989; Jensen and Ruback, 1983; Kaplan and Weisbach, 1992), payment methods (Brown and Ryngaert, 1991; Myers and Majluf, 1984; Servaes, 1991; Travlos, 1987), relative size (Asquith et al., 1983; Jarrell and Poulsen, 1989; Jensen and Ruback, 1983), bidder size (Moeller et al., 2004), capital structure (Schlingemann, 2004; Toffanin, 2005; Yook, 2003) corporate governance (Amihud et al., 1990; Ghosh and Ruland, 1998), CEO overconfidence (Malmendier and Tate, 2008), different variants of uncertainties (Bhagwat et al., 2016; Hao et al., 2020; Nguyen and Phan, 2017; Nguyen et al., 2020), bidder and target valuations (Dong et al., 2006; Rhodes-Kropf and Viswanathan, 2004; Rhodes–Kropf et al., 2005; Shleifer and Vishny, 2003), corporate liquidity (Almeida et al., 2011), and investor sentiment (Danbolt et al., 2015; Rosen, 2006) can affect bidder abnormal returns. We uncover AOR as a new determinant showing a short-term positive association with bidder abnormal returns followed by a reversal in the post-announcement periods. Understanding the dynamics between the night traders and day-time arbitrageurs in the context of acquisition announcements is of great significance given the importance of acquisition activity in creating value for the bidders.

Our research is closely related to the behavioral models in Rosen (2006) and Danbolt et al. (2015). Both the studies concur that under the presence of high sentiment, investors overestimate the synergies of the impending mergers while underestimating the risks associated with them resulting in short-term overreaction followed by a long-term reversal. Our study complements these findings by reporting another source of cognitive bias, attention of night traders affecting the bidder abnormal returns. The study also extends the previous findings that managers time their acquisition decisions based on market valuation (Bouwman et al., 2009; Rhodes-Kropf and Viswanathan, 2004; Rhodes–Kropf et al., 2005; Shleifer and Vishny, 2003). We particularly highlight that the trades by the retail investors may also affect the merger announcement returns. Our empirical finding that retail investors are the net buyers of the attention-grabbing bidders around the merger announcements is also largely consistent with the empirical results in Barber and Odean (2008) and Grullon

et al. (2004). This finding is also consistent with the story of Gervais et al. (2001) that increased visibility of stock may attract new investors, especially around a major corporate announcement like acquisitions.

The remainder of the chapter is organized as follows: Section 2.2 presents the literature review. Section 2.3 describes the sample, data, and variables used in the analysis. Section 2.4 presents the empirical results. Finally, section 2.5 concludes the chapter.

2.2 Literature review

In this section, we give a comprehensive literature review on the previous determinants of bidder abnormal returns and the recent developments in retail investor attention and overnight returns.

2.2.1 Bidder abnormal announcement returns

This section of the study covers the literature related to the short-term and long-term performance of the acquiring firms following takeover announcements. There is extant literature on how short-run announcement returns are almost always positive for target shareholders but vary significantly for bidders based on the different bidder and deal-specific fundamentals. The section further covers different streams of theories that try to solve the post-merger performance anomalies.

2.2.1.1 Target public status

Previous literature shows that bidder short-run announcement returns are higher for cash offers and private targets compared to stock offers and public targets. After investigating the U.S firms from 1962-1985, Jensen and Ruback (1983) find that the announcement gains for the public targets are slightly positive for the overall sample but negative in different sub-periods. Bradley et al. (1988) similarly find negative announcement returns for the public targets while reporting positive returns only in the periods of fewer regulations. Jarell and Poulsen (1989) predict that it's the severe competition among the numerous bidders that drives away the gains from public targets. Kaplan and Weisback (1992) draw a similar conclusion for public targets but their sample includes only the largest

acquisitions of the 1980s. Agrawal et al. (1992), Higson and Elliot (1998), Sudarsanam et al. (1996), Firth (1980) similarly conclude that the bidder's announcement returns for the public targets are mostly insignificant.

On the other hand, previous studies concur that short-run bidder announcement returns are higher for private targets. Hansen and Lott Jr (1996) use the auction theory to explain the difference in returns for private and public targets. In their sample, around 65% of the public targets experience negative announcement returns while the percentage comes down to 43% for the private targets. These results are explained within the framework of auction theory which states that, due to the regulatory nature of the bidding procedure of the publicly traded firms, the public bidders end up bidding higher for the other publicly traded firms than they would have bid for similar private targets.

Draper and Paudyal (2006) summarise different theories behind the altering market reaction for public and private firms and add managerial ambitions to be a factor behind contrasting market reactions between public and private targets. It is deemed more prestigious for the managers if they can acquire public firms and this managerial ambition leads to overpayment for the public firms. Antoniou et al. (2007) analyzing UK firms give results that contradict the findings given by Fuller et al. (2002) and conclude that deal-specific characteristics only matter for the short-term return of the bidders. In the long run, both the public and private firms failed to generate wealth for investors. Alexandridis et al. (2010) go against the majority of research that finds negative abnormal returns for public acquisitions and conclude that public firms can have positive abnormal returns in the less competitive markets outside of the US, UK, and Canada.

2.2.1.2 Methods of payment

The acquiring firm can choose cash, stocks, other financial instruments (bonds, convertibles), or a mixture of all these payment options to acquire the firms. These payment methods, along with the target listing status (private or public) can have a significant impact on the abnormal announcement returns of the bidders. The probability of a target accepting an offer in the tender contest is higher for cash offers than stocks. Travlos (1987), find that on average, acquirer announcement returns are lower for stock offers than for cash bids.

Eckbo et al. (1990) propose that bidders in equilibrium use a mix of cash and stock deals. They further add that the adverse selection of targets prompts the bidders to use stock offers, while target undervaluation prompts the bidders to pay with cash. When bidders use a greater proportion of their payment in cash, the greater the chance that bidders are nearing their true value. These conjectures are supported by the result that bidder abnormal stock returns are highest for all-cash deals and lowest for the all-stock deals. The bidder abnormal returns for the mixed deals fall between the two. Moreover, the financial market uses the proportion of the deal paid in cash to separate low-value from high-value bidders.

When public bidders acquire public firms with stock for stock swap, on average, the market reacts negatively. Myers and Majluf (1984) and Travlos (1987) recognize information asymmetry between the managers and investors of the bidder firms as a source of the negative abnormal returns. More often than less, when an acquirer goes for acquiring a public firm with stock, it indicates to the marker that the stocks are overvalued and hence, the bidder is trying to acquire with overvalued shares. As overvalued shares are more likely to experience sharp price-fall, investors perceive this as negative news. Asquith et al. (1987), Servaes (1991), Brown and Ryngaert (1991), Smith and Kim (1994), Emery and Switzer (1999), Heron and Lie (2004), Schlingemann (2004) further corroborate this finding that bidder abnormal returns are negative in all-stock offers for public deals.

On the contrary, the market reaction for private targets bought with stock swaps, on average, results in positive bidder abnormal returns. As explained in Chang (1998), investors react positively to the acquisition of the private stock swaps because of the increased monitoring capacity of the outside blockholders on the managers. Chang (1998) argues announcement returns are higher for private targets with stock offers than private targets with cash. The author explains the higher abnormal returns of the sub-sections of private targets with stock swap deals by the increased monitoring activities of the target shareholders and reduced information asymmetries. When public bidders acquire private firms by offering stocks, the process, in turn, creates target shareholders as the outside block holders who can monitor the performance of the managers better. The increased monitoring by the target shareholders lower the agency cost between investors and managers in the long run. Moreover, the small number of owners of the private firms are more stringent in terms of accepting bidder's overvalued stocks. Hence, buying private firms with stocks normally

conveys positive news for the bidders' shareholders. The reduced information asymmetry also plays a vital role as the managers of acquirers can disclose all the confidential information to the target shareholders who are limited in numbers. Fuller et al. (2002) after analyzing the announcement returns of the bidders with multiple acquisitions conclude that when bidders go for private firms, they face less competition in a comparatively illiquid market. The acquisition value of the private firms reflects that liquidity discount. Moreover, when the owners of the private firms are compensated with stocks, it delays their tax liability thus, owners often accept a lower bid for stock acquisitions.

2.2.1.3 Bidder characteristics

Among bidder-specific characteristics, the size of bidders has a significant impact on the announcement returns. Moeller et al. (2004) find that small bidders tend to earn higher returns than their larger counterparts. The result is driven by the fact that large firms are more likely to go for public acquisitions with overvalued stocks which normally results in negative abnormal returns. Moreover, in large firms, managers tend to make decisions backed by personal motivations whereas the small firm managers take decisions which are more aligned with the need of the shareholders. Moeller et al. (2005) provide further evidence that negative abnormal returns of the large firms are mainly driven by 2% of the largest acquisitions.

The relative size, measured as the size of the target divided by the size of the acquirer, significantly affects the bidder abnormal returns (Asquith et al., 1983; Jarrell and Poulsen, 1989; Jensen and Ruback, 1983). larger targets relative to the acquirers are expected to have a greater impact on the bidder. Consequently, the greater the relative deal size, the higher the bidder abnormal returns. Rau and Vermaelen (1998) document that, the glamour acquirers with low book-to-market value outperform the value acquirers with high book-to-market value by having higher short-term bidder announcement returns. However, in the long run, the same glamour acquirers underperform compared to the value acquirers. As glamour firms previously experienced steady performance, managers tend to overestimate their abilities to complete a value-enhancing acquisition. Managers affected by hubris, end up destroying values in such firms. For the UK firms, Sudarsanam and Mahate (2003) further

corroborate that value firms outperform the glamour firms in the three years. The authors postulate market overvaluation to be one of the primary reasons for the finding.

The payment method selected by the acquirers is part of their broader capital structure strategy. Also, managers act to protect private benefits of control (Harris and Raviv, 1988; Stulz, 1988). Consequently, bidder managers prefer debt-financed cash payments over stock payments to retain more control in the merged firms. Schlingemann (2004) and Toffanin (2005) find that there is a direct association between bidder financing decisions and takeover announcement returns. Yook (2003) finds greater bidder gains in all-cash offers when the takeover causes down-grading of the merged firm's debt (due to increased leverage). The results are consistent with agency costs of free cash flow (Jensen, 1986).

The corporate governance structure and the percentage of management shareholdings of the bidders can affect the announcement returns. For example, Amihud et al. (1990), Martin (1996), Ghosh and Ruland (1998) conclude that increased managerial shareholdings negatively affect stock financing. Martynova and Renneboog (2006) find a direct association between corporate governance quality and market reaction to stock acquisitions.

2.2.1.4 Merger momentum and relevant theories

Merger and acquisition activities come as clusters or waves (Andrade et al., 2001) which create merger momentum. Rosen (2006) defines merger momentum as the correlated market reaction to a merger announcement with recent market conditions. However, merger momentum is not necessarily the same thing is as merger waves. Merger waves are normally referred to as the number of mergers happening in a particular period. Having said that, the hot market is often associated with large merger waves. The literature is divided in terms of explaining the sources of the merger momentum. In the majority of the cases, merger momentum is associated with higher short-run returns and differing long-run returns. Based on the explanations given for the long-run reactions of the bidder's abnormal returns, the overall findings can further be divided into three broad theoretical steams (1) neoclassical theories, (2) managerial hubris, and (3) market valuations and investor sentiment.

According to neoclassical theorists, the primary sources of merger momentum are the regulatory or external shocks that increase the merger synergies for a group of mergers. Andrade et al. (2001) document that merger momentum is related to external shocks and the stock market reacts positively with these shocks. Mitchell and Mulherin (1996) further postulate that the industry-wise momentum in takeover attempts is explained by economic shocks related to the respective industries. These results can explain that the merger activities in the 1980s are primarily driven by macroeconomic factors. The neoclassical theorists make their arguments on the basis that managers are beyond any cognitive errors and always work for the best interest of the investors. Moreover, the manager takes those acquisition decisions which will increase the share price of the bidder in the long run. Other things remaining constant, when mergers are centered around similar external shocks, then due to the common factors that influence the potential synergies of these mergers positively, these mergers will perform better than the mergers happening at other times. Hence, under the neoclassical stream of literature, it may not be a necessary condition, but the stock market reaction and merger momentum can be highly correlated to the common positive external shocks.

The next stream of literature focuses on the role of managerial hubris and motivation in reaction to external shocks that can increase the merger activities. The concept of managerial hubris is introduced by Roll (1986) who explains the role of managerial overconfidence or arrogance in the decision-making process. Unlike neoclassical theorists, this stream of literature takes into consideration that managers are not beyond making any errors in their decision making. The market is rational but not the managers and the irrationality of managers can directly influence the corresponding merger activities. Roll (1986) suggests the hubris hypothesis as the overconfidence of managers that entails the managers to bid higher than the fair value of an acquisition target. Malmendier and Tate (2008) by taking managerial stock options as the proxy for managerial overconfidence find a similar conclusion that the overconfident CEOs tend to overpay and take value-destroying acquisition decisions. This relation is stronger when overconfident CEOs have greater access to internal finance. Other than managerial hubris, different managerial motivations also influence the merger outcomes. Morck et al. (1990) hypothesize that managers often go for acquisition just to reduce the probability of the firm being acquired. Gorton et al. (2009) confirm that merger waves are the result of managers acquiring to stop other firms from

acquiring their firms. These defensive mergers often follow major economic shocks and not likely to create any value for the bidding firm. Bouwman et al. (2009) investigate the acquisitions during the booming and recessionary periods and conclude that managerial herding is the main driver behind the alternate performances in different valuation periods.

Market valuation theory related to mergers goes beyond the deal-specific characteristics, firm-specific fundamentals, and managerial motivations that influence merger decisions. This line of literature predicts bidder announcement return is positively tied to the prevailing stock market valuations. Around the late 1990s, a large stream of merger deals involved stock as a mode of payment (Andrade et al., 2001). The stocks which were involved in these merger deals were overvalued before the deals are attempted by the bidders. This entails a strong correlation between market valuation and merger activities, especially with stock acquisitions. The relation is significant for other periods as well (Jovanovic and Rousseau, 2001; Martin, 1996).

Sheifer and Vishny (2003) give a theoretical model that explores the influence of market valuation on the firm acquisitiveness, payment methods, bidder performance, and ultimately merger waves. The paper hypothesizes overvalued firms want to convert their overvalued stocks into long-term assets at an effective discount and this discount comes at a long-term loss for the shareholders of the target firms. Ang and Cheng (2006) present the empirical test for the theoretical model given in Sheifer and Vishny (2003). According to the empirical results, overvalued bidders are more likely to go for the acquisitions with stocks as stock acquirers are more overvalued than cash acquirers. Moreover, overvaluation is highly correlated with stock market returns. Furthermore, the bidders in successful mergers are more overvalued than the target firms even after controlling for the target premium adjusted valuations. Also, successful bidders of the stock acquisition whose shares are more overvalued than the target's target premium adjusted overvaluation, tend to perform better than the matched non-successful overvalued bidders. Dong et al. (2006) use market price-to-fundamental ratios as proxies for investor misvaluation, growth opportunities, and agency problems to extend the work of Sheifer and Vishny (2003). The paper finds bidder and target misvaluations (price-to-book, or price-to-residual-income-model-value) affect the payment method, mode of acquisition, premia, target hostility, offer success, and the bidder and target announcement return. Savor and Lu (2009) find that the bidder long-term

shareholders eventually benefit from the deals made during the overvalued market, even though they might not have any real synergies.

In another theoretical model, Rhodes-Kropf and Viswanathan (2004) predict that the target manager cannot distinguish between the market-wide and firm-specific overvaluation and ultimately end up accepting offers from the overvalued bidders. Rhodes-Kropf, Robinson, and Visvanathan (2004) later give empirical evidence of the previously given theoretical model by Rhodes-Kropf and Viswanathan (2004). In their empirical paper, misvaluations are decomposed into market-wide, industry-wide, and firm-specific components. The results find firm-specific valuation errors to be a more significant factor than market-wide errors. Moreover, takeovers tend to take place when both the acquirer and the target are overvalued. Jensen (2004) gives the argument that managers of the overvalued firms try to prolong the misvaluation by engaging in value-destroying strategies like nonprofitable acquisitions, investments, and earnings management. Croci et al. (2010) test managerial hubris in different valuation periods and provide evidence that less overconfident managers are the better judge of value-creating deals in all the valuation periods. On top of that, less overconfident managers tend to gain the most in the high valuation periods.

Similar to market valuations, investor sentiment can also alter the market reactions to bidder abnormal returns. Bouwman et al. (2009) find acquisitions made in the overvalued market are followed by high short-run gain but underperformance in the long run. Rosen (2006) finds similar short-run high abnormal returns and long-term reversals in the return of the acquiring firms during the hot market. Investor sentiment is mentioned as one of the possible explanations for the high short-run return followed by a long-run reversal. The paper further finds, firms that go for mergers during the hot market are not better than the deals that go through other times, but optimistic investors as a group tend to underestimate risks. The high sentiment (optimism) among the investors drives the high short-run abnormal announcement returns, but in the long run the, elevated expectations of the investors are not matched by the underperformance. Hence, bidding firms experience a reversal in their long-term returns. Danbolt et al., (2015) also find investor sentiment to be a significant predictor of bidders' abnormal return. The authors take Gross National Happiness Index (GNH) from Facebook as the proxy for investor sentiment and find that bidder abnormal returns are significantly higher for the announcements made on the high GNH periods. On days of high

sentiment, investors subconsciously overestimate the synergy and underestimate the risk associated with the mergers. The results are most significant for public targets, uninformed investors, bigger firms that attract more attention.

2.2.2 Investor attention in the financial market

It is a very well documented notion that on the days of information release or large price movements, stock trading volume increases (Bamber et al., 1997; Karpoff, 1987). For example, when Maria Bartiromo, the famous presenter of the Midday Call on CNBC, mentions a stock, its trading volume increases nearly five times in the minutes after the mention (Busse and Green, 2002). The neoclassical asset pricing models assume that new information in the market is readily incorporated into the stock price, requiring the investors to pay enough attention to the news. However, in reality, attention is a scarce cognitive resource (Kahneman, 1973). Recent studies on attention provide us a theoretical framework to assess how investor attention affects the share price movement in the financial market.

One important question to ask here is, who is buying, and who is selling these stocks that grab the attention of the investors? Lee et al. (1991) examine the trading activity around earnings announcements over a year and finds that small retail traders are the net buyers of stocks having both positive and negative earnings surprises. Lee et al. (1991) predict that earnings news may attract investors' attention. Similarly, Hirshleifer and Shumway (2003) also conclude that retail investors are the net buyers following both positive and negative earnings surprises. In another paper, Peng and Xiong (2006) argue that high individual investor attention leads to price overreactions in up markets while offsetting underreactions to events such as earnings reports. Odean (1999) explores the trading records of investors and concludes that on average, the stocks bought by the retail traders underperform those they sell. The author further observes that stocks these investors buy stocks having greater absolute price change in the previous two years. He further suggests that to address the potential search problem of which securities to buy, investors constrain their search to stocks that grabbed their attention.

In another study, Odean (1998) posits that investors trade excessively when they are overconfident about their information, leading to overvaluing the importance of such events

that catch their attention and resulting in suboptimal tradings. Odean (1999) and Barber and Odean (2001, 2002) similarly find that self-directed individual investors, in the presence of cognitive biases, indeed trade sub-optimally while lowering their expected returns through excessive trading. Seasholes and Wu (2004) observe that individual investors are the net buyer of the stocks that hit the upper limit the day before in the Shanghai Stock Exchange. Moreover, the relationship is stronger for first-time buyers. Grullon et al. (2004) document that, advertising may also grab investors' awareness of a firm. They find that firms that spend more on advertising, increase the investors' association with the firm, and consequently, these firms have a greater number of individual and institutional investors. Gervais, et al. (2001) find that stocks that experience a high trading volume lead to price appreciation. The authors argue that buyers of these stocks are investors who are optimistic about their prospects. The increased awareness among the investors, coupled with high trading volume results in the net purchase of these stocks. Thus, investors do not purchase stocks that they don't follow, and these purchases are biased towards the attention-grabbing stocks.

Previous research also reports the role of investor attention in assessing corporate announcements. DellaVigna and Pollet (2009) find that abnormal returns are muted during the announcements made on Fridays when the investor attention is lower. Louis and Sun (2010) document similar findings for merger announcements. Similarly, Hirshleifer et al. (2009) find evidence that the stock market's reaction to earnings surprises is weak on days during which multiple firms give similar announcements. Adra and Barbopoulos (2018), find that limited investor attention allows overvalued bidders to engage in stock-financed acquisitions without experiencing great wealth loss. The authors find that, in the presence of limited investor attention, bidders acquiring public targets with stock payments do not experience significant loss around announcements. On the contrary, bidders with high attention, experience more negative abnormal returns in the announcement of acquiring public targets acquired by stocks.

2.2.3 Overnight returns

The traditional asset pricing models do not account for the overnight returns anomaly which is short-term in nature. Decomposing the daily returns into overnight and intraday components, significant negative autocorrelation is reported between these two returns

(Berkman et al., 2012; Branch and Ma, 2012). High overnight returns, calculated at the opening of the market, are followed by negative intraday returns on the same day. The result contradicts the notion of the efficient market hypothesis that the returns should be free from any form of autocorrelation. The evidence further suggests, over the years, more and more earnings announcements and other company-specific rumors are coming outside the regular trading period. Moreover, Cliff et al. (2008) report that over the last decade, equity premiums in the U.S market are mainly driven by the returns in the night period. This indicates that more investors are staying active even after the stock market is closed. But even with the increased activity in the night period, not much has been reported on the factors that drive high overnight returns.

Several studies have recognized that overnight returns behave differently than the total returns of the firm. For instance, Berkman et al. (2012) find that overnight returns are more prone to capture the attention-grabbing sentiment of retail investors. The paper finds that attention-grabbing stocks on the current day will have higher overnight returns on the following day. The excess demand for these attention-grabbing stocks first reflects when the market opens the next day. The increased demand due to attention puts upward pressure on the price of the stocks, resulting in higher overnight returns. Also, due to this attention-driven retail buying pressure, the opening prices are found higher compared to the intraday period. These findings are consistent with the shreds of evidence given in two other papers: Branch and Ma (2012) and Cliff et al. (2008).

Lou et al. (2019) give further evidence that overnight returns behave differently than the total and intraday returns. The most important finding of this paper is overnight returns are better explained by momentum profit where other stock market anomalies (value, size factors, etc) are found more significant for the intraday period. Essentially, all the abnormal return on the momentum strategy occurs at overnight while the abnormal returns on other strategies primarily occur at the intraday period. These findings represent a challenge not only to neoclassical models of risk and return but also to intermediary- and behavioral-based explanations of the cross-section of average returns. The paper argues that investor heterogeneity in two periods can explain why momentum profits accrue overnight. Relative to individuals, institutional investors as a class (on a value-weight basis) tend to trade against momentum during the day. However, the degree to which this is the case varies through time

and across stocks, generating an interesting tug of war from intraday to overnight. Similarly, Akbas et al. (2020) report that a more persistent tug of war between the overnight and intraday returns is driven by the differing investor clienteles composed of noise traders in the overnight period, and arbitrageurs during the intraday returns leads to higher future returns. The reported association remains strong for both the individual stocks and the overall market. The authors conclude that daytime arbitrageurs underestimate the probability of positive news arriving at the overnight period and consequently, overcorrect the persistent overnight price of the securities.

Aboody et. al (2018), suggest overnight returns as a proxy for the firm-specific investor sentiment. The suitability of overnight returns as a sentiment proxy is based on the notion that retail investors compared to institutional investors, are more likely to engage themselves in sentiment-driven behavior as explained in Barber et al. (2009), Berkman et al. (2012), and Lee et al. (1991). Moreover, high overnight returns are mainly driven by the purchase of retail investors (Berkman et al., 2012). The overnight return also captures firm-specific information surprises. A good portion of the earnings announcements comes once the stock market is closed at 4:00 pm. Besides, many other regulatory changes in the firms happen outside the trading hours. Thus, individual traders often give orders for the next day's trading at the overnight period which puts temporary upward or downward pressure on the opening price the next day.

Three separate tests are carried out by Aboody et al. (2018) to check the suitability of the overnight returns as a firm-specific sentiment proxy. In the first test, following the work of Barber et al. (2009), the paper carries out a short-run- persistence test for overnight returns. The short-term persistence in returns is mostly driven by the investment pattern of retail investors and might last over several weeks. Moreover, it is checked whether the short-run persistence is greater for the firms with low institutional holdings as the lower the institutional holding, the higher the retail investor sentiment sensitivity of the firms. The second test is conducted to check whether overnight return persistence is greater for harder-to-value firms, a characteristic that is consistent with several empirical studies where market-wide sentiment is used (Baker and Wurgler, 2006; Hribar and McInnis, 2012). Lastly, the third test is conducted to check the long-term reversal of the high overnight returns. Keeping in line with all the previous proxies of sentiment, stocks with high overnight returns remain

high for consecutive weeks, should underperform in the long run. All these tests conclude that overnight returns show characteristics of sentiment proxies used in previous studies. Short-term persistence is found higher for firms with low institutional holding. Further, the paper finds firms that are harder to value report high overnight returns. Lastly, stocks with low overnight returns tend to outperform the stocks with high overnight return decile in the long run, a result that is consistent with the long-run reversal of the sentiment-driven results.

Weißofner and Wessels (2020) extend the findings of Aboody et al. (2018) in the international framework and report that overnight returns show the characteristics of investor sentiment in the international equity market as well. Just like the return characteristics in the US stock market, overnight returns remain persistent in the short run; the persistence remains stronger among harder-to-value firms and lastly, underperforms in the long run. Gamm (2019), deconstructs the total stock returns after the earnings announcements into the overnight and intraday returns and reports that strong positive abnormal overnight returns persist for several weeks following extreme earnings announcement returns. The finding is in line with the attention-induced trading pattern by the investors. The retail investors remain active in the overnight period after newsworthy events. The association is opposite following the intraday returns, meaning that this trend is not captured through the total returns. The reported association is stronger in the high sentiment period and harder-to-value firms.

2.3. Data, sample, and estimation of AOR

2.3.1 Sample development

Our M&A sample which is collected from the SDC Platinum Database includes deals announced between January 1993 to December 2018. The dates before 1993 are not considered because the information for overnight returns is not available in the CRSP database before 1993. The bidders are the US public firms and targets are both public and private firms from all over the world. Next, we exclude deals with a value of less than $1 million and relative deal value to acquirer market capital capitalization one month before the announcement less than 1%. The highly regulated financial (SIC 6000-6999) and utility (SIC 4900–4999) companies are not considered for the sample. We also exclude the bidders that had stock prices less than $1 in our sample period. After these procedures, our M&A sample

consists of 16,177 deals with 4,193 unique acquiring firms worth, on average, a total of $2.79 billion per year.

2.3.2 Estimation of retail investor attention (AOR)

To test different theories related to investor attention, finding an appropriate proxy remains a challenge for the empiricist as there is no direct proxy available for retail investor attention. Currently, there are several indirect proxies available to capture investor attention such as one-day extreme returns, extreme daily returns, abnormal trading volume, news, advertising expense, and google search volume index (Barber and Odean, 2008; Chemmanur and Yan., 2009; Da et al., 2011; Gervais et al., 2001; Hou et al., 2008; Grullon et al., 2004). However, none of these proxies are free from the potential pitfalls. For example, proxies like one-day extreme returns and abnormal volumes suggested by Barber and Odean (2008) are very short-term in nature and also exposed to trading by institutional investors. Da et al., (2011) suggest, google search volume index as a potential proxy for retail investor attention. While the proxy can potentially capture the retail investor's attention, the lack of data for the less renowned firms remains a hurdle. News headlines as a potential proxy do not guaranty that investors are paying any attention to them.

By addressing the potential issues with current proxies of investor attention, we propose that mean absolute overnight returns (AOR) as a potential proxy to capture retail investors' attention. The motivation for selecting AOR as a measure of investor attention stems from the recent findings in the fields of psychology and behavioral finance. For example, Kraemer et al. (2000) document that an individual's ability to give attention may vary based on time of day, and the peak in attention often coincides when the stock market is closed in the overnight period. In a recent study, Evans et al. (2017) further posit that compared to the intraday period, individuals are more vulnerable to cognitive biases in the overnight period. These studies from human psychology are further complemented by the recent findings on overnight returns. For instance, Lou et al. (2019) suggest that investor heterogeneity drives the contrasting returns pattern between the overnight and intraday periods. Similarly, Berkman et al. (2012) document that the retail investors who are more likely to be affected by cognitive biases, prefer to trade at the night period and wait for the trades to be executed at the market open. Aboody et al. (2018) on the same premise that retail

investors are more likely to be affected by sentiment, propose overnight returns as a proxy for firm-specific investor sentiment. Moreover, when the retail investors place orders outside the trading hours in the overnight period, they seldom worry about liquidity or the price impact of the orders (Lou et al., 2019).

Akbas et al. (2020) extend the work of Lou et al. (2019) and support the conjecture that two distinct groups of investors drive the opposing returns patterns in the overnight and intraday periods. The excess demand created by the retail investors in the overnight period pushes the prices in one direction while the daytime arbitrageurs trade against these retail investors resulting in price reversal in the day. Besides, over the years more and more firms are disclosing company-specific information after the market closes (Barclay and Hendershott, 2003; Santosh, 2016). Even though these announcements may grab the attention of all sorts of investors, however, it is the retail investors who are more likely to act upon the news and put orders outside the regular trading hours, especially when the significance of the news is such that these trades are too costly to delay. Thus, our proxy of attention is constructed based on retail investors who actively trade in the overnight period.

Uncertainties in the financial market play a vital role in the trading of investors. Shiller (2003) argues that intrinsic animal spirits within the investors increase their propensity to take investment decisions even under uncertainties. Within our framework of M&A announcements, investors' attention may be grabbed long before the actual announcement. The rumors and speculations surrounding potential merger activities infiltrate the market regularly. In an attempt to reduce the information asymmetry, retail investors who actively trade on these private signals, go through different means like interviewing managers, verifying rumors, analyzing the firm performances from financial statements, etc. (Daniel et al., 1998). Moreover, these investors remain more confident about the precision of the attention-grabbing signals that they get or generate first-hand (Odean 1999). The short-term attention proxies like one-day extreme returns or Friday announcements may not capture the attention of the retail investors that were captured in the period leading to the merger. Thus, to construct our proxy we measure the AOR for the period leading to the merger announcement (-20 to -3 days). If the news, rumors, or the private signals about the upcoming merger grab the attention of the individual investors, they are likely to place orders of the stocks of the acquiring firms irrespective of the price or

liquidity in the overnight period (Lou et al., 2019), resulting in extreme overnight returns (both positive and negative). These extreme returns whether negative or positive, more often are associated with the news of the corresponding bidders. The news driving the extreme overnight returns will catch the attention of some of the investors, while the extreme return itself may grab the attention of the others, especially, in the absence of official announcements. Thus, the high AOR of the bidder in the period leading to the announcement means retail investors as a group are actively paying attention to the imminent acquisition.

To construct AOR, first, we calculate the overnight returns of the bidders in our sample. The total returns of a company can be divided between returns earned in overnight and intraday periods. Overnight returns are the returns earned by the firms between the closing of the market and the opening of the market the next day. Overnight returns of the bidders are calculated in the following way:

$$OR_{it} = \frac{OP_{it} - CP_{it-1}}{CP_{it-1}} \quad (2.1)$$

where OR_{it} is the overnight return of the bidder i on day t. OP_{it} is the opening price of the stock i on the day t, whereas CP_{it-1} is the closing price of the stock i on day t-1. The opening and the closing price of the stocks are adjusted for the stock splits, stock dividends, and cash dividends.

Next, our main independent variable of interest, the AOR is calculated in the following way:

$$AOR_{it} = \frac{\sum_{t=-20}^{-3} |OR_{it}|}{18} \quad (2.2)$$

where AOR_{it} is the average absolute overnight returns of the bidder from -20 to -3 days leading to the acquisition announcement on day t. Consequently, our proxy can capture the attention of retail investors up to 20 days before the actual announcement[6].

[6] Our results remain qualitatively similar for other windows from -10 to -2 days and -15 to -2 days before the announcement.

2.3.3 Cumulative Abnormal Returns

Cumulative Abnormal Returns (CARs) is the short-term measure to capture the initial reaction of the stock market following the merger announcement. It is the cross-sectional analysis of the abnormal stock return of the bidding firm in the days surrounding the announcement date. Abnormal return is the difference between the bidder's stock return and the market return.

$AR_{i\,t} = R_{i\,t} - RM_t$ *(2.3)*

$CARs_{it} = \sum_{t=-1}^{1} R_{it} - RM_t$ *(2.4)*

where R_{it} is bidder i's daily stock return on date t and RM_t is the return for the value-weighted CRSP index on the same date t. For CARs (-1, +1), abnormal returns are calculated for the 3 days event window starting from 1 day before the announcement date to 1 day after the announcement. Then, the abnormal returns for the 3 days are added to calculate CARs (-1, +1). Similarly, CARs for two other periods, (-2, +2) and (0, +3) are calculated.

2.3.4 Sample characteristics

Panel A of Table 2.1 reports all the descriptive statistics of the AOR measure and other control variables used in the empirical setting. A detailed definition of all the variables is included in Appendix A. To take out the effect of the extreme values, we winsorize all the continuous variables at the 1st and 99th percentile. The sample descriptive statistics are in line with the findings of the previous studies (Bonaime et al., 2018; Hao et al., 2020; Nguyen and Phan, 2017).

Panel B of Table 2.1 presents the major deal-and firm-specific characteristics according to the high and low AOR before the announcement. The sample statistics show that the completed deals following high and low AOR are almost the same (89.5% versus 91%). This result is in line with Louis and Sun's (2010) finding that the deal completion rate does not differ much with varying levels of investor inattention. However, one interesting finding is that on average, deals following high AOR are completed more quickly than the

deals followed by low AOR (53 days versus 59 days). Moreover, the other deal-specific characteristics such as target public status, method of payment are also different for the two different sub-groups. In particular, we find that stock deals are more likely to grab attention than cash deals. This is in line with the previous findings that investors tend to overreact negatively to the public targets bought with stocks and positively to the private targets bought with stocks (Louis and Sun, 2010). So, it is not unlikely that the deals completed with stock acquisitions grabbed more attention in general. Among the firm-specific characteristics, high AOR firms are mostly concentrated among the small bidders, a finding that is in line with Da et al. (2011).

[Please Insert Table 2.1 About Here]

Table 2.2 presents the distribution of the average three-day CARs (-1, +1) by different deal-specific characteristics including target public status and methods of payment. The grouping reflects the substantial literature that suggests target listing status and payment method convey information to the market that influences the intrinsic value of bidders (Chang, 1998; Draper and Paudyal, 2006; Myers and Majluf, 1984; Travlos, 1987). For the full sample, the mean cumulative abnormal return for the 3 days is 0.9 %. According to the target public status, the mean CARs of the private target is significantly higher than the mean CARs of the public target. This result is in line with the long list of studies that confirm that average market reaction for the public target is economically insignificant (Agrawal et al., 1992; Bradley et al., 1988; Jarrell and Poulsen, 1989; Kaplan and Weisbach, 1992) and slightly positive for private targets (Chang, 1998; Fuller et al., 2002). Draper and Paudyal (2006) summarize the different hypotheses behind the outperformance of private targets over public targets and conclude that due to managerial ambition and the more competitive nature of the bidding process, managers tend to overpay for public firms. On the other hand, private targets are often lesser-known, more likely to experience a less competitive bidding process, better fit for the bidders, and often available for the bidders at the discounted price.

The average CARs (1.5%) following 100% cash deals is higher than the average CARs (-0.3%) following 100% stock acquisitions, the finding is in line with the previous studies report that cash acquisitions report slightly higher abnormal returns than stock acquisitions (Myers and Majluf, 1984; Travlos, 1987). In our study, the average CARs (-

2.5%) is the lowest for the sub-sample of public targets bought with stock payments. On the contrary, the average CARs (2.1%) of the sub-sample private targets purchased with stocks is significantly positive. The contrasting market reactions between the public and private targets purchased with stock swaps are well documented in the previous studies. The market generally reacts negatively to stock acquisitions of public targets as it reflects overvalued bidders whereas the positive market reaction for private targets purchased with stocks reflects the increased monitoring by external blockholders in the combined firm, (Chang, 1998).

[Please Insert Table 2.2 About Here]

2.4 Empirical analysis

2.4.1 AOR and market reaction

The neoclassical theorists believe that investors are inherently rational in nature and only make decisions to maximize their utility function. However, the extant literature in the fields of psychology and behavioral finance shows that different behavioral and cognitive biases can affect the investment choices made by individuals[7]. In this study, we revisit the premise that attention given by investors is a scarce resource that substantially affects the quality of the decision-making by the equity investors (Kahneman, 1973; Barber and Odean, 2008). Equity investors have a great deal of exposure to new information in the stock mark and yet, have very little time to process and integrate the information in their decision-making. Consequently, retail investors are subject to cognitive bias like short-term attention span that instigates them to trade at prices not justified by market fundamentals[8].

The term "attention" refers to the intensity of a task or activity (Kahneman, 1973). In our everyday life, there is more attention than mere selection. The concept of selection is

[7] Please see Greenwald (1980), Svenson (1981), Cooper et al. (1988), Taylor and Brown (1988), and Griffin and Tversky (1992).

[8] Please see Odean (1999), Barber and Odean (2008), Lou and Sun (2010), Berkman et al. (2012).

fundamentally important to explain attention as individuals must select from different activities in which they can engage at a point in time. The capacity theory of attention considers that individuals have limited ability to carry out multiple activities at the same time and hypothesizes that the total amount of attention that an individual can assert at any time is limited (Kahneman, 1973). It also assumes that this limited capacity can be allocated with considerable freedom among concurrent activities (Moray, 1967). When the supply of attention does not meet the demand then the performance of the task falters or even fails. Similarly, in the financial market, when there are many options for the investors, stocks that grab the attention of the investors, are more likely to be selected. On the other hand, stocks that don't attract the attention of investors are more likely to be ignored. For example, DellaVigna and Pollet (2009) find a weak market reaction to the release of corporate news on Fridays when investors have low attention. Louis and Sun (2010) document similar findings for merger announcements[9].

How does a sharp increase in retail investor attention, proxied by high AOR, affect the market reaction of the bidders' stocks at the merger announcement? According to the price pressure hypothesis given by Barber and Odean (2008), retail investors are the net buyer of attention-grabbing stocks. While selecting stocks to purchase, individual investors, face difficulty as they are bombarded with hundreds of choices. However, while selling, they can only sell from the few stocks that they have in their portfolio. Although the retail investors do not end up buying all the stocks that grab their attention, however, they are the net buyers of the attention-grabbing stocks. As retail investors short sell very infrequently, the selling side is not equally affected as they can only sell the stocks that they have in their portfolio. If the high AOR leading to the announcement indeed captures the retail investors' attention, we can directly test the price pressure hypothesis given by Barber and Odean (2008). After private signals of the impending merger grab the attention of the retail investors and at a later point when public news confirms their initial prediction, it increases the demand for the bidders' stocks. More specifically, we predict that high AOR before the merger

[9] More recently Michaely et al. (2016) contribute these findings to selection bias.

announcement should put a temporal price pressure that positively affects the bidders' abnormal returns at the merger announcement.

2.4.1.1 Univariate analysis

We start our empirical tests by directly investigating what does overnight returns capture in the context of merger announcements. It is plausible that our proxy of retail investor attention AOR is capturing investor sentiment, instead of retail investor attention. Aboody et. al (2018), suggest overnight returns (OR) as a proxy for the firm-specific investor sentiment. It is imperative to disentangle between attention and sentiment as just like attention-driven stock returns, sentiment-driven market returns are reversal prone while showing stronger reactions for harder to arbitrage stocks (Baker and Wrugler, 2007; Dan bolt et al., 2015). To distinguish between the two empirically, following Aboody et al. (2018) we also construct mean overnight returns (OR) estimated -20 to -3 days before the takeover announcement and see if OR as a proxy for firm-specific sentiment can explain the bidder abnormal returns. In the context of investor sentiment, Danbolt et al. (2015) propose that in the presence of sentiment, investors are likely to overestimate the synergy from the impending merger while underestimating the risk, resulting in a positive market overreaction during the announcement. Consequently, in the context of our study, albeit through two different mechanisms, both the AOR as a proxy of attention and OR as the proxy of sentiment predicts a positive association with bidder abnormal returns.

Table 2.3 presents the first univariate analysis that explores the differential market reactions by the deciles of OR and AOR. The average acquirer OR and AOR are calculated for the 18 days (-20 to -3) period before each announcement. Next, the individual merger announcements are ranked and divided into the deciles of OR and AOR. Dividing the sample into deciles allows us to have a deeper look into how bidder CARs change across the 10 portfolios of OR and AOR. Portfolio 1 comprises of the bidders with the lowest OR and AOR whereas portfolio 10 represents the bidders with the highest OR and AOR before the announcement. The results from the univariate test give us the initial support that our proxy of retail investor attention, AOR positively affects the bidder abnormal returns whereas there is no evidence of a strong association between OR and bidder CARs. The mean CARs following the highest portfolio of AOR (4.7 %) is more than four times the mean CARs of

the overall sample. Further, the difference in mean CARS between the highest and lowest AOR groups is both statistically significant and economically meaningful. On the contrary, the difference in mean CARs following the highest and lowest portfolios of OR is insignificant and economically very small.

[Please Insert Table 2.3 About Here]

2.4.1.2. Multivariate analysis

To empirically assess the impact of AOR on the three-day cumulative bidder abnormal returns (1, +1) in the multivariate framework, we run OLS regression by controlling for a series of firm-, deal-, and macro-level determinants that previous literature has shown to affect the acquirers' acquisition performance. We use the following model:

$$CARs_{i,t} = \alpha + \beta \times AOR_{i,t} + \times X' \times C_{i,t-1} + \gamma\ INDUSTRY\ FIXED\ EFFECTS + \lambda\ TIME\ FIXED\ EFFECTS + \varepsilon_{i,t} \quad (2.5)$$

where the dependent variable is the three-day acquirer CARs (-1, +1) calculated by using the market model where the CRSP value-weighted index return is the market return. Our main variable of interest AOR is the mean absolute overnight returns calculated -20 to -3 days before the merger announcement. C is a series of all the control variables included in the multivariate model. All the firm-level control variables are measured in the fiscal year ending in the previous calendar year, and the macroeconomic variables are measured (as averages) in the prior calendar year of the acquisition announcement.

The bidder-specific firm-level control variables include size, book leverage, market–to–book, return on assets (ROA), sales growth, cash to assets, past returns, non–cash working capital, firm age, and firm volatility. For the deal-specific control variables, we include the listing status of the target firm (public vs private) and payment method (cash vs stock payment), high tech dummy, hostile takeover dummy, diversification dummy, and challenge dummy (Draper and Paudyal, 2006; Chang, 1998; Myers and Majluf, 1984; Travlos, 1987).

We follow Bonaime et al. (2018) to include the following macro-variables that may affect the bidders' announcement returns. First, we include the principal component of the University of Michigan index of consumer confidence, the National Activity Index from the Chicago Federal Reserve Board, and the average one–year–ahead GDP growth forecast from the Livingstone Survey of Professional Forecasters. Second, we construct an industry–level economic shock variable which is the first principal component of seven economic shock variables (profitability, asset turnover, research and development, capital expenditures, employee growth, ROA, and sales growth) for each Fama–French 48 industry. Third, to control for market liquidity, we use the spread between Baa–rated bonds and the Federal Funds rate. Fourth, to account for different facets of macro-uncertainty we take the first principal component of the Jurado et al. (2015) monthly index of macroeconomic uncertainty, VXO implied volatility index released by the CBOE and following Bloom (2009), we add to our model the cross-sectional standard deviations of monthly returns from CRSP and the cross-sectional standard deviations of annual sales growth from Compustat.

Besides, to account for the possibility that our proxy of retail investor attention AOR may capture the high equity valuation of the stock market, we add a series of control variables as a proxy for relative valuation, overall market valuations, and investor sentiment. In particular, we add Shiller's cyclically adjusted price-earnings (CAPE) ratio, as a proxy for the relative valuation of the market (high values indicate overvaluation). Further, to proxy for overall market valuation, we estimate the industry median Tobin's q and industry median cumulative returns over the prior three years for each of the Fama and French (1997) 48 industries (Harford, 2005). To capture industry return volatility, we calculate the industry median standard deviation of monthly returns during the 36 months ending the prior fiscal year. The detailed descriptions of the variables are presented in Appendix A.

Table 2.4 reports the results for multivariate OLS regressions. Specifications (1) and (3) do not include the macro-level controls whereas specifications (2) and (4) are the complete models including the macro-level controls. In all the specifications, we further include the time and industry fixed effects. Finally, we use robust standard errors double–clustered by firm and year. Supporting the price pressure hypothesis of attention, we find that AOR has a strong positive association with bidder abnormal returns. In both specifications (1) and (2), the coefficient of AOR is statistically 1 % level of significance.

Specification (2), our main multivariate model, reports that the parameter coefficient on AOR is 0.428 with a t-value equal to 3.017, depicting that with one percentage point increase in bidder AOR is associated with a 0.428 percentage point increase in the three-day bidder cumulative abnormal returns. The economic magnitude of such an increase in the coefficient on AOR translates into a $1.19 billion value increase for our sample average bidder with a market value of $ 2.79 billion. Moreover, as bidder CARs are calculated in excess of the CRSP value-weighted market returns, the reported positive association in the study is on top of the attention-driven stock returns already reported in previous studies.

Specifications (3) and (4) in Table 2.4 confirm that OR, the proxy for firm-specific investor sentiment doesn't hold any explanatory power on the bidder abnormal returns. The results in specifications (3) and (4) confirm that the coefficients on OR do not have any statistical significance. To summarise, the market overreacts to the acquisition announcements that follow high retail investor attention captured through high AOR however, the proxy for sentiment OR remains insignificant.

[Please Insert Table 2.4 About Here]

2.4.2 Stock swap deals

Louis and Sun (2010) argue that the research setting of stock swap deals is particularly relevant for the investor attention hypothesis. They base their argument on the premise that targets' public status is one of the most vital determinants of bidders' abnormal return for the stock swap announcements. For the merger announcements involving stock acquisitions, investors not only need to closely monitor the value of the target and the potential synergy but also interpret all the complex conditions and contingencies involving the deal. Moreover, the investors tend to react quite strongly to these stock swap deals. In particular, previous studies confirm that on average, investors react positively to stock swap deals involving private targets and negatively to those involving public targets. The average CARs of public and private stock swap deals in Table 2.2 for our sample data also support these predictions. Since investors have a strong predisposition that the announcement of stock swaps involving private targets is a positive outcome, under the investor attention framework it is intuitive to think that following high AOR the market reaction of stock

acquisitions involving private targets should be more positive. Similarly, as investors have a strong belief that stock acquisition of a public target is a negative event, the market reaction of these deals following high (low) AOR should be more (less) negative.

Supporting our conjecture, multivariate analyses in Table 2.5 show that the association between AOR and bidder abnormal returns varies significantly between the public and private stock swap deals. In the multivariate framework, the coefficient on the interaction variable AOR*Public stock (-0.860) is strongly negative and statistically significant at a 1% level of significance. In terms of economic magnitude, for the public deals with stock payments, one percentage point increase in AOR results in an approximate value loss of $2.39 billion compared to our sample average bidder of $2.79 billion. On the contrary, the coefficient on the interaction variable AOR*Private stock remains positive, economically large, and statistically significant. These findings provide further justifications for using AOR as a proxy for retail investor attention. At the same time, it contradicts the investor sentiment explanation as the specifications (3) and (4) report that the coefficients on the interaction variable of OR with public stock and private stock deals do not have any explanatory power over the bidder abnormal returns in the stock swap deals framework.

[Please Insert Table 2.5 About Here]

2.4.3 Economic mechanism

The positive coefficient on AOR in explaining the bidder abnormal returns provide support to the price pressure hypothesis. To further validate the finding that temporal price pressure is indeed the economic mechanism that drives our results, we do additional tests related to the acquiring firms' institutional ownership, harder-to-value deals, and stock swap deals.

2.4.3.1 Harder to value deals

What makes some deals more exposed to the cognitive bias-driven trades by the retail traders than others? In our attention framework, investors' subjective valuation about a bidder varies with the level of information uncertainty in the stock market. For example,

smaller and younger firms with good growth opportunities, however, having little earrings history and fluctuating cashflows make it difficult for the investors to justify their subjective valuations put on the price of such securities (Baker and Wrugler, 2007). In such cases, investors overweight their ability to generate and process private information and underweight the forecasting error associated with the prediction (Odean, 1999). Further, under the presence of uncertainty, even when investors have access to the same basic information, the differences of opinion may persist in large magnitude (Miller, 1977). Zhang (2006) also suggests that investors overreact more when the market provides less information on certain stocks (young, volatile, harder to value stocks). Keeping these findings as our background, we predict that the attention-driven overreaction should be stronger for the acquiring firms and deals that the investors find less information about and harder to value or arbitrage (Baker and Wurgler, 2007; Berkman et al., 2012; Daniel et al., 1998; Zhang, 2006).

We take small bidders, young bidders, and acquisitions of private targets as our three proxies for hard-to-value acquires and deals. A series of extant literature shows that arbitrage is particularly expensive for the smaller and younger firms with a high degree of idiosyncratic variations in their returns and cashflows (D'avolio, 2002; Wurgler and Zhuravskaya, 2002). Moreover, the attention-driven overreaction should be pronounced for the small firms that are usually associated with a larger price change (Da et al., 2011). We further predict that as retail investors are more likely to rely on private information that grabbed their attention, the attention-driven overreaction should be stronger for the private targets having comparatively less publicly available information. To test the predictions, we construct the following variables: i) small firm, a dummy variable equals 1 if the bidder's size is lower than the 25^{th} percentile and 0 otherwise; ii) young firm: a dummy variable equals 1 if bidder's age is less than the 25^{th} percentile and 0 otherwise. iii) private: a dummy variable equals 1 if the target is private, 0 otherwise.

The results in Panel A, Table 2.6 explore the predictive power of AOR on bidder abnormal returns by the varying level of information asymmetry and deal difficulty. Keeping in line with our prediction, the results in specifications (1) – (3) confirm that the positive association between AOR and bidder CARs is stronger for the subsection of small acquirers, young acquirers, and private deals. Particularly, the coefficients on the interaction variables

of AOR with the small firm dummy, young firm dummy, and the private target dummy remain economically large and statistically significant. To sum up, the results in Table 2.6 are in line with our prediction that attention-driven overreaction of bidder announcement returns is stronger under the presence of greater information asymmetry.

2.4.3.2 Whose attention does AOR capture?

In this section, we ask the question, whose attention does high AOR capture? Previous studies show that the investors who trade in the overnight period are different from the investors who trade in the intraday period. For instance, Lou et al. (2019) confirm that the level of investor heterogeneity is one of the major determinants of the opposite returns pattern observed between the overnight and intraday periods. Similarly, Berkman et al. (2012) suggest that the trading strategies of retail investors are more likely to be influenced by different cognitive biases, including attention. Whereas institutional investors are less likely to be affected by attention since they have access to far better information gathering sources like Reuters or Bloomberg (Da et al., 2011). Aboody et al. (2018) while proposing overnight returns as a proxy of firm-specific investor sentiment, find that retail investors are more likely to be affected by it. Moreover, when the retail investors place orders outside the trading hours in the overnight period, they seldom worry about liquidity or the price impact of the orders (Lou et al., 2019). Keeping these findings as our background premise, intuitively, following high AOR, the overreaction to merger announcements should be stronger for the sub-section of firms with more retail traders.

To test whether AOR has a stronger association with bidders' abnormal return for acquirers with a greater proportion of retail investors, following Buchanan et al. (2018) we construct two measures of institutional ownership: i) Top 5 institutional ownership and ii) Blockholder ownership. Top 5 institutional ownership variable is the total percentage of the acquirers' shares held by the top 5 institutional investors. The blockholder ownership variable is the total percentage of the acquirers' shares held by the investors with at least 5% ownership of acquirers' shares. Next, we construct two dummy variables as the proxies for the firms with high retail traders: i) low institutional ownership, a dummy variable equals 1 if top 5 institutional ownership is lower than the 25^{th} percentile and 0 otherwise; ii) low

blockholder ownership: a dummy variable equals if block holder ownership variable is less than the 25th percentile value of our sample and 0 otherwise.

Specifications (4) and (5) in Panel A of Table 2.6 report the association between AOR and bidder returns by the acquirers' institutional ownership status. Confirming our prediction, the reported positive association between AOR and bidder CARs is stronger for the subsection of bidders with low institutional ownership. In particular, we find that the positive coefficient on the interaction variables AOR* Low institutional ownership, and AOR* Low blockholder are large and statistically significant. Moreover, the predictive power of AOR on acquirer CARs goes down once we introduce the interaction with institutional ownership dummies. All these results indicate that smaller and less sophisticated retail investors who are susceptible to behavioral biases drive the attention-driven overreaction.

[Please Insert Table 2.6 About Here]

2.4.3.3 Institutional ownership, deal complexity, and stock swap

For the next set of analyses, we test how the association between AOR and bidder abnormal returns for the stock swap deals varies according to the deal complexity and institutional ownership status. In line with our findings so far, if the AOR indeed affects the bidder CARs through the mechanism of the investor attention, then we expect the positive overreaction for private stocks and negative overreaction for the public stocks should be more pronounced when the deals are already harder to value or bidders having a greater concentration of retail investors.

To test our predictions, we measure the interaction variables of AOR with public and private stocks for the subsection of bidders based on firm size, firm age, top 5 institutional ownership percentage, and blockholder ownership percentage. Panel B of Table 2.6 shows that supporting our prediction, the attention-driven positive overreaction for private stock deals and negative overreaction for public stock deals are amplified for the sub-section of small bidders, young bidders, the low percentage of top 5 institutional ownership, and low percentage blockholder ownership.

2.4.5 Robustness tests

In this part of our analysis, we run a series of robustness tests to provide further justifications to the baseline estimations.

2.4.5.1 Alternate CARs, alternate AOR, and abnormal trading volume

In this section, we further justify our main results by extending our analysis for different windows of CARs, alternate definitions of AOR, and abnormal trading volume. First, we test the impact of AOR on bidder CARS for two additional windows: CARs (-2, +2) and CARs (0, +3). Specifications (1) and (2) of Table 2.7 confirm that our results are not driven by any particular window of bidder abnormal returns, rather the association between AOR and bidder abnormal returns holds across different durations of bidder CARs.

One potential concern could be that our proxy of attention could be biased towards the small bidders for whom, a small price change might lead to a greater change to our main independent variable AOR. To address this particular issue, for the next robustness tests, we construct two alternate proxies of retail investor attention based on absolute overnight returns. For the first alternate proxy, we take the difference between mean absolute overnight returns (-20, -3 days) in the merger period and the mean absolute overnight returns (-40, -20 days) in the normal period. We construct the second alternate proxy of attention by taking the difference between mean absolute overnight returns measured -20 to -3 days prior to the takeover announcement and CRSP value-weighted index return for the same period. Specifications (3) and (4) of Table 2.7 confirm that the coefficients on the alternate proxies of AOR remain statistically and economically significant in explaining bidder CARs.

Next, we test the association between AOR and abnormal trading volume. If the price pressure hypothesis truly holds then high acquirer AOR leading to the merger announcement should result in a high announcement period abnormal trading volume as well. To construct the abnormal trading volume, we take the percentage change of the acquirers' trading volumes from the pre-bid (-40, -24) to the announcement (0, +3) period. To measure the abnormal trading volumes, first, we take the natural logarithm of the daily trading volumes. Next, we estimate the percentage difference between mean LOG_VOLUME at the merger

announcement period (0, 3 days) and mean LOG_VOLUME calculated over the pre-bid period (-40, -24 days). The control variables remain unchanged. The specifications (5), (6), and (7) confirm that all three variants of AOR positively affect the bidder abnormal volume around the merger announcements.

[Please Insert Table 2.7 About Here]

2.4.5.2 Reversal in acquirer returns

The positive and statistically significant AOR coefficients in Table 2.4 are consistent with the price pressure hypothesis suggested by Barber and Odean (2008) that the retail investors make their purchase decision based on the stocks that grabbed their attention which eventually increases the price of the relevant stocks. On the contrary, neo-classical theorists might argue that the price increase simply reflects the market's positive reaction to the potential merger synergy. Consequently, if the AOR coefficient captures the positive deal-specific fundamentals, then the initial positive reaction should sustain in the post-merger stock performance of the acquirer as the potential merger synergies slowly get integrated into the acquirer stock price. However, if the positive short-term performance is an overreaction due to overnight attention paid by the retail investors then we expect the market to adjust their initial overreaction in the post-merger period and the same acquirers will underperform in the long run.

To disentangle the overlapping findings stemming from two different schools of thought, we focus on the post-merger stock performance of the deals that are completed following periods of high AOR. In particular, we examine the effect of AOR on post-merger bidder cumulative abnormal returns (+4, +8). Supporting our conjecture of returns reversal, specification (1) of Table 8 reports that the coefficient on AOR in explaining CARs (+4, +8) is negative and statistically significant. More specifically, one percentage point increase in acquirer AOR results in a .166% decrease in the four-days post-announcement CARs (+4, +8). After comparing the coefficients on AOR between in announcement and post-announcement period, we can see that a significant portion of the retail investor attention-driven overreaction in the market is quickly adjusted in the post-announcement period. The result is in line with the previous findings that following the overreaction in the short-term bidder announcement returns, repeated public signals drive the stock price back to the

fundamental values (Daniel et al., 1998). Additionally, merger arbitrageurs actively trade around the announcement days to take advantage of the short-term mispricing and cause the post-merger prices to reverse (Danbolt et al., 2015).

Additionally, we complement the short-run analysis by investigating the long-run effect of AOR on acquirer 1-, 2-, and 3-year BHAR using the matched firm adjusted method suggested by Barber and Lyon (1997) and Lyon, Barber, and Tsai (1999). The long-run analysis helps to further distinguish between the price pressure and favorable information incorporation hypothesis. If the acquirer AOR indeed captures good news instead of retail investor attention, then the positive association should persist in the long run. Specifications (2) to (4) of Table 2.8 report that the association between AOR with long-run BHARs is statistically insignificant. These results further confirm our previous finding that AOR affects the bidder abnormal returns through the price pressure channel.

[Please Insert Table 2.8 About Here]

2.4.5.3 Merger versus normal period

To give further validation that the mean AOR leading to the merger announcement indeed captures the attention of the induvial retail investors, we compare the association between AOR and acquirer abnormal return in the merger (bid) and normal (pre-bid) period. This test also helps us to justify using mergers and acquisitions as our testing platform. Mergers are one of the most important and complex corporate investments which help the acquiring firms to create value and achieve growth. To successfully create wealth for the shareholders, acquirers hope that there is enough attention from the investors around the announcement days. The information content of a merger announcement is such that it takes significantly longer for the investors to process the news and act on it. Consequently, the lack of attention from the market agents means it will take longer for the stock market to incorporate this new announcement information (Louis and Sun, 2010).

Retail investors as a group, are more likely to speculate on private information that grabbed their attention. In this context of takeover announcements, compared to the normal period, the relation between AOR and bidder abnormal return should be stronger around the bid period when the bidder stock is more exposed to the subjective valuation by the equity

investors. For the bid period, we keep the calculation windows exactly like our main multivariate test in Table 2.4. For the pre-bid period, the new dependent variable pre-bid CARs is calculated -22 to -20 days before the merger announcement and the pre-bid AOR is calculated on -40 to -24 days before the announcement.

Table 2.9 reports the relation between AOR and bidder abnormal returns compared in the bid and pre-bid period. Specification (1) of Table 2.9 repeats our main multivariate test from Table 2.4, the association between AOR and acquirer CARs (-1, +1) in the bid period. In specification (2), we repeat the same test by taking pre-bid AOR as the main independent variable. The reported coefficient on pre-bid AOR in the specification (2) confirms that the coefficient on pre-bid AOR is weaker and statistically insignificant. Specification (3) reports that the difference between AOR and pre-bid AOR in explaining three days acquire CARs (-1, +1) is 0.317 and statistically significant at a 1% level of significance. This result also lends support to the justify measuring AOR for the period -20 to -3 days leading to the announcement. Lastly, specification (4) of Table 2.9 reports that the pre-bid AOR has no explanatory power on the pre-bid CARs, as the coefficient on pre-bid AOR remains weak and statistically insignificant. To summarise, supporting our conjecture, all the results show that the association between AOR and bidder abnormal return is only significant in the bid period. Furthermore, the difference between the AOR coefficients in the bid and pre-bid period is also statistically significant. Barber and Odean (2008) and Berkman et al., (2012) previously investigated the impact of attention on stock market returns, focusing primarily on the normal periods. Our results show that the association between retail investor attention and market abnormal returns is equally important around special corporate events like takeover announcements.

[Please Insert Table 2.9 About Here]

2.4.5.4 Propensity score matching (PSM)

Attention paid by the retail investors in different merger announcements may not be distributed randomly. Da et al., (2011) and Reyes (2018) point out that retail investors are more likely to pay attention to the deals that make the news headlines. Moreover, the Google search volume index shows that investors actively pay more attention to the deals involving

large bidders and targets (Reyes, 2018). Consequently, AOR may also differ along with these different bidders and deal-specific characteristics. Even though our results do hold after controlling for a series of firm-, deal- and macro-level characteristics, to further control for the potential selection bias that the retail investors might have, we conduct the propensity score matching (PSM) analysis. In particular, we follow the method suggested in Drucker and Puri (2005) and construct a sample of bidders that experienced high retail investor attention (the treatment group) with similar characteristics to the low-investor attention bidders (the control group). Next, we use the sample to retest our multivariate OLS regressions in table 3. Rosenbaum and Rubin (1985) and Imbens and Wooldridge (2009) suggest that this method eradicates the potential biases while estimating the average treatment effects.

The matching sample is constructed by matching each firm with a control firm. The control firm is a bidder that is not affected by high retail investor attention (i.e., do not belong to the top retail attention bidder group), however, has a close propensity score to the treated firms based on the one-to-one nearest neighbor matching with replacement. To match the firms, we use the following covariates based on the different deal- and bidder-specific variables: size, book leverage, market–to–book, return on assets (ROA), past returns, firm age, firm volatility, target public status, and stock payments. Panel A of Table 2.10 reports the univariate comparison between the firm characteristics between the treatment group and the control group. In the majority of the cases, the differences between the two groups remain insignificant, meaning that most of the characteristics between the two groups are largely similar. Next, Panel B of Table 2.10 shows that the impact of the AOR on bidder CARs and the abnormal trading volume for the matched sample remains positive and statistically significant at 1% level of significance. These results alleviate the concern that potential selection bias by the investors may drive our overall results.

[Please Insert Table 2.10 About Here]

2.4.5.5 Instrumental variable (IV)

To address the issue that omitted variables may drive our results, in this section of our analysis we perform a two-stage instrumental variable (IV) procedure. This method

requires an instrumental variable that affects our independent variable AOR, however, unlikely to influence the bidder abnormal returns. Therefore, to instrument for AOR, we select the percentage of home-broadband users in the US provided by the PEW research agency. The suitability of using the percentage of home-broadband users stems from the findings in Barber and Odean (2002) that the availability of internet in the US homes changed the way retail investors trade in the market. After the easy accessibility to online trading, particularly from 1999 onwards, these retail investors have started trading more actively, more speculatively, and earning less profit in the long run (Barber and Odean, 2002). On the contrary, institutional investors rely primarily on the more sophisticated news sources like Reuters or Bloomberg terminals (Da et al., 2011). In the context of our study, the accessibility to home internet may affect the retail investors' attention-driven decisions in two ways. Firstly, the internet has become one of the most important sources of verifying attention-grabbing events. Secondly, it gives the retail investors the option to trade instantly on the news that grabbed their attention. At the same instant, it is unlikely that the percentage of home-broadband users would have any direct association with bidder abnormal returns. One of the potential pitfalls of using this IV is that it restricts our sample as the percentage of home broadband users is only made available from the year 2000.

Table 2.11 reports the findings from the IV analysis. To perform the IV analysis, in the first stage (specification (1) and specification (3)), we quantify the impact of the percentage of home-broadband subscribers on the AOR. Supporting our conjecture, we find that access to the home-internet has a statistically significant association with retail investor attention. More importantly, the post estimation results from the first-stage regression show that the Kleibergen–Paap rk Wald F statistic for the weak identification test is higher than the critical value prescribed in Stock and Yogo (2002) (i.e., LIML Size of Nominal 10% Wald, that is 16.38 in our case) and rejects the null hypothesis of the weak instrument. In specifications (2) and (4) of Table 2.11, the results confirm that the instrumented AOR remains positive and statistically significant in explaining bidder abnormal returns and abnormal volume.

[Please Insert Table 2.11 About Here]

2.5 Conclusion

The study revisits the role of investor attention on the stock market returns by examining a previously unexplored behavioral dimension – attention in the overnight period, in the context of takeover announcements. Previous literature (i.e., Barber and Odean 2012; Berkman et al., 2012) finds a positive association between attention and stock market returns. Similarly, Aboody et al., (2018) and Lou et al., (2019) find that the distribution of two different clienteles drives the short-term overreaction in the stock market. However, our study goes beyond this reaction between retail investor trading and stock market returns in the normal period and focuses on the merger announcement period when the market value of the bidder is more susceptible to the subjective valuations by the retail investors. Given the importance of corporate acquisitions in creating value for the shareholders, the attention-driven short-term overreaction around the merger announcements is expected to have a great influence on the value of the combined firm.

We argue that in the presence of overnight attention, retail investors overestimate their ability to make a correct prediction and underestimate the risks associated with mergers. Taking this new proxy of retail investor attention, we provide robust evidence that AOR has a strong positive short-term association with bidder abnormal returns. The results show both the statistical and economic significance. 1% percent increase in AOR before the announcement leads to a 0.428% percent increase in the bidder CARs. The magnitude of the association is quite high considering that bidder CARs are already calculated over market returns. The found positive association between the AOR and bidder CARs supports the price pressure hypothesis of investor attention as the AOR-induced short-term overreaction in the market is followed by returns reversals in the post-announcement days. Additionally, several other cross-sectional tests show that the positive impact of AOR on bidder abnormal returns is stronger for bidders with low institutional ownership and bidders that are hard to value.

Furthermore, by exploiting the research setting of the stock swap deals, we report that AOR positively affects the bidder announcement returns around private stocks while negatively affects the announcement returns for the public stocks. The significance of this finding is two-fold. First, we document that, when investors already have a negative belief

about the outcome of certain deals (e.g., public targets acquired by stocks), heightened retail investor attention can lead to negative stock returns. Second, the stock swap deals help us to disentangle the debate regarding what overnight returns capture. The alternate reactions to stock swap deals mean that AOR is indeed capturing investors' attention instead of sentiment which is not likely to differ between the public stock and private stock deals.

For empiricists, especially in behavioral finance, it is always a challenge to find the appropriate proxies that are easily constructed and applied in the research context. While the search volume index proposed by Da et al. (2011) can capture retail investor attention, however, the lack of data remains a hurdle, especially for the deals that fail to generate significant news. To our knowledge, this is the first paper that uses this research setting of divergent investors between the overnight and intraday periods on the bidder abnormal returns. Finally, in a period characterized by great uncertainty across the world, our findings have important implications for corporate managers as well. Corporate managers, who are responsible for assessing the risks and strategically time the announcement of their merger, should pay special consideration to the attention paid by overnight traders and the impact on the shareholder value.

Appendix A

Variables	Definitions	Source
	Panel A: AOR and OR	
AOR	Mean Absolute Overnight Returns (AOR), measured -20 to -3 days prior to the takeover announcement with 0 being the announcement day.	CRSP
OR	Mean Overnight Returns (OR), measured -20 to -3 days prior to the takeover announcement with 0 being the announcement day.	CRSP
Alternate AOR	The independent variable Alternate_AOR is calculated by taking the difference between the mean absolute overnight returns (-20, -3 days) and mean absolute overnight returns (-40,-20 days) with 0 being the announcement day.	CRSP
Alternate AOR_2	The independent variable Alternate_AOR2 is calculated by taking the difference between mean absolute overnight returns measured -20 to -3 days prior to the takeover announcement and CRSP value-weighted index return for the same period with 0 being the announcement day	CRSP
	Panel B: Dependent variables	
CARs (-1, +1)	Acquirer 3-day (-1, +1) cumulative abnormal returns (CARs) with day 0 being the M&A announcement day. The abnormal returns are calculated using the market model with the market model parameters estimated over the period starting 255 days and ending 46 days prior to the announcement. CRSP value-weighted index return is the market return.	CRSP

CARs (0, +3)	Acquirer 4-day (0, +3) cumulative abnormal returns (CARs) with day 0 being the M&A announcement day. The abnormal returns are calculated using the market model with the market model parameters estimated over the period starting 255 days and ending 46 days prior to the announcement. CRSP value-weighted index return is the market return.	CRSP
CARs (-2, +2)	Acquirer 5-day (-2, +2) cumulative abnormal returns (CARs) with day 0 being the M&A announcement day. The abnormal returns are calculated using the market model with the market model parameters estimated over the period starting 255 days and ending 46 days prior to the announcement. CRSP value-weighted index return is the market return.	CRSP
CARs (+4, 7)	Acquirer 4-day (+4, +7) cumulative abnormal returns (CARs) with day 0 being the M&A announcement day. The abnormal returns are calculated using the market model with the market model parameters estimated over the period starting 255 days and ending 46 days prior to the announcement. CRSP value-weighted index return is the market return.	CRSP
Buy-hold abnormal returns (BHARs)	Buy–and–hold abnormal returns (BHARs) are estimated using the matched firm adjusted method suggested by Barber and Lyon (1997) and Lyon, Barber, and Tsai (1999) for 1-, 2- and the 3 years after the acquisition.	CRSP
Abnormal trading volume	Abnormal trading volume calculated as the percentage change between mean LOG_VOLUME at the merger announcement period (0, 3 days) and mean LOG_VOLUME calculated over the pre-bid period (-40, -24 days).	CRSP
	Panel C: Firm-specific Controls	
Size	The natural logarithm of the book value of assets.	Compustat

Book leverage	Long-term debt (item DLTT) plus debt in current liabilities (item DLC), divided by total assets (item AT).	Compustat
Market to book	The ratio of the market value of assets to the book value of assets.	Compustat
ROA	Return on assets, measured as income before extraordinary items (annual item IB) plus interest expense (item XINT) plus income taxes (item XINT), divided by total assets (item AT).	Compustat
Sales growth	The company year–on–year difference of year-end sales.	Compustat
Cash to assets	Cash and short-term investments (item CHE) divided by total assets (item AT).	Compustat
Stock returns	Cumulative returns during the 12 months ending at the end of the firm's fiscal year. This is measured using monthly returns from the CRSP monthly database.	CRSP
Non-cash working capital	The ratio of (working capital – cash) to the book value of assets.	Compustat
Firm age	Number of years that a firm appears in Compustat.	Compustat
Firm volatility	The standard deviation of the firm's daily returns from month *t*-13 to *t*-2.	CRSP
Panel D: Macro Controls		
Investment opportunities (First principal component)		

1. Consumer confidence	The monthly, survey-based index of consumer confidence developed by the University of Michigan.	Available at http://www.sca.isr.umich.edu/
2. CFNAI	The Chicago Fed National Activity Index, which is designed to measure current economic activity and inflationary pressure based on 85 monthly economic indicators.	Available at https://www.chicagofed.org/research/ data/cfnai/historical- data
3. Expected GDP growth	The average one-year-ahead GDP forecast from the biannual Livingstone Survey of Professional Forecasters	The Philadelphia FED
Industry economic shock	It is constructed based on the following seven firm-level indicators: net income to sales (IB/SALE), sales to assets (SALE/AT), R&D to assets (XRD/AT), capital expenditures to assets (CAPX/AT), employment growth (percentage change in item EMP), return on assets (IB/AT), and sales growth (percentage change in item SALE). For each of the 48 industries in the Fama and French (1997) classification, each year, we take the industry median of the absolute (annual) change in each of the above variables.	Compustat
Rate spread	The spread between Baa-rated bonds and the Federal Funds rate. To match the annual frequency of the firm-level data, we use calendar-year averages of this (monthly) spread variable.	The St. Louis FED
Shiller's CAPE ratio	The cyclically adjusted price-earnings (CAPE) ratio developed by Robert Shiller.	Available at http://www.econ.yale.edu/~shiller/data.htm
Industry median Q	The annual, median value of Tobin's Q for each of the Fama and French (1997) 48 industries. Tobin's Q is measured as the book value of assets minus the book value of equity plus the market value of equity, divided by the book value of assets.	Compustat

Industry median past returns	The annual median of firm-level 36–month cumulative returns for each of the Fama and French (1997) 48 industries. Each calendar year *t*, we calculate each firm's cumulative returns using the 36 months leading up to the last month of the fiscal year ending in *t*.	CPSP
Industry σ past returns	The annual median of firm-level 36–month return volatility for each of the Fama and French (1997) 48 industries. Each calendar year *t*, we calculate the standard deviation of each firm's returns, using the 36 monthly return observations leading up to the last month of the fiscal year ending in *t*.	CRSP
Macroeconomic uncertainty (First principal component)		
1. JLN uncertainty index:	Monthly index of macro-economic uncertainty developed by Jurado et al. (2015) as the unforecastable component in a system of 279 macroeconomic variables.	Available at https://www.sydneyludvigson.com/data-and-appendixes
2. VXO index	Daily index of implied volatility released by the Chicago Board Options Exchange, calculated based on the trading of S&P 100 options.	Available at http://www.cboe.com/products/vix-index-volatility/volatility-on-stock-indexes
3. CS σ past returns	The cross-sectional standard deviation of cumulative returns from the past three months, calculated each month.	CPSP
4. CS σ past sales growth	The cross-sectional standard deviation of year-on-year sales growth (percentage change in the Compustat quarterly item SALEQ), calculated each calendar quarter.	Compustat
Panel D: Deal-level Controls		

Stock deal dummy	A dummy variable that takes the value of 1 if the payment is 100% in stock, and 0 otherwise.	SDC
Cash deal dummy	A dummy variable that takes the value of 1 if the M&A deal is 100% funded by cash, and 0 otherwise.	SDC
High tech dummy	A dummy variable that takes the value of 1 if an acquirer's 4–digit SIC code is equal to 3571, 3572, 3575, 3577, 3578, 3661, 3663, 3669, 3671, 3672, 3674, 3675, 3677, 3678, 3679, 3812, 3823, 3825, 3826, 3827, 3829, 3841, 3845, 4812, 4813, 4899, 7371–7375, 7378, or 7379, and 0 otherwise.	SDC
Diversification deal dummy	A dummy variable that takes the value of 1 if the acquirer and target belong to different 2–digit SIC code industries, and 0 otherwise.	SDC
Hostile deal dummy	A dummy variable that takes the value of 1 if the M&A deal is a hostile takeover, and 0 otherwise.	SDC
Public target	A dummy variable that takes the value of 1 if the target is a publicly listed firm, and 0 otherwise.	SDC

Table 2. 1 Summary statistics

Panel A of Table 2.1 reports summary statistics of all variables used in our baseline regression models. The sample consists of all merger and acquisition announcements reported in the Securities Data Corporation (SDC) database between 1993 and 2018 that pass the filters described in section 2.3.1. The number of observations, mean, standard deviation, minimum, 25th percentile, median, 75th percentile, and maximum are reported from left to right, in sequence for each variable. Detailed definitions of all variables are described in Appendix A. Panel B reports the major deal- and firm-specific characteristics by high versus low AOR.

Panel A	N	Mean	p25	Median	p75	Std. Dev.
AOR	16178	0.011	0.005	0.008	0.013	0.012
OR	16178	0.001	-0.002	.0.000	0.002	0.007
Size	16184	5.768	4.332	5.706	7.095	1.984
Book Leverage	16139	0.225	0.027	0.187	0.349	0.226
A M2B	16129	2.417	1.312	1.739	2.577	3.150
A ROA	16150	0.010	0.004	0.044	0.080	0.210
Sales growth	14310	0.17	-0.06	0.05	0.21	50.731
Cash to assets	16147	0.186	0.027	0.097	0.280	0.212
Stock return	13328	0.138	-.0108	0.147	0.404	0.522
Non-cash working capital	15829	.075	-.021	0.059	0.167	0.169
Firm age	16192	2.113	1.266	2.178	2.98	1.056
Firm volatility	14769	0.038	.025	.035	.052	0.016
Stock	16192	0.130	0.000	0.000	0.000	0.336
Cash	16192	0.310	0.000	0.000	1	0.463
High tech	16192	0.314	0.000	0.000	1	0.464
Diversification	16192	0.377	0.000	0.000	1	0.485
Hostile	16192	0.013	0.000	0.000	0	0.111
Public	16192	0.189	0.000	0.000	0	0.391
Challenge	16192	0.018	0.000	0.000	0	0.135
Investment opportunity	16192	60.891	56.259	62.301	66.085	7.988
Shock index	16191	0.230	0.146	0.202	0.274	0.129
Rate spread	16192	3.796	2.402	4.060	4.994	1.533
Shiller's Cape ratio	16192	26.846	21.755	25.943	30.955	6.427
Industry median Q	16183	1.65	1.27	1.48	1.84	0.551
Industry median past returns	16192	1.225	0.985	1.209	1.451	0.372
Industry σ past returns	16192	0.141	0.110	0.136	0.161	0.041
Macro uncertainty	16192	11.284	8.220	11.103	15.752	8.073

	High AOR		Low AOR	
Panel B	Mean	Stdev	Mean	Stdev
Completion time	52.580	90.028	58.161	84.853
Completed deals	0.895	0.307	0.913	0.281
Public deal	0.164	0.370	0.213	0.410
Stock deal	0.186	0.389	0.074	0.262
Cash deal	0.249	0.432	0.371	0.483
Hight tech deal	0.384	0.486	0.244	0.430
Diversify	0.368	0.482	0.385	0.487
Hostile deal	0.009	0.096	0.016	0.124
Multiple bidder	0.011	0.105	0.026	0.158

Size	4.820	1.825	6.714	1.659
Book Leverage	0.204	0.237	0.245	0.213
Market to book value	2.740	4.197	2.096	1.435
ROA	-0.026	0.276	0.047	0.095
Cash to asset	0.232	0.238	0.140	0.171
Stock Return	0.117	0.654	0.157	0.366

Table 2. 2 Sample CARs distribution

Table 2.2 presents the results of univariate acquirer 3-day (-1, +1) cumulative abnormal returns (CARs) by target listing status, payment method, and the combinations between them. The sample consists of all merger and acquisition announcements reported in the Securities Data Corporation (SDC) database between 1993 and 2018 that pass the filters described in section 2.3.1. The abnormal returns are calculated using the market model with the market model parameters estimated over the period starting 255 days and ending 46 days prior to the announcement. CRSP value-weighted index return is the market return. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

		Target Listing Status		**Payment Method**		**Target Listing Status & Payment Method**			
	Full Sample	**Public**	**Private**	**Cash**	**Stock**	**Public Cash**	**Public Stock**	**Private Cash**	**Private Stock**
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
CARs (-1,1)	0.009***	-0.001	0.010***	0.015***	-0.003*	0.022***	-0.025***	0.011***	0.021***
	(16.891)	(- 0.192)	(11.585)	(17.320)	(-1.935)	(12.391)	(-8.460)	(7.380)	(5.334)
N	16,189	3,052	7,725	5,021	3,204	1,271	1,068	1,831	1,110

Table 2. 3 Univariate analysis: AOR and acquirer market reactions

Table 2.3 provides acquirer short-run returns by decile ranking of the (1) mean Overnight Returns (OR), measured -20 to -3 days prior to the takeover announcement and, (2) mean Absolute Overnight Returns (AOR), measured -20 to -3 days prior to the takeover announcement. The sample consists of all merger and acquisition announcements reported in the Securities Data Corporation (SDC) database between 1993 and 2018 that pass the filters described in section 2.3.1. The dependent variable in specifications (1) and (2) is the acquirer 3-day (-1, +1) cumulative abnormal returns (CARs) with day 0 being the M&A announcement day. The abnormal returns are calculated using the market model with the market model parameters estimated over the period starting 255 days and ending 46 days prior to the announcement. CRSP value-weighted index return is the market return. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)
Portfolios	OR	AOR
Portfolio 1	0.031***	0.009***
	(6.840)	(6.987)
N	1,617	1,618
Portfolio 2	0.011***	0.013***
	(5.453)	(8.970)
N	1,618	1,618
Portfolio 3	0.012***	0.009***
	(6.651)	(5.647)
N	1,618	1,618
Portfolio 4	0.009***	0.008***
	(5.066)	(4.764)
N	1,618	1,618
Portfolio 5	0.012***	0.011***
	(6.575)	(6.243)
N	1,617	1,616
Portfolio 6	0.012***	0.011***
	(6.575)	(6.243)
N	1,617	1,616
Portfolio 7	0.014***	0.009***
	(7.328)	(4.217)
N	1,618	1,618
Portfolio 8	0.009***	0.021***
	(4.739)	(6.139)
N	1,618	1,618
Portfolio 9	0.015***	0.016***
	(6.188)	(6.389)
N	1,618	1,618
Portfolio 10	0.029***	0.047***
	(6.161)	(8.190)
N	1,617	1,617

Table 2. 4 Multivariate analysis of AOR and acquirer market reaction

Table 2.4 presents the results of the OLS regression analysis for the effect of mean Absolute Overnight Returns (AOR), measured -20 to -3 days prior to the takeover announcement (specifications (1) and (2)), and mean Overnight Returns (OR) measured -20 to -3 days prior to the takeover announcement (specifications (3) and (4)) on acquirer short-run returns (specifications (1) -(4)). The sample consists of all merger and acquisition announcements reported in the Securities Data Corporation (SDC) database between 1993 and 2018 that pass the filters described in section 2.3.1. The dependent variable in specifications (1)-(4) is the acquirer 3-day (-1, +1) cumulative abnormal returns (CARs) with day 0 being the M&A announcement day. The abnormal returns are calculated using the market model with the market model parameters estimated over the period starting 255 days and ending 46 days prior to the announcement. CRSP value-weighted index return is the market return. All firm-level variables are measured at the end of the prior fiscal year t; macroeconomic variables are measured as averages over the prior calendar year t. The definitions of all variables are provided in Appendix A. In all models, we control for Fama–French 48 industry fixed effects and year fixed effect. Heteroscedasticity– robust standard errors clustered by both firm and year are reported in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

	Acquirer Short-Run CARs			
	(1)	**(2)**	**(3)**	**(4)**
AOR	0.411***	0.428***		
	(3.017)	(3.125)		
OR			-0.417	-0.412
			(-1.153)	(-1.137)
Size	-0.005***	-0.005***	-0.008***	-0.008***
	(-11.845)	(-11.828)	(-10.469)	(-11.347)
Book leverage	0.004	0.004	0.010	0.011
	(0.992)	(1.056)	(0.874)	(0.909)
Market to Book	-0.001***	-0.001***	-0.001*	-0.001**
	(-3.358)	(-3.262)	(-1.950)	(-2.089)
ROA	0.001	-0.000	-0.012	-0.013
	(0.128)	(-0.002)	(-0.967)	(-1.048)
Sales growth	-0.000	-0.000	-0.000	-0.000
	(-0.433)	(-0.406)	(-0.900)	(-0.897)
Cash to assets	-0.018***	-0.016***	-0.021**	-0.021*
	(-3.569)	(-3.349)	(-2.079)	(-1.998)
Stock returns	-0.005***	-0.005***	-0.010***	-0.010***
	(-3.277)	(-3.105)	(-4.553)	(-4.468)
Non-Cash working capital	-0.006	-0.006	-0.014	-0.014
	(-1.095)	(-1.027)	(-1.360)	(-1.354)
Firm age	0.001	0.001	0.001	0.001
	(1.515)	(1.347)	(1.199)	(1.250)
Firm volatility	-0.158	-0.143	-0.356***	-0.322**
	(-1.590)	(-1.440)	(-2.871)	(-2.216)
Stock deal	-0.007***	-0.007***	-0.007*	-0.007*
	(-3.355)	(-3.225)	(-1.905)	(-1.846)
Cash deal	0.011***	0.011***	0.011***	0.011***
	(5.683)	(5.742)	(5.086)	(5.119)
High tech deal	-0.003	-0.002	-0.003	-0.003
	(-0.927)	(-0.765)	(-0.852)	(-0.745)
Diversifying	-0.005***	-0.005***	-0.004	-0.004

	(-3.035)	(-3.085)	(-1.598)	(-1.617)
Hostile	-0.012**	-0.012**	-0.013**	-0.014**
	(-2.064)	(-2.180)	(-2.212)	(-2.321)
Public	-0.006**	-0.006**	-0.006*	-0.005
	(-2.227)	(-2.181)	(-1.747)	(-1.682)
Challenge dummy	0.006	0.007	0.007	0.008
	(0.441)	(0.502)	(0.476)	(0.539)
Investment opportunities (First principal component)		0.000		-0.000
		(0.850)		(-0.392)
Industry economic shock		-0.019		-0.022*
		(-1.679)		(-1.798)
Rate spread		0.001		0.001
		(0.366)		(0.656)
Shiller's CAPE ratio		0.001		0.001*
		(1.426)		(1.989)
Industry median Q		-0.000		-0.000
		(-1.014)		(-1.007)
Industry median past returns		-0.001		0.004
		(-0.414)		(1.197)
Industry σ past returns		-0.011		0.021
		(-0.239)		(0.427)
Macroeconomic uncertainty (First principal component)		0.000		-0.000
		(0.197)		(-0.854)
Industry Fixed Effect	Yes	Yes	Yes	Yes
Time Fixed Effect	Yes	Yes	Yes	Yes
N	12,885	12,879	12,885	12,879
Adjusted R square	0.039	0.039	0.027	0.027

Table 2. 5 Stock swap deals

Table 2.5 presents the results of Multivariate analysis for the effect of mean Absolute Overnight Returns (AOR), measured -20 to -3 days prior to the takeover announcement (specifications (1) and (2), and mean Overnight Returns (OR), measured -20 to -3 days prior to the takeover announcement (specifications (3) and (4), on acquirer short-run returns by the stock swap deals (Public Stock and Private Stock). The sample consists of all merger and acquisition announcements reported in the Securities Data Corporation (SDC) database between 1993 and 2018 that pass the filters described in section 2.3.1. The dependent variable in specifications (1)-(4) is the acquirer 3-day (-1, +1) cumulative abnormal returns (CARs) with day 0 being the M&A announcement day. The abnormal returns are calculated using the market model with the market model parameters estimated over the period starting 255 days and ending 46 days prior to the announcement. CRSP value-weighted index return is the market return. All firm-level variables are measured at the end of the prior fiscal year t; macroeconomic variables are measured as averages over the prior calendar year t. The definitions of all variables are provided in Appendix A. In all models, we control for Fama–French 48 industry fixed effects and year fixed effects. Heteroscedasticity– robust standard errors clustered by both firm and year are reported in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

	Acquirer Short-Run CARs			
	(-1, +1)	**(-1, +1)**	**(-1, +1)**	**(-1, +1)**
	(1)	**(2)**	**(3)**	**(4)**
AOR	0.502***	0.284***		
	(6.736)	(3.690)		
OR			-0.150	-0.096
			(-1.538)	(-0.927)
Public stock	-0.027***		-0.037***	
	(-7.244)		(-14.095)	
Private stock		-0.003		0.006***
		(-0.885)		(2.576)
AOR*Public stock	-0.860***			
	(-3.815)			
AOR*Private stock		0.534***		
		(2.989)		
OR*Public stock			0.571	
			(1.620)	
OR*Private stock				-0.201
				(-0.788)
Firm-level controls	Yes	Yes	Yes	Yes
Deal-level controls	Yes	Yes	Yes	Yes
Macro-level controls	Yes	Yes	Yes	Yes
Industry Fixed Effect	Yes	Yes	Yes	Yes
Time Fixed Effect	Yes	Yes	Yes	Yes
N	12,879	12,879	12,879	12,879
Adjusted R square	0.049	0.028	0.045	0.031

Table 2. 6 Economic mechanism

Table 2.6 presents the results of OLS regression analysis for the effect of mean Absolute Overnight Returns (AOR), measured -20 to -3 days prior to the takeover announcement, on acquirer short-run returns by deal complexity, institutional ownership percentage, and stock swap deals. The sample consists of all merger and acquisition announcements reported in the Securities Data Corporation (SDC) database between 1993 and 2018 that pass the filters described in section 2.3.1. The dependent variable in the specifications in Panel A and B is the acquirer 3-day (-1, +1) cumulative abnormal returns (CARs) with day 0 being the M&A announcement day. The abnormal returns are calculated using the market model with the market model parameters estimated over the period starting 255 days and ending 46 days prior to the announcement. CRSP value-weighted index return is the market return. In Panel A: 1) Small firm, a dummy variable equals 1 if the bidder's size is lower than the 25th percentile and 0 otherwise; 2) Young firm, a dummy variable equals if the bidder's age is less than the 50th percentile value of our sample and 0 otherwise; 3) Private, a dummy variable equals 1 if the target is private, 0 otherwise; (4) Low institutional ownership (IO), a dummy variable equals 1 if the top 5 institutional ownership is lower than the 25th percentile and 0 otherwise; and (5) Low Block holder ownership, a dummy variable equals if the blockholder ownership variable is less than the 25th percentile value of our sample and 0 otherwise. For the sub-sample analysis in Panel B the additional variables are 1) Big firm, a dummy variable equals 1 if the bidder's size is higher than the 75thth percentile and 0 otherwise; 2) Old firm, a dummy variable equals if bidder's age is greater than the 50th percentile value of our sample and 0 otherwise (3) High institutional ownership (IO), a dummy variable equals 1 if the top 5 institutional ownership is higher than the 75thth percentile and 0 otherwise; and (4) High Block holder ownership, a dummy variable equals if the blockholder ownership variable is higher than the 75th percentile value of our sample and 0 otherwise. All firm-level variables are measured at the end of the prior fiscal year t; macroeconomic variables are measured as averages over the prior calendar year t. The definitions of all variables are provided in Appendix A. In all models, we control for Fama–French 48 industry fixed effects and year fixed effects. Heteroscedasticity–robust standard errors clustered by both firm and year are reported in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Panel A	**Acquirer Short-Run CARs**				
	(-1, +1)	**(-1, +1)**	**(-1, +1)**	**(-1, +1)**	**(-1, +1)**
	(1)	**(2)**	**(3)**	**(4)**	**(5)**
AOR	0.248	0.269	0.214**	0.148*	0.297***
	(1.443)	(1.642)	(2.307)	(1.781)	(3.736)
Small firm	0.006**				
	(2.424)				
Young firm		-0.012**			
		(-2.758)			
Private			-0.005**		
			(-2.510)		
AOR*Small firm	0.555***				
	(2.894)				
AOR*Young firm		0.690**			
		(2.105)			
AOR*Private			0.332***		
			(2.666)		
Low investor ownership				-0.005*	
				(-1.946)	
Low blockholder					-0.005**
					(-2.187)
AOR*Low investor ownership				0.778***	
				(5.736)	
AOR*Low blockholder					0.464***
					(3.162)
Firm-level controls	Yes	Yes	Yes	Yes	Yes
Deal-level controls	Yes	Yes	Yes	Yes	Yes
Macro-level controls	Yes	Yes	Yes	Yes	Yes
Industry Fixed Effect	Yes	Yes	Yes	Yes	Yes
Time Fixed Effect	Yes	Yes	Yes	Yes	Yes
N	12,879	12,879	12,879	12,879	12,879
Adjusted R square	0.032	0.037	0.029	0.039	0.036

Panel B	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
	Low IO	High IO	Low Blockholder	High Blockholder	Small Firms	Big Firms	Young Firms	Old Firms	Low IO	High IO	Low Blockholder	High Blockholder	Small Firms	Big Firms	Young Firms	Old Firms
AOR*Public Stock	-1.769***	-1.330	-1.286***	-1.389	-2.842***	-1.089	-1.862***	-0.679**								
	(-2.926)	(-1.515)	(-2.661)	(-1.436)	(-3.708)	(-1.130)	(-3.014)	(-2.592)								
AOR*Private Stock									2.763***	-0.143	0.907***	-0.435	5.401***	0.488	0.913***	-0.775
									(6.362)	(-0.191)	(2.591)	(-0.553)	(11.112)	(0.451)	(3.650)	(-0.866)
Firm-level controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Deal-level controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Macro-level controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	2,501	3,236	2,406	2,764	2,714	3,478	5,452	7,420	2,501	3,236	2,406	2,764	2,714	3,478	5,452	7,420
Adjusted R-squared	0.087	0.062	0.066	0.063	0.054	0.053	0.051	0.040	0.097	0.057	0.059	0.056	0.088	0.044	0.033	0.041

Table 2. 7 Alternate CARs, Alternate AOR, and Abnormal Trading Volume

Table 2.7 presents the results of OLS regression analysis for effect mean Absolute Overnight Returns (AOR), measured -20 to -3 days prior to the takeover announcement (specifications (1), (2) and (5)), and two alternate variants of AOR (specifications (3), (4), (6) and (7)) for different windows of acquirer CARs (specifications (1) (4)) and abnormal trading volume (specifications (5) - (7)). The sample consists of all merger and acquisition announcements reported in the Securities Data Corporation (SDC) database between 1993 and 2018 that pass the filters described in section 2.3.1. The independent variable Alternate_AOR in the specification (3) and (6) is calculated by taking the difference between the mean absolute overnight returns (-20, -3 days) and mean absolute overnight returns (-40, -20 days) with 0 being the announcement day. The independent variable Alternate_AOR2 in the specifications (4) and (7) is calculated by taking the difference between mean absolute overnight returns measured -20 to -3 days prior to the takeover announcement and CRSP value-weighted index return for the same period with 0 being the announcement day. The dependent variable in the specification (1) is the acquirer 5-day (-2, +2) cumulative abnormal returns (CARs) with day 0 being the M&A announcement day. The dependent variable in specification (2) is the acquirer 4-day (0, +3) cumulative abnormal returns (CARs) with day 0 being the M&A announcement day. The abnormal returns are calculated using the market model with the market model parameters estimated over the period starting 255 days and ending 46 days prior to the announcement. The dependent variables in specifications (3) and (4) are the acquirer 3-day (-1, +1) cumulative abnormal returns (CARs) with day 0 being the M&A announcement day. The abnormal returns are calculated using the market model with the market model parameters estimated over the period starting 255 days and ending 46 days prior to the announcement. CRSP value-weighted index return is the market return. The dependent variables in specifications (5) - (7) are the abnormal trading volume calculated as the percentage change between mean LOG_VOLUME at the merger announcement period (0, 3 days) and mean LOG_VOLUME calculated over the pre-bid period (-40, -24 days). All firm-level variables are measured at the end of the prior fiscal year t; macroeconomic variables are measured as averages over the prior calendar year t. The definitions of all variables are provided in Appendix A. In all models, we control for Fama–French 48 industry fixed effects and year fixed effects. Heteroscedasticity– robust standard errors clustered by both firm and year are reported in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

	Alternate CARs		**Alternate AOR**		**Acquirer Abnormal Volume**		
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**
AOR	0.352***	0.290*			0.398***		
	(3.400)	(1.830)			(3.574)		
Alternate_AOR			0.275*			0.531***	
			(1.784)			(3.249)	
Alternate_AOR2				0.352**			0.247*
				(2.623)			(2.038)
Firm-level controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Deal-level controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Macro-level controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	12,879	12,879	12,846	12,879	12,854	12,846	12,854
Adjusted R square	0.032	0.028	0.037	0.038	0.039	0.040	0.038

Table 2. 8 Returns reversal

Table 2.8 presents the results of OLS regression analysis for the effect of mean Absolute Overnight Returns (AOR), measured -20 to -3 days prior to the takeover announcement, on acquirer short-run returns (specification (1)) and acquirer long run BHARs (specifications (2) to (4)). The sample consists of all merger and acquisition announcements reported in the Securities Data Corporation (SDC) database between 1993 and 2018 that pass the filters described in section 2.3.1. The dependent variable in specifications (1) is the acquirer 5-day (4, 8) cumulative abnormal returns (CARs) with day 0 being the M&A announcement day. The abnormal returns are calculated using the market model with the market model parameters estimated over the period starting 255 days and ending 46 days prior to the announcement. CRSP value-weighted index return is the market return. The dependent variables in specifications (2) to (4) are the acquirer 1-, 2-, and 3-year buy-and-hold abnormal returns (BHARs), respectively, after the completion date. The abnormal returns for long-run analysis are calculated using the matched firm adjusted method suggested by Barber and Lyon (1997) and Lyon, Barber, and Tsai (1999). All firm-level variables are measured at the end of the prior fiscal year t; macroeconomic variables are measured as averages over the prior calendar year t. The definitions of all variables are provided in the Appendix. In all models, we control for Fama–French 48 industry fixed effects and year fixed effects. Heteroscedasticity– robust standard errors clustered by both firm and year are reported in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

	Acquirer Short-Run CARs	**Acquirer Long-Run BHARs**		
	(4, 8)	**(1 Year)**	**(2 Years)**	**(3 Years)**
	(1)	**(2)**	**(3)**	**(4)**
AOR	-0.166**	2.636	2.198	2.505
	(-2.122)	(1.407)	(1.055)	(1.293)
Firm-level controls	Yes	Yes	Yes	Yes
Deal-level controls	Yes	Yes	Yes	Yes
Macro-level controls	Yes	Yes	Yes	Yes
Industry Fixed Effect	Yes	Yes	Yes	Yes
Time Fixed Effect	Yes	Yes	Yes	Yes
N	12,879	12,004	12,004	12,004
Adjusted R square	0.004	0.036	0.051	0.064

Table 2. 9 Merger versus normal period

Table 2.9 presents the results of OLS regression analysis for the effect of mean Absolute Overnight Returns (AOR), measured -20 to -3 days prior to the takeover announcement, on acquirer short-run returns (specifications (1) and (2)) and pre-bid short-run returns (specification (4)). The pre-bid AOR is measured at -40 to -24 days prior to the announcement. The sample consists of all merger and acquisition announcements reported in the Securities Data Corporation (SDC) database between 1993 and 2018 that pass the filters described in section 2.3.1. The dependent variables in specifications (1) - (3) are the acquirer 3-day (-1, +1) cumulative abnormal returns (CARs) with day 0 being the M&A announcement day. The abnormal returns are calculated using the market model with the market model parameters estimated over the period starting 255 days and ending 46 days prior to the announcement. CRSP value-weighted index return is the market return. The dependent variable in specifications (4) is the acquirer 3-day (-22, -20) cumulative abnormal returns (CARs) with day 0 being the M&A announcement day. All firm-level variables are measured at the end of the prior fiscal year t; macroeconomic variables are measured as averages over the prior calendar year t. The definitions of all variables are provided in the Appendix. In all models, we control for Fama–French 48 industry fixed effects and year fixed effects. Heteroscedasticity–robust standard errors clustered by both firm and year are reported in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

	Acquirer Short-Run CARs			
	(-1, +1)	**(-1, +1)**	**(-1, +1)**	**(-22, -20)**
	(1)	**(2)**	**(3)**	**(4)**
AOR	0.428***			
	(3.125)			
Pre-bid AOR		0.111		0.075
		(1.541)		(0.758)
Difference in AOR coefficient			.317***	
Firm-level controls	Yes	Yes		Yes
Deal-level controls	Yes	Yes		Yes
Macro-level controls	Yes	Yes		Yes
Industry Fixed Effect	Yes	Yes		Yes
Time Fixed Effect	Yes	Yes		Yes
N	12,879	12,846		12,847
Adjusted R square	0.039	0.037		0.005

Table 2. 10 Propensity score matching (PSM) analysis

Table 2.10 presents the results of propensity score matching (PSM) analysis of the effect of Absolute Overnight Returns (AOR), measured -20 to -3 days prior to the takeover announcement, on acquirer short-run returns and abnormal trading volume. The sample consists of all merger and acquisition announcements reported in the Securities Data Corporation (SDC) database between 1993 and 2018 that pass the filters described in section 2.3.1. The treatment group consists of bidders that generated high attention, while the control group consists of firms that did not receive high attention. We match firms using one-to-one nearest neighbor propensity score matching without replacement. Panel A reports univariate comparisons between the treatment and control firms' characteristics and their corresponding t-statistics. Panel B reports the OLS regressions on the matched sample. The dependent variable in Panel B specifications (1) is the acquirer 3-day (-1, +1) cumulative abnormal returns (CARs) with day 0 being the M&A announcement day. The abnormal returns are calculated using the market model with the market model parameters estimated over the period starting 255 days and ending 46 days prior to the announcement. CRSP value-weighted index return is the market return. The dependent variables in Panel B specification (1) is the abnormal trading volume calculated as the percentage change between mean LOG_VOLUME at the merger announcement period (0, 3 days) and mean LOG_VOLUME calculated over the pre-bid period (-40, -24 days). All firm-level variables are measured at the end of the prior fiscal year t; macroeconomic variables are measured as averages over the prior calendar year t. The definitions of all variables are provided in the Appendix. In all models, we control for Fama–French 48 industry fixed effects and year fixed effects. Heteroscedasticity– robust standard errors clustered by both firm and year are reported in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Panel A	**Mean**		**T-test**		
	Treated	**Control**	**% Bias**	**T value**	**P-Value**
Size	4.309	4.331	-1.300	-0.510	0.612
Book Leverage	0.201	0.184	7.500	2.750	0.006
Market to book value	2.534	2.92	-14.500	-4.420	0.000
Return on asset	-0.053	-0.063	4.400	1.230	0.217
Firm age	1.971	1.987	-2.000	-0.790	0.429
Firm Volatility	0.039	0.04	-0.700	-0.280	0.777
Stock deal	0.062	0.074	-2.000	-0.690	0.491
Cash deal	0.233	0.245	-2.700	-1.100	0.271
Public	0.158	0.169	-3.000	-1.200	0.231

Panel B: Regression on the matched sample	**Acquirer Short-Run CARs (-1,+1)**	**Acquirer Abnormal Volume**
	(1)	**(2)**
AOR	0.292***	0.387***
	(3.980)	(3.617)
Firm-level controls	Yes	Yes
Deal-level controls	Yes	Yes
Macro-level controls	Yes	Yes
Industry Fixed Effect	Yes	Yes
Time Fixed Effect	Yes	Yes
N	5,781	5,754
Adjusted R square	0.069	0.057

Table 2. 11 Instrumental variable (IV) analysis

Table 2.11 presents the results of a two-stage instrumental variable (IV) regression analysis using as an instrumental in the first stage regression, the percentage of home broadband owners provided by PEW research agency to instrument the mean Absolute Overnight Returns (AOR), measured -20 to -3 days prior to the takeover announcement. The sample consists of all merger and acquisition announcements reported in the Securities Data Corporation (SDC) database between 2000 and 2018 that pass the filters described in section 2.3.1. The dependent variable in specification (2) is the acquirer 3-day (-1, +1) cumulative abnormal returns (CARs) with day 0 being the M&A announcement day. The abnormal returns are calculated using the market model with the market model parameters estimated over the period starting 255 days and ending 46 days prior to the announcement. CRSP value-weighted index return is the market return. The dependent variable in specification (4) is the abnormal trading volume calculated as the percentage change between mean LOG_VOLUME at the merger announcement period (0, 3 days) and mean LOG_VOLUME calculated over the pre-bid period (-40, -24 days). All firm-level variables are measured at the end of the prior fiscal year t; macroeconomic variables are measured as averages over the prior calendar year t. The definitions of all variables are provided in the Appendix. In all models, we control for Fama–French 48 industry fixed effects and year fixed effects. Heteroscedasticity– robust standard errors clustered by both firm and year are reported in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Two-stage IV analysis	**First stage**	**Second stage**	**First stage**	**Second stage**
	(1)	**(2)**	**(3)**	**(4)**
Percentage of home broadband users	0.004***		0.004***	
	(6.15)		(6.15)	
Instrumented AOR		3.859**		4.356***
		(2.27)		(2.68)
Firm-level controls	Yes	Yes	Yes	Yes
Deal-level controls	Yes	Yes	Yes	Yes
Macro-level controls	Yes	Yes	Yes	Yes
Kleibergen-Paap rk	37.76		37.76	
LIML size of nominal 10% Wald	16.38		16.38	
Industry fixed effects	Yes	Yes	Yes	Yes
Time Fixed Effect	Yes	Yes	Yes	Yes
N	7,509	7,509	7,509	7,509

Chapter 3: CEO connectedness and corporate cash holdings

3.1 Introduction

The systematic increase in cash holdings by U.S. public companies has been the focal point of discussion among the financial press, policymakers, and academics (Bates et al., 2009). At the end of the fiscal year 2015, the total cash holdings by the listed US firms are nearing $2.3 trillion, almost 12.5% of the annual U.S GDP (Ward et al., 2018). The extant literature in corporate finance offers extensive explanations regarding the different motives and firm-specific determinants of corporate cash holdings[10]. The increase in the secular trend in the aggregate cash level means the managerial agency problems are also under the spotlight than before as the decisions related to cash holdings remain strictly at the discretion of the manager (i.e., the CEO). CEOs may either invest the money wisely to create value for the shareholders or take advantage of the excess cash to enjoy additional benefits, excessive salaries and invest in projects that maximize their utility.

When CEOs and investors both share a similar belief, the optimal cash balance held by a firm is determined by the marginal cost-benefit analysis of holding cash (Opler et al., 1999). On the contrary, the recent literature in behavioral finance finds that different managerial attributes and biases such as age (Serfling, 2014), gender (Liang et al., 2018), risk-taking propensity (Liu and Mauer, 2011), insider debt (Liu et al., 2014), optimism (Huang-Meier et al., 2016) and overconfidence (Deshmukh et al., 2018) shape the decisions related to corporate liquidity policies. Consequently, these managers may end up holding cash at a level that is not aligned with the shareholders' wealth maximization. This study contributes to the behavioral line of inquiry by examining the influence of CEO connectedness, the relative position of a CEO in the social network hierarchy, on corporate cash holdings.

Following the extensive literature in graph theory (Bonacich, 1972; Freeman, 1977; Proctor and Loomis, 1951), the study uses the network centrality measure CEO

[10] For example, financial constraint status (Faulkender and Wang, 2006), growth opportunities (Denis and Sibilkov, 2010), corporate governance (Pinkowitz et al., 2006; Dittmar and Mahrt-Smith, 2007; Kalcheva and Lins, 2007).

connectedness: the total number of direct connections (degree centrality) a CEO has with other members in the social network universe. In the study of social networks, each CEO is represented as a node and these CEOs are linked with other nodes through common education, work, and social settings. These nodes and links together create the universe of social networks (Jackson, 2010). However, the positions of individual nodes are not randomly distributed (Jackson and Rogers, 2007). The more connections a CEO has in his network, the more centrally positioned he is in his network realm. Therefore, CEO connectedness also signifies a CEO's overall ability to access and utilize the information from the network participants, lead others and influence the outcome of different corporate decisions (Banerjee et al., 2012; Hanneman and Riddle, 2005; Jackson, 2010; Padgett and Ansell, 1993).

Previous studies that focus on the bilateral relationship (Cai and Sevilir, 2012; Engelberg et al., 2012) between the financial market agents, fail to capture how the hierarchy of relationships that individuals experience might shape their decision-making process. Furthermore, bilateral ties between the participants of financial transactions form less frequently whereas the measure CEO connectedness is a continuous measure that is comparable across firms and different corporate policies. More importantly, bilateral ties often do not have an equal impact on the connected parties whereas CEO connectedness, a set of measures that captures the ability of the CEO to affect information flows and influence others, even without having direct prior links, is the more appropriate representation of the role of social capital in influencing corporate decision outcomes (Jackson, 2010). Our estimation of the CEO-level centrality within the individual networks, is also fundamentally different from the firm-level connectedness measures, the overall position of the firms within the realm of corporations. The primary difference between the two measures is that firm-connectedness should unequivocally create benefits for the firms in the long run whereas the increased connectedness may distort the rational decision-making mechanism of the CEOs leading to less than average outcomes for the firms.

There is an increasing debate on the role of the social network hierarchy in shaping the outcomes of different firm-level decisions. The recent studies find compelling evidence that depending on how CEOs use their privileged position in the social network, the choices made by them can result in both value-enhancing or value-destructive outcomes for the

firms. For instance, increased social ties improve economic efficiency and coordination within the participants resulting in better loan deals, fewer covenant restrictions, higher R&D expenditures with more patent citations (Engelberg et al., 2012; Faleye et al., 2014; Fogel et al., 2018). On the other hand, the privileged position in the social network hierarchy may come in the way of efficient corporate governance and rational decision-making, leading to irrational and value-destructive investment. For example, superior social connectedness is associated with weakened board monitoring, higher CEO compensation, low pay-performance sensitivity, increased fraudulence, and poor M&A performances (Chidambaran et al., 2011; El-Khatib et al., 2015; Fracassi and Tate, 2012; Hwang and Kim, 2009).

The divided conclusions on the impact of social network connectedness mean a strategically important decision like cash holdings provides a meaningful platform to study to role of CEO connectedness. Liquidity management is not necessarily a stand-alone corporate strategy and plays a significant role in shaping other crucial corporate decisions[11]. The recent literature finds that superior CEO connectedness affects strategically vital decisions like mergers and acquisitions (El-Khatib et al., 2015) and R&D (Faleye et al., 2014). However, how CEO connectedness affects cash holdings remains an unanswered question in the literature. Hence, this study asks the following questions: first, does a CEO's position in the social network hierarchy affect the decisions related to corporate cash holdings? Second, what are the economic mechanisms through which CEO connectedness affects the corporate liquidity position of the firms? To our knowledge, this is the first study that combines the learnings from social networking (Bonacich, 1972; Freeman, 1977; Proctor and Loomis, 1951) in explaining the decisions and outcomes related to cash holdings.

The predicted relationship between CEO connectedness and corporate cash holding is not clear ex-ante. Social capital can influence decisions related to corporate finance through four distinct mechanisms: trust, the flow of information, the ability to punish and

[11] Corporate liquidity affects mergers (Almeida et al., 2011; Harford, 1999), R&D expenditures (Brown el al, 2009; Brown and Petersen, 2011), entries to new markets (Fresard, 2010; Morelle et al., 2013) and investments in general (Almeida et al., 2004; Fazzari et al., 2004).

reward, the ability to alter preferences (Ferris et al., 2017). Depending on which of these mechanisms dominate the decision-making process of the CEOs, the moderating role of CEO connectedness may have two opposite outcomes on the corporate cash holdings. Consequently, this study proposes two alternate hypotheses in predicting the role of CEO connectedness on corporate liquidity management : (i) Reduced information asymmetry hypothesis. (ii) CEO power hypothesis.

The reduced information asymmetry hypothesis focuses on the trust and information dissemination dimensions of social capital. Researches that focus on this trust dimension (Dasgupta, 1988; Fukuyama, 1995) posit that increased trust among the network members lowers the risk of incomplete transactions (Grossman and Hart, 1986). Personal connections, in the spectrum of social networks, works as an effective channel for exchanging information, ideas, knowledge, suggestions, and even private information. Moreover, the primary benefit of increased social ties that it creates an environment of enhanced trust and moral values for the participants within that network. Social capital can also improve economic efficiency in decision makings through effectively disseminating the information within their network (Larcker et al., 2013; Schonlau and Singh, 2009). Moreover, increased trust among economic agents means that individuals allocate more resources on the productive inputs, instead of diverting resources against violation of laws and rights.

Recent literature in corporate finance also emphasizes that hierarchical position in a social network shapes the way managers make important corporate decisions by influencing factors like dissemination of information, cost of doing business, access to easier external funds, and portfolio allocation choices (Cohen et al., 2008; Engelberg et al., 2012; Hochberg et al., 2007; Kuhnen, 2009; Rauch and Casella, 2001). Information shared within a network also works as a mechanism of peer influence to moderate managerial decision-making (DeMarzo et al., 2003; Ellison and Fudenberg, 1995). Shue (2013) finds that the information and belief transpiring through common social ties influence the executives to take similar decisions. Similarly, Fracassi (2016) finds that the greater the connections that two companies share via executives, the more similar are their corporate policies. In the context of this study, more centrally connected CEOs through their increased trust and effective information dissemination within the network members should have easier excess to external finance, which in turn reduces the precautionary need for corporate cash holdings.

Consequently, the reduced information asymmetry hypothesis predicts that increased CEO connectedness negatively affects corporate cash holdings.

On the other hand, the CEO power hypothesis uses the theoretical framework of the approach inhabitation theory of power (Keltner et al., 2003) and agency theory of corporate cash holdings (Jensen, 1986). As the chief strategist and the principal decision-maker of the firm, a CEO is responsible for setting the future direction of the firm. However, the extent to which a CEO can implement his managerial vision also depends on his power to convince the board and other important stakeholders. In the interconnected web of the social network, the power of the CEOs is not randomly distributed. At the individual level, high social power is associated with increased resources, control of the resources, and protection from adverse consequences (Keltner et al., 2003). A CEO positioned higher in the social network hierarchy is considered more powerful having more direct links (nodes) with other executives, institutional agents, suppliers, and stakeholders. Subsequently, this power also grows once a CEO gains more influential connections in his network while gaining greater access to exclusive information, resources, investment opportunities, or even insider information (Rowley, 1997). The superior social network also ensures that these CEOs are less likely to face personal consequences following failed corporate decisions; more connected managers can utilize their superior channels to improve their chances of re-employment (Cingano and Rosolia, 2012; Mazerolle and Singh, 2004). Consequently, a network-powerful CEO can use his elevated position in the social network to enjoy greater bargaining power, more loyalty, and conformity in the boardroom to steer different corporate policies and board decisions in their favor.

According to the approach inhabitation theory of power (Keltner et al., 2003), the behavioral cognition process of powerful CEOs is fundamentally different from that of the CEOs positioned lower in the social network hierarchy. Elevated power triggers the behavioral approach inhabitation system which is responsible for instilling the positive attitudes and emotions within the individuals that facilitate the pursuit of different goals and rewards (Sutton and Davidson, 1997). The approach inhabitation theory proposes two mechanisms through which the behavioral approach system affects the behavior of the network-powerful CEOs. Firstly, superior positions in the social network hierarchy ensure that these well-connected CEOs experience an information-rich environment, giving them

greater access to both financial and social rewards. Secondly, the experience of power comes with the realization that one can take decisions without facing major interference or personal consequences. Hence, these network-powerful CEOs are more likely to take positive actions while showing greater attentiveness to rewards[12]. On the contrary, in the absence of power, less connected CEOs are more likely to focus more on achieving others' goals while avoiding punishments and risky ventures. Moreover, the increased power also ensures that these well-connected CEOs are rewarded even if their investments turn out to be value destructive in nature (El–Khatib et al., 2015). Hence, the approach inhabitation theory of power also gives the theoretical justification of why more centrally connected CEOs often fail to create value even with better access to information.

For the managers, shareholder wealth maximization is not an obligation, rather a choice. This is especially true when managers have substantial decision-making power over others. Increased power also gives the managers the incentive to see firms grow as it increases resources under their control (Murphy, 1985). Agency theory of cash holdings argues that cash is like free cashflow, which gives the managers the freedom to invest according to their will. In other words, by holding excess cash, managers can have more control over the firm's overall assets while giving them the flexibility to pursue their own goals and gain additional non-pecuniary benefits (Jensen, 1986). Similarly, network-powerful CEOs showing increased attentiveness to individual rewards instead of maximizing shareholder's wealth can create agency costs for the shareholders (Jensen, 1986). Additional cash increases the level of assets that CEOs control allowing them the flexibility to pursue their objectives. While CEOs can use excess cash whenever they want, they may not be able to raise additional capital according to their wish, especially for pursuing their personal objectives. Moreover, holding extra cash managers aid the network-powerful managers to avoid the external disciplinary mechanism of the financial markets. Hence, according to the CEO power and agency theory of corporate cash holdings

[12] El–Khatib et al. (2015) and Faleye et al. (2014) show that the network powerful managers are more likely to invest in M&As and R&D projects that are tied to personal rewards.

framework, this study predicts network-powerful CEOs keep more cash at their disposal compared to that of the less connected CEOs.

To test these predictions, the main independent variable CEO connectedness is constructed for S&P 1500 firms using the BoardEx database which provides biographical information on current and past employment, the education, and other social activities of top corporate executives. The variable CEO connectedness (degree centrality) captures the direct ties that the CEOs have with other members of the network based on three facets of social interaction: common education, employment, and social history. For the sample period of 1990 to 2017, CEO connectedness is constructed at the beginning of each year. In other words, CEO connectedness varies with both time and firms. Once a connection is formed, two individuals stay connected for the rest of the sample period. Effectively, the total number of connections does not decrease over time. Following Opler et al. (1999), the study takes the ratio of cash and marketable securities to net assets (total assets minus cash and marketable securities) as the main dependent variable with the perspective that a firm's ability to generate cash is primarily a function of the assets. The empirical results from the baseline regression model report that controlling for the known determinants of cash holdings, the CEO connectedness positively affects the corporate cash holdings. The positive and statistically significant coefficient on the CEO connectedness supports the CEO power hypothesis and at the same time rejects the reduced information hypothesis.

To further validate the results of the baseline regressions, the study conducts a series of robustness tests. First, we consider the possibility that network-powerful CEOs in our sample may not be distributed randomly, implying that firm-level characteristics may significantly be different for the firms that are managed by network-powerful CEOs compared to firms that are managed by the less-connected CEOs. In that case, the results could be affected by the biased sample. To account for such possibilities, the study conducts the propensity score matching (PSM) analysis. Specifically, by following the method suggested by Drucker and Puri (2005), the study constructs a sample of firms managed by network-powerful CEOs (the treatment group) with similar characteristics to the less-connected CEOs (the control group). Having a separate treatment and the control group takes care of the potential biases while estimating the average treatment effects (Imbens and Wooldridge, 2009; Rosenbaum and Rubin, 1985). Next, the combined matching sample is

constructed by matching each firm with a control firm, a firm that is not managed by a network-powerful CEO, however, has a close propensity score to the treated firms based on the one-to-one nearest neighbor matching with replacement. For the matching process, the covariates are all the control variables used by the baseline regression models. The results from the matched sample of the PSM analysis confirm that the positive association between CEO connectedness and the cash holdings remains persistent and robust, implying that the baseline estimations do not suffer from functional misspecification biases. Additionally, we repeat the test by creating a matched sample based on the size of the firms. The coefficient on the CEO connectedness and cash holdings remain positive and significant for the second matched sample as well, implying that our results are not driven by the firm size misspecification bias.

Second, the study further checks the association between CEO connectedness and level of cash holdings by taking alternate proxies of firm-level cash holdings. Bates et al. (2009) argue that cash to net assets ratios, as a cash holding proxy, may have the problem of generating large outliers. Especially for the firms that hold a significantly large amount of cash compared to the overall assets. To take care of any potential issues that might arise from these outliers, following Itzkowitz (2013) and (Foley et al., 2007) this study takes the natural logarithm of one plus cash to net assets ratio as an alternate proxy for cash holdings. For further robustness, the cash to total assets ratio is also taken as another proxy of cash holdings. The results hold for the alternate cash-holding models as well. For the third robustness test, the study uses alternate definitions of CEO connectedness. In particular, the study uses CEO connectedness rank which captures the change in the cash holdings with a one-unit change in the comparative position of a CEO in the social network hierarchy and High CEO Connectedness is a dummy variable that takes the value of 1 if the CEO's number of personal connections is greater than the median value of the sample that year or 0 otherwise. The results confirm that the alternate proxies of CEO connectedness remain positive and statistically significant in explaining the cash holdings.

Fourth, to address the potential criticism that baseline estimations might be driven by the unobserved firm-specific heterogeneity, the study further controls for firm-fixed effects. If the strength of the coefficient on the CEO connectedness in the baseline regressions is driven by the unobserved firm heterogeneity, then the strength of the

coefficient should go down once controlling for the firm-fixed effects. The results remain both statistically significant and economically meaningful even after controlling for the firm-fixed effect. Fifth, to rule out the possibility that our main independent variable CEO connectedness may capture other unobserved CEO specific factors which may ultimately drive the association between CEO connectedness and the cash holdings, we control for a series of managerial attributes such as the managerial ability, CEO gender, CEO pay slice, CEO duality, CEO age, and CEO tenure. Our baseline regression results hold even after controlling for all these managerial attributes.

To give further validation to the CEO power hypothesis, this study also makes a series of predictions related to the economic mechanisms driving this positive association between CEO connectedness and cash holdings. First, the study empirically investigates the link between the investment behavior of the network powerful CEOs and the cash holdings. In a recent study, (Tsoukalas et al., 2017) propose a nonlinear model of corporate cash holdings based on the premise that firms tend to invest in lumps, implying that firms save cash during the low investment periods to fund their large investments made during investment spikes. In line with the findings by Tsoukalas et al. (2017), during investment spikes, every CEO, network-powerful or not, is more likely to be investing big by depleting the cash balance. If the CEO power is indeed the economic mechanism, then the network-powerful CEOs should hold more cash during the quieter low investment periods which will facilitate their individual goal-driven investments during the spikes. Confirming our prediction, the results show that the positive relationship between CEO connectedness and corporate cash holdings is stronger in the low investment period whereas the coefficient becomes insignificant during the investment spikes. Further analysis reveals that the moderating role of the network-powerful CEOs magnifies the impact of cash flow sensitivity cash, implying that the network-powerful CEOs primarily save from the internal cashflows to increase their cash holdings and later use these cash reserves to fund their big investments. This finding is also in line with the agency motive of cash holdings as saving from internal cashflows helps the network-powerful managers to avoid external monitoring mechanisms of the financial market.

Second, the study also examines the moderating role of network-powerful CEOs on cash holdings according to the financial constraint status of the firms. Fazzari et al. (1988)

find that financially constrained firms rely more on internal cash flows for making their investments. Similarly, Almeida et al. (2004) propose that in the presence of costly external finance, financially constrained firms with future investment opportunities tend to save more cash from the internal cash flows. If network-powerful CEOs indeed hold additional cash to facilitate their preferred investment opportunities, this positive association should be stronger in the financially constrained firms facing costly external finance. On the contrary, centrally connected CEOs in the financially unconstrained firm do not need to hold additional cash to implement their investment choices as these firms are already endowed. Confirming this notion, the results show that the positive association between CEO connectedness and level of cash holdings is more prominent within the subsample of financially constrained firms. Moreover, the CEO connectedness coefficients become both statistically and economically insignificant for the financially unconstrained firms.

Third, the study investigates the influence of the quality of the corporate governance mechanism on the expected association between CEO connectedness and corporate cash holdings. According to the agency theory of cash holding, cash is like free cashflow that gives the managers the freedom to invest in projects they like (Jensen, 1986). However, in the absence of proper governance and monitoring, managers are more likely to proceed with reckless investment decisions. Consequently, the personal goal-driven cash holdings behavior of the network powerful CEOs should be stronger for the firms where the quality of the corporate governance is already weak. By taking E-index by Bebchuk et al. (2009) as the proxy of the quality of corporate governance, we find evidence to support the prediction.

For the fourth test related to disentangling the economic mechanism, we investigate the moderating role of institutional ownership on the relationship between CEO connectedness and cash holdings. Ward et al. (2018) show that increased institutional investor monitoring can reduce the agency conflict between the managers and investors which in turn results in a positive value of cash. In the absence of active monitoring by the strong institutional owners, managers are more likely to get away with raising additional cash for the value-destructive investments. Similarly, in our context, we expect the positive association of network-powerful managers on the cash level to be stronger for the firm-year observations with weak institutional monitoring. The results support the conjecture.

Lastly, following Halford et al. (2017) we further control the different cash regimes. Halford et al. (2017) state that it is imperative to control the different cash regimes when testing the significance of the marginal value of cash. Intuitively. In line with, Faulkender and Wang (2006), CEOs in general, network-powerful or not, raise cash during the raising regime. If CEO power is indeed the mechanism that drives the positive association between CEO connectedness and the cash holdings, we expect the relationship to be stronger in the raising regime to facilitate their personal ambition-driven investments at a later period. Consequently, we expect the CEO power hypothesis to dominate in raising cash regimes than distributing cash regimes. The results support our prediction.

The study makes meaningful contributions to the existing literature. First, it contributes to the extensive literature on corporate cash holdings. Previous literature shows that different firm- and CEO-level factors like corporate governance (Dittmar and Mahrt-Smith, 2007; Dittmar et al., 2003; Harford et al., 2008) cashflow volatility (Bates et al., 2009), R&D expenditure (Bates et al., 2009; Opler et al., 1999; Pinkowitz et al., 2013), respiration tax (Foley et al., 2007), industry impact (Chudson, 1945), market competition (Baskin, 1987), financial distress (John, 1993), acquisitiveness (Harford, 1999), growth opportunities (Denis and Sibilkov, 2010), CEO age (Serfling, 2014), CEO risk-taking propensity (Liu and Mauer, 2011), CEO insider debt (Liu, Mauer, and Zhang, 2014), optimism (Huang-Meier et al., 2016) and overconfidence (Deshmukh et. al., 2018) can shape corporate cash holdings. After controlling for the majority of these known determinants of corporate cash holding, we document that increased CEO connectedness increases the corporate cash holdings. Moreover, the association is stronger in presence of investment spikes, financial distress, raising cash regimes, weak corporate governance, and weak institutional investor monitoring.

Second, we contribute to the growing debate on the literature regarding the key question, Are firms better off with well-connected CEOs? Intuitively, a strategically important decision like cash holdings provides an important platform to study to role of CEO connectedness. Liquidity management is not necessarily a stand-alone corporate strategy and plays a significant role in shaping other crucial corporate decisions like mergers (Almeida et al., 2011; Harford, 1999), R&D expenditures (Brown et al., 2009; Brown and Petersen, 2011) entries to new markets (Fresard, 2010; Morellec et al., 2013) and investments in

general (Almeida et al., 2004; Fazzari et al., 1988). We borrow the theoretical predictions from the approach inhabitation theory of power by Keltner et al. (2003) to give a behavioral explanation of the value-destroying investment behavior of the network-powerful managers.

Third, our study further contributes to the literature of different motives behind corporate cash holdings. For the managers, shareholder wealth maximization is only a choice, and they are not obligated to do so. Now, network-powerful CEOs showing increased attentiveness to individual rewards and hoarding excess cash supports the agency motive of cash holdings (Jensen, 1986). Fourth, this study contributes to the literature related to CEO power and financial outcomes as well. Previous studies show that increased CEO power comes in the way of efficient corporate governance and is associated with value-destroying projects, larger bonuses, value-destructive acquisitions, rigged pay structure, corporate fraudulence, biased earnings management, accounting manipulation, and increased stock price crash risk. (Daily and Johnson, 1997; Feng et al., 2011; Friedman, 2014; Grinstein and Hribar, 2004; Khanna et al., 2015; Morse et al., 2011). Our study contributes to this line of literature by showing network-powerful CEOs create agency problems for the firms by hoarding excess cash.

Lastly, how firms grow has always been a fundamental query in corporate finance as it sheds light on the overall mechanism of the competitive process, strategic learning, the changes in the market structure, and aggregate economy (Carpenter and Petersen, 2002). This study directly contributes to knowledge of how network-powerful CEOs treat cash holding as a separate strategy in an attempt to grow their firm and reap personal benefits in the process.

The next sections are organized as followed: section 3.2 includes the literature review, section 3.3 discusses the hypothesis development, section 3.4 includes data management and variable construction, section 3.5 includes the empirical results and section 3.6 includes the conclusion.

3.2. Literature review

In this section, we give a comprehensive literature review on the determinants of the cash holdings, recent developments on the role of social network connectedness, and lastly, approach inhabitation theory of power.

3.2.1 Corporate cash holdings

In this section, the study explores the previous literature related to three facets of cash holdings: (i) motives of cash holdings; (ii) empirical models of cash holdings; (iii) cash holdings and other corporate policies.

3.2.1.1 Motives of cash holdings

The vast literature on corporate liquidity offers different firm-level motives of cash holding. All these motives of corporate cash holding can be divided into three broad categories: trade-off theory (includes the transaction and precautionary motives), agency theory, and pecking order theory. In one of the pioneering studies on corporate cash holdings, Keynes (1934) talks about two main benefits of holding cash: transaction motive and precautionary motive. The transaction motive for corporate cash holding suggests that managers hold extra cash so that they don't need to liquidate other current assets or seek additional funds to make payments. Miller and Orr (1966) give a theoretical model of corporate cash holding and argue that firms hold additional cash so that don't need to incur transaction costs while converting from other nonfinancial assets to cash. On the other hand, the precautionary motive of cash holdings suggests that firms need to hold extra cash because of the frictions in the capital market. Miller and Orr (1966) propose that there is an optimal point for corporate cash holdings and in the presence of significant transaction costs in the economy, firms hold excess cash to avoid the high transaction cost. Similarly, Kim et al. (1998) give a transaction cost of the model of cash holding based on assumption that there is a liquidity premium, the cost of holding liquid assets, in the financial market. Hence, all these liquidity assets have an opportunity cost. This cost is significantly more for the most liquid asset cash and less for assets that are inefficient substitutes for cash.

Keynes (1936) further argues that the financial constraint status of the firms drives the need for liquidity management. Han and Qiu (2007) in their theoretical model of corporate cash holding argue that the precautionary motive of corporate cash holding is more pronounced among financially constrained firms. When financially constrained firms cannot fully diversify future cashflow risk, they hold excess cash responding to future volatility. Nevertheless, this response is not relevant to the financially unconstrained firms having easier access to external finance. Hence, in the presence of costly external finance, firms with excess cash can cope better with the adverse shocks in the capital market. Almeida et al. (2004) deduce a similar precautionary motive explaining the cashflow sensitivity of cash. The authors hypothesize that firms' reliance on internally generated cashflow captures their financial constraint status. Firms that are more financially constrained show a positive association with internal cash flow, whereas unconstrained firms do not have any significant association with cash flows.

In one of the most renowned papers on corporate cash holdings, Opler et al. (1999) propose a trade-off model in corporate cash holdings. The trade-off theory proposes that managers hold an optimal level of cash by doing a marginal cost-benefit analysis. On one hand, additional cash holdings lower the transaction costs and give extra cushion for investment to the financially distressed firms. On the other hand, excess cash holdings increase the opportunity cost as this additional cash could be invested in some assets with potentially greater returns. Opler et al. (1999) provide empirical evidence that firms with high growth opportunities, riskier cashflow, and more financial distress hold more cash.

The pecking order theory of cash holdings contradicts the findings of the trade-off theory. Pecking order theory predicts that there is no optimal balance for cash holdings. The intuition behind this theory is that one dollar of cash is equivalent to one dollar of additional debt. Hence, under this assumption cash is considered as negative debt: debt minus cash. The pecking order model is also known as the financial hierarchy model. According to this hierarchy of financing, cash is nothing but a buffer between retained earnings and investments made. In the presence of information asymmetry firms find it more convenient to use internal funds before going for external financing. Effectively, to fund any new investments, firms first use internal funds, followed by debt and equity. Myers and Majluf (1984) give a theoretical framework for this pecking order model which is also consistent

with shareholder wealth maximization. According to their model, if there is no cost of holding cash then a firm having excess cash should use the additional cash to pay dividends or reduce reliance on external finance (repurchase share).

Agency cost theory of cash holdings argues that cash is like free cashflow, which gives the managers the freedom to invest according to their will. In other words, by holding excess cash, managers can have more control over the firm's overall assets which in turn gives them the flexibility to pursue their own goals (Jensen, 1986). Moreover, holding extra cash managers may avoid relying on financial market discipline and they can also fund the projects which the financial market may find too risky to invest. However, this additional cash hoarding by the managers may negatively affect the value of the firm. With the excess cash, managers must make additional investments but often end up making poor decisions in the absence of value-enhancing projects. Hence, the additional cash held by the managers may lead to value-destroying investments that are not aligned with the shareholder value maximization.

Several other studies further confirm the agency conflict channel affecting corporate cash holdings. Harford et al. (2008) find that excess cash in the weakly governed firms leads to lower profitability and valuation. Moreover, in the weakly controlled firms, managers quickly deploy the excess cash on capital expenditures, rather than hoarding it for a long time. Similarly, Dittmar et al. (2003) provide international evidence of agency problems affecting corporate liquidity strategies by reporting that firms in weak shareholder protection countries hold almost twice as much cash in corporations with strong shareholder protection. Besides, in the counties with weak shareholders' rights, the excess cash is driven by investment opportunities and information asymmetry. These findings are in line with the notion that investors with poor shareholder protection fail to force the managers to lower the excessive cash balances. Kuan et al. (2011) examine the association between corporate governance and cash policy within family-controlled firms. Family businesses provide an interesting framework for testing the agency theory of cash holdings as the family businesses must consider the needs and desires of the family owners which creates a major issue in mitigating conflicts of interest between managers and shareholders. Using a sample of publicly listed companies in Taiwan the study finds that family-controlled firms with higher board independence hold more cash compared to the nonfamily-controlled firms. Harford

(1999) confirms that managers holding excess cash lead to excessive cash lead to attempting more acquisitions. Nevertheless, these acquisitions are mostly diversifying in nature and fail to create any value for the shareholders. Cunha (2013) concludes that excess cash leads to wasteful acquisition decisions in the firms that source the auxiliary cash from internal operational activities. Managers are more careful when it comes to using cash raised from external debt financing.

3.2.1.2 Empirical models on corporate cash holdings

It is very well documented in the existing corporate cash holding literature that, firms hold a substantial amount of assets in the form of cash. Even though one of the earliest works on corporate liquidity goes back to Keynes (1936), the role of efficient corporate liquidity management in firm survival has regained interest among policymakers and academics after the recent financial crisis of 2008-2009 Besides, since the 1990's the average cash holding by the US public firms has increased significantly over time (Bates et al., 2009). The authors justify this gradual increase in cash holding to the changing composition of the firms that are now operating. Particularly, firms hold significantly more cash than before to accommodate for the increase in cash flow volatility and R&D projects. However, a large portion of the increase in cash is still unexplained. Foley et al. (2007) argue that repatriation taxes explain a part of this increase in cash holding by multinational firms. US multinationals often hold a large amount of cash from their operations in different countries. However, bringing back the cash home can be costly due to the presence of very high repatriation taxes. Hence, these multinationals hold more cash abroad to avoid paying the repatriation tax. However, Pinkowitz et al. (2013) think high repatriation taxes only explain the cash holding behavior of the selected group of multinational firms. R&D expenditures seem to drive the cash holdings of most of the firms. Moreover, the main determinants of cash holding remain somewhat the same in the post-financial crisis period.

Chudson (1945) reports the systematic variation in cash ratios of the firms by their industry. Baskin (1987) finds that firms hold more cash in a more competitive market scenario. The empirical evidence shows that firms holding higher cash balances are better at exploiting new opportunities in the market. John (1993) provides empirical evidence of the precautionary motive of holding cash and concludes that firms with higher financial distress

hold more cash. By taking the market to book value ratios and tangible assets ratios as proxies for financial distress level, the paper concludes that firms with high market to book value ratios and low tangible assets hold more cash. In the context of mergers and acquisitions, Harford (1999) finds that firms with higher acquisitive nature hold cash. The excess cash helps the firms to complete the mergers without relying on external finance. Moreover, these acquisitions are more likely to be diversifying in nature and fail to create value for the shareholders.

Corporate liquidity management is especially important because it has a heavy link with the investment decisions taken by the CEOs (Graham and Harvey (2001). At the same time, there is extensive literature on how different CEO-level characteristics influence the cash holdings by the firms. For example, Liang et al. (2018) by using listed firms from Taiwan provide empirical evidence that female CEOs hold more cash than male CEOs. The authors hypothesize that female CEOs tend to be more risk-averse than male CEOs. Consequently, risk-averse female CEOs hold significantly more cash than the male CEOs due to the precautionary motive of corporate cash holding, Moreover, under the moderating role of female CEOs, the firms encounter less value-destroying investment outcomes. Zeng and Wang (2015) find similar results while explaining the role of CEO gender on corporate cash holding in Chinese firms. Huang-Meier et al. (2016) study the role of CEO optimism on corporate cash holdings. The study takes the option-exercising behavior of the CEOs as a proxy for managerial optimism and reports that corporate cash holding varies significantly between optimistic and non-optimistic CEOs. Optimistic managers find external finance to be more expensive and hold excess cash to fund the investments reflecting growth opportunities. Moreover, optimistic managers do not show any conservation of using debt. The paper further finds, optimistic managers hold more cash during crisis times than non-optimistic managers.

Tong (2011) finds that CEOs with high-risk incentives hold less cash. Moreover, the value of cash is higher for the firms managed by these CEOs with high-risk incentives. Liu and Mauer (2011) contradict the findings in Tong (2011) and report that there is a positive association between CEO risk-taking propensity (vega) and level of cash holding. However, these high vega CEOs fail to create value for the stockholders with the excess cash held by them as the paper finds a negative association between CEO vega and the value of cash.

Moreover, this negative relationship between vega and the value of cash is greater in firms with high leverage. The authors explain these results with the costly contracting hypothesis which infers that CEOs taking risky investment decisions need to compensate the bondholders by holding excess cash than the rational CEOs. In another paper, Liu et al. (2014) find that CEOs with greater pension and differed compensation (inside debt) as part of their overall compensation package hold significantly more cash. CEO inside debt positively affects the overall cash holding and negatively affects the value of cash. The results further show that CEOs having greater inside debt are more likely to hold additional cash for meeting the requirements of the bondholders. Hence, these CEOs fail to create value for the shareholders.

More recently Deshmukh et. al (2018) show that CEO overconfidence has a significant impact on the cash holding by the firms. Overconfident CEOs overestimate their ability to generate significant investment returns. Besides, they overestimate their firm's future cash flows and hence perceive that their firm is undervalued by the market (Malmendier and Tate, 2005, 2008). If internal finance is abundant, overconfident CEOs make overinvestments that are value-destroying in nature. Malmendier and Tate (2005,2008) find that CEO overconfidence in the firms which have sufficient internal cash can lead to excessive expenditures and value-destroying mergers and acquisition activities. Thus, overconfident CEOs avoid external financing, as it is perceived to be costly, and rely more on internal funds to finance their investment opportunities. Based on all these findings on CEO overconfidence, Deshmukh et al. (2018) propose a model depicting the cash holding behavior of overconfident managers. The relationship between CEO overconfidence and cash holdings is not very straightforward and hence the authors propose hypotheses having two completely opposite outcomes. Under the overinvestment hypothesis, overconfident managers hold more cash to fund their excessive investment propensity. However, the overconfident CEOs also behave as if they are financially constrained, given their belief that external financing is overly costly. An optimistic CEO's perceived financial constraints imply two opposing effects on cash holdings. Optimistic CEOs may hold more cash than rational CEOs to finance future investments with internal cash. On the other hand, optimistic CEOs may view current external financing as unduly costly and, therefore, finance current investments with more internal cash and maintain a lower cash balance than rational CEOs.

Supporting the costly external finance hypothesis, the results show that CEO optimism, on average, is associated with a 24 percent reduction in the firm's cash balance.

In an attempt to study the role of CEO overconfidence on the value of corporate cash holding, Aktas et al. (2019) find that the costly external finance hypothesis dominates the value of cash holdings as well. Under the costly external financing hypothesis, if internal finance is not ensured, CEO overconfidence may not lead to overinvestment as overconfident CEOs tap risky external finance and overinvest only if the overestimated investment returns are larger than the perceived financing costs. If not, then overconfident CEOs may even underinvest. Controlling for other known determinants of the value of cash, the results show a strong positive relation between CEO overconfidence and the marginal value of an additional dollar of cash. Further examining the validity of both hypotheses, the paper finds overinvestment is more likely when the firm has abundant resources (i.e., financially unconstrained), while underinvestment is more likely when the firm has limited resources (i.e., financially constrained).

3.2.1.3 Cash holdings and corporate policies

There is extensive literature that shows corporate liquidity policy is not a standalone as they are often taken concurrently with other important corporate decisions including investment decisions. In their pioneering work, Fazzari et al. (1988) posit that the investment cashflow sensitivity of the firms is determined by the financial constraint status. In other words, more financially constrained firms rely heavily on internal cashflows for carrying out investments. Similar assumptions are made in Schiantarelli (1995), Hubbard (1997), and (Bond and Van Reenen, 2007). Later, Almeida et al. (2004) introduce the concept of cash flow sensitivity of cash and infer that more financially constrained firms save cash out of cashflows to make future investments. On the contrary, financially unconstrained firms don’t show such savings behavior as they have easier access to external finance.

Corporate liquidity policy has a significant impact on the R&D projects taken by the firms. Brown et al. (2009) find that more innovative firms rely more on internal cashflows and external equity. The results are stronger for young firms but fail to hold for mature firms. He and Wintoki (2016) also show that R&D expenditure can explain a major portion of the

increase in cash holdings by U.S firms. Compared to an average cash holding of $0.04 for each dollar of R&D expenditures in 1980, firms in 2012 hold $.60 against the same one dollar of R&D spending. The authors think that the changing nature of the competitiveness in the domestic and global market explains R&D expenditure drive cash holding behavior by the U.S firms. Baldi and Bodmer (2018) find similar innovation-driven cash holding behavior in the context of European countries. The authors divide the different groups of countries based on their level of innovation and find that there is a positive association between changes in R&D and cash holding. On the contrary, changes in fixed investment do not affect the level of cash holding. The positive association is found stronger for the subsample of more innovative countries, although the difference across the country group does not vary as expected. In another study, Brown and Pertersen (2011) use a dynamic model to find that there is a direct association between cash reserves and R&D smoothing. Moreover, the result is stronger for firms that are more likely to be financially constrained.

There is substantial evidence on the importance of excess cash reserves on acquisition decisions. Harford (1999) finds that cash-rich firms have a greater propensity to go for acquisitions. However, these acquisitions are value-destroying in nature. These results support the agency costs of cash holding motive. Almeida et al. (2011) explain the phenomenon of liquidity mergers where financially distressed firms get acquired by comparatively more liquid acquirers even if the mergers fail to bring any operational efficiency. The main purpose of these liquidity mergers is to redistribute liquidity from firms with excess liquidity to financially constrained firms within the same industry. Liquidity mergers are more common in industries with low firm-level specificity (industry components can efficiently redistribute the distressed firm's assets). Moreover, if the firms within an industry are expecting liquidity mergers, they are more likely to use credit lines than cash. Erel et al. (2015) study the impact of acquisitions on the cash holding position of the target firms. Using a dataset on firm subsidiaries, the authors find that following merger, the level of cash holding, cash flow sensitivity to cash, and investment sensitivity to cash of the target firms go down drastically. The fall is sharper within the targets that were financially constrained before the mergers. These results indicate following the mergers, acquirers improve the liquidity condition of the financially constrained targets.

Among other corporate decisions, Klasa et al. (2009) show that unionized labor has a strong negative influence on corporate cash holding. In the industries where the labor unions are stronger and have more collective bargaining power over individual firms, the managers like to hide the cash in the form of other assets. This negative association is stronger for the firms that want to gain a bargaining advantage over the union. Moreover, in firms with excess cash holding, strong unionization increases the probability of workers going on a strike.

Fresard (2010) establishes product market competition as one of the prime factors behind corporate cash holding. The results show that firms with significant cash holding gain higher future market shares from competitors. This relationship is especially strong when competitors are financially constrained. Moreover, the competitive effect of cash hoarding is fundamentally different from the effect of debt on product market performance. In a similar study, Morellec et al. (2013) find that firms operating in a more competitive industry structure hold more cash to outperform the competitors. The relationship is stronger for more financially constrained firms. Likewise, Fresard and Valta (2013) show that U.S firms increase their cash holdings, decrease their capital and R&D expenditures following any reduction in tariff rates. As a result of these strategies taken by US firms attract more foreign competition and make the industry more competitive. Boutin et al. (2013) show that the business group's cash holding significantly affects the probability of a firm's entry into a new market. Using a unique data set on French conglomerates, the paper concludes that a firm's entry into the manufacturing industry is positively related to the entrant's access to extra cash held by the business group. Moreover, there is a negative association between excess cash held by the affiliated business groups of the existing participants in an industry and a new entrant's probability of successfully entering that market. The significance of this cash holding behavior of business groups on potential entry to a new industry is more pronounced in a financially constrained environment. Duchin (2010) finds a similar conclusion that firms with multiple divisions hold significantly less cash than stand-alone firms.

3.2.2 Social network connectedness and corporate policies

There is growing literature on how the social capital measured as increased connection, trust, and information within the firm- and manager-level social networks (Woolcock, 1998) affect different corporate policies. In the literature, the terms of social capital and social network are often used interchangeably. To differentiate between the two, social networks are means through which social capital operates (Ferris et al., 2017). The literature on social capital can be divided into two broad categories: cognitive and structural theories. The cognitive theories primarily focus on common norms, attitudes, and beliefs shared within the network members (Coleman, 1988; and Putnam, 1993). On the contrary structural theory builds on Bourdieu's framework focusing on the social connections and participation from the network members (Bourdieu, 1984, 1986, 1989). These theories summarize four distinct mechanisms through which social capital, through the participants within the social network, affects different decision outcomes. The distinct mechanisms are trust, the flow of information, the ability to alter state, the ability to punish and reward.

The interpretations of the moderating role of social network hierarchy on the corporate outcomes vary based on which mechanism that researchers focus on. For instance, researchers focusing on the trust dimension (Dasgupta, 1988; Fukuyama, 1995) posit that increased trust among the network members lowers the risk of incomplete transactions (Grossman and Hart, 1986). Personal connection, in the spectrum of social networks, works as an effective channel for exchanging information, ideas, knowledge, suggestions, and even private information. The central benefit of having a personal tie is that it fosters an environment to enhance trust and value for the participants within that network. Increased trust among economic agents means that there will be a more optimal investment horizon while deploying more resources on innovation and production instead of diverting resources against violation of laws and rights. Social capital can also improve economic efficiency in decision makings through the information dissemination channel (e.g., Larcker et al., 2013; Singh and Schonlau, 2009).

In the financial market, the personal ties among the market participants offer a meaningful understanding of their numerous socio-economic transactions. Recent literature in corporate finance emphasizes that social ties shape the way managers make important

corporate decisions by influencing factors like dissemination of information, cost of doing business, access to external funds, and portfolio allocation choices (Cohen et al., 2008; Engelberg et al., 2012; Hochberg et al., 2007; Kuhnen, 2009; Rauch and Casella, 2001). Information shared within a network also works as a mechanism of peer influence to moderate managerial decision-making (DeMarzo et al., 2003; Ellison and Fudenberg, 1995). Shue (2013) conducts a natural experiment on randomly assigned MBA students from Harvard Business School and infers that executives from the same educational background tend to take similar corporate policies. The author theorizes that the information and belief transpiring through common social ties influence the executives to take similar decisions. Similarly, (Fracassi, 2017) creates pairs of firms based on similar social connections and finds that the greater the connections that two companies share via executives, the more similar are their corporate policies (e.g., capital investments, R&D expenses, cash reserves, and interest coverage ratios). Cohen et al. (2008) primarily focus on the connections between the mutual fund managers and the top executives to empirically show that mutual fund managers tend to invest more and perform better on the stocks of the companies where they had previous ties with.

Compared to the trust and information efficiency mechanism, the ability to change the state of others has gained relatively low attention in the context of finance. Identification within a social network, change the way that individuals act and take their decision. For instance, social capital can motivate individuals to take risky decisions that while providing them a mechanism of informal insurance of not having to face any dire consequences (Bloch et al., 2008; Bramoullé and Kranton, 2007; Genicot and Ray, 2005).

Social ties created through prior education, work experience, and other social interactions create a platform where the participants of the financial market take important value-altering financial decisions. The mutual trust and likeness stemming from these social connections ease the process of undertaking important decisions involving financial transactions. Depending on the setting, social connectedness can result in both value-creating or even value-destroying deals. For instance, social ties improve economic efficiency and enhance coordination within the network and which in turn reduces information asymmetry among the members. Engelberg et al. (2012) show that previous ties between the participants in a loan deal lead to higher loan amounts, lower spreads, and less restrictive covenants.

Fogel et al. (2016) find a similar outcome that better-connected CFOs can negotiate loan contracts with lower loan spreads and fewer covenant restrictions. Larcker et al. (2013) posit that by having greater access to information, socially connected boards have greater risk-adjusted returns. Faleye et al. (2014) show that well-connected CEOs invest more in research and development projects and consequently generate more patents for the firms. Cohen et al. (2008) find that sell-side analysts outperform when they have previous educational ties with the executives of the firm the cover.

On the other hand, previous social ties can also result in value-destroying outcomes for the firms. The social connection comes in the way of effective corporate governance and director monitoring. Moreover, in the presence of previous ties, managers may undermine the importance of rational decision-making and ultimately lead to inferior and value-destroying deals. Fracassi et al. (2016) show that CEO–director connections weaken board monitoring and destroy corporate value. Hwang and Kim (2009) find that prior board member-CEO social connection leads to higher CEO compensation, lower pay-performance sensitivity, and lower turnover-performance sensitivity. Chidambaran et al. (2011) show that the likelihood of fraud is higher in the presence of CEO–director connections that are formed outside the professional sphere. In the context of mergers and acquisitions, social connections report mixed implications. Cai and Sevilir (2012) show that prior social connection between the directors between target and acquirer improve information flow and result in better quality deals.

El-Khatib et al. (2015) show that M&A deals initiated by the high-centrality CEOs are more frequent but value-destroying in nature. The bidder CARs and combined CARs following the deals initiated by the high-centrality CEOs carry greater value loss. The results further infer that high-centrality CEOs use their superior power to reap private benefits while avoiding the disciplinary mechanism of the labor and financial market. Jandik et al. (2020) reach similar conclusions in the context of IPO outcomes. In particular, high centrality CEOs are associated with higher IPO underpricing, a lower likelihood of offer price increases, and a lower likelihood of positive wealth effects Besides, poor performing high-centrality CEOs are less likely to be replaced. These findings together confirm that better-connected CEOs achieve greater entrenchment and private benefit, leading to poor IPO performance.

In a recent study, Ferris et al. (2017) propose that CEO social networks directly influence the risk-taking propensity of the managers. The increased social ties with participants of the financial market give the manager more sense of power, insurance, and access to insider information which incline them to make riskier investments. The empirical results find that CEO social capital positively influences aggregate corporate risk-taking, where risk-taking is measured as the annualized standard deviation of monthly stock returns and earnings. Javakhadze et al. (2016) report on the impact of social capital on external financing and investments. The results show that the superior firm connection is inversely related to the investment sensitivity to cashflows. In other words, firms with superior connections are less reliant on internal cashflows and use greater external financing to fund their new investments. Now, the investment sensitivity of cash flow is considered a financial constraint. Moreover, this constraint is low for firms that have access to cheaper external financing (Fazzari et al., 1988; Fazzari et al., 2000; Hubbard, 1997). Similarly, Carpenter and Petersen (2002) represent the situation from the perspective of the internal growth theory of finance which explains that a significant portion of firms finds it hard to access external finance due to information asymmetry between borrowers and lenders. Lack of trust and information gaps between the parties make it difficult to access external funds at a cheaper rate. So, firms that have easier access to the external fund show a weak relationship between internal cash flow and investments.

3.2.3 Approach inhabitation theory of power

There is extensive literature that highlights power as the fundamental force behind shaping social relationships (Fiske, 1993; Kemper, 1991). The importance of power in the realm of social science is equivalent to the importance of energy in understating physics (Russell, 2004). Increased power, or the lack of it, affects the cognitive process of the individuals, including stereotyping (Fiske, 1993; Jost and Banaji, 1994), social reasoning (Gruenfeld, 1995), personality development (Moskowitz, 1994), and interpretation of nonverbal behavior (Hall and Halberstadt, 1994; LaFrance and Banaji, 1992). Power also influences the social behavior of the individuals; for example, power affects the way individuals show behavioral confirmation, emotion, familiar aggression, sexual aggression, and even hate crime (Clark, 1990; Copeland, 1994; Green et al., 1998; Malamuth, 1996). As

central as the role of power in understanding human behavior, it is often difficult to reach a consensus on an all-embracing definition of power. The definition of power can be multifaceted which varies with the factors like the process of origin, the place of origin, the distribution process, the units of analysis. Some researchers focus on the action of the actor (power as a form of dominance) while others focus on the response of the target (power as a form of influence).

As power plays a significant role in the way individuals behave, act, and take decisions, it is imperative to ask the question that where does power originate from? Among the studies that seek to answer the origin of power, the social psychologists French and Raven in their pioneering study on social power, propose five bases of power known as coercion, expertise, charisma, authority, and rewards (French and Raven, 1959). Later, Raven (1993) adds the informational ability or social influence as the sixth base of power. Berger et al. (1972) propose a group-based definition of power and infer that individuals can also draw power from the group that they belong to. The idea that powerful people belong in opinion majority groups is also in line with the assumptions of the authority-based powers proposed in French and Raven (1959).

Another line of literature focuses on the factors that are commonly associated with power. Differing levels of power tend to associate with varying levels of biological facets like cortisol, testosterone, etc. Moreover, power also associates with the individual perception of efficiency, reliance, freedom, and locus of control (Haidt and Rodin, 1999; Kipnis, 1972). Power can also be explained by understanding the consequence of the power on the target's behavior; for example, individuals are more likely to take orders coming from powerful figures (Milgram, 1963) and also accept the reality that the powerful individuals more likely to exploit them (Petty and Cacioppo, 1986).

The approach inhabitation theory of power in Keltner et al. (2003) is primarily motivated by the finding that elevated power makes individuals corrupt (Kipnis, 1972; Rind and Kipnis, 1999). After conducting a comprehensive manager-employee simulation, Kipnis (1972) provides evidence that when individuals get control over managerial decisions like pay rise and terminations, they make greater attempts to manipulate their subordinates. Consequently, in the presence of elevated power, individuals valued their colleagues'

contributions less while crediting the success of their control mechanism. Further, these powerful supervisors also show increased psychological distance from the subordinates and use different persuasive means to gain the loyalty of the subordinates. Later, (Kipnis, 1976) asserts that the perpetual exercise of power leads individuals to adopt strategies that are self-righteous and narcissistic. Moreover, these powerful individuals are more likely to vilify and avoid less powerful individuals. The model offered by Kipnis (1976) explains how power changes the way individuals behave. Nonetheless, Kipnis (1976) assumes that powerful individuals exert power to satisfy their inherent desires. Contrarily, the approach inhabitation theory of power exerts that, powerful triggers a behavioral change among the individuals without their conscious awareness.

Keltner et al. (2003), put forward the idea that the experience of power is centered around the consequences of the individuals who possess power versus individuals who don't. Keltner et al. (2003) define power as the subject's ability to change other's states by providing or withholding resources in the context of social interactions like affection, knowledge, empathy, praise, humor, etc. Here, the theory focuses more on powerful individual's increased ability to influence others compared to non-powerful individuals. Here the authors emphasized more on the capacity than the actual practice. In the more formal structures, depending on their position within groups, powerful individuals use their superior access to resources for financial means, contacts, better decision making, etc. According to this theory, power affects the way individuals behave through two systems: the behavioral approach system and the behavioral inhabitation system. The behavioral approach system focuses on the part that powerful individuals are associated with more positive actions, more responsive to the surrounding changes, and more rewards-oriented behavior. On the other hand, the behavioral inhibition system focuses on increased anxiety, fear, vigilance, and social threats that prohibit the less powerful individuals to take positive actions.

The approach inhabitation theory also discusses the sources of social power through which individuals can facilitate the change in others. At the individual level, certain traits, features, and characteristics give individuals elevated social power, the capacity to change the state of individuals. In the presence of elevated social power, individuals tend to be more extroverted, dominant, sociable, and charismatic (Anderson et al., 2001; Buss and Craik,

1981; Gough, 2000). Moreover, even if individuals have greater control over resources, the level of social power depends on when others can get similar resources by using other means (Emerson, 1962). In the group context, power stems from the ability to facilitate resources for other members of the group (Emerson, 1962; Merton, 1957). The group dynamics of social power are relevant for both formal authorities like organizations and informal hierarchical authorities like siblings (Hickson et al., 1971; Pfeffer, 1992; Sulloway, 1996). Lastly, individuals can also change others' states by using the power that stems from belonging to elite socioeconomic class, majority or minority group associations, and ethnic status that provides individuals with the opportunity to have superior control over the resources (Brewer, 1979; Sidanius, 1993). For example, previous studies show that men tend to be more powerful than women as men have privileged access to different resources and political decision-making (Henley and LaFrance, 1984).

The approach inhabitation theory further explains the channels through which power shapes the cognition and behavior of the individuals. Elevated power triggers the behavioral approach inhabitation system within the individuals. The behavioral approach part regulates the behavior of the individuals related to primitive drives like sex, food, achievement, attainment, and social attachment. Rewards and opportunities around powerful individuals trigger approach- related process that helps them to attain their goals associated with these rewards. The approach inhabitation theory proposes at least two mechanisms through which elevated power activates the approach-related process. Firstly, powerful people live in an environment with abundant rewards that range from financial resources to social resources. Secondly, elevated power facilitates these individuals to act without having any interferences or social consequences (Weber, 1947). Being the central decision-makers in the reward-rich environment, free of any social consequence, powerful individuals are more likely to take positive actions.

Similarly, low power is associated with greater inhabitation as less powerful individuals have restricted access to social, financial, and cultural resources (Domhoff, 1998). Moreover, less powerful individuals are more likely to be affected by social constraints and punishments (Fiske, 1993). For example, less powerful individuals are subject to more bullying, racism, physical violence, and hate crime (Gottfredson and Hindelang, 1981; Sanday, 1997; Sidanius, 1993; Whitney and Smith, 1993) This

environment of increased fear and punishment coupled with a lack of resources leads to the inhibition-related effect. To summarize, increased power facilitates individuals with a positive attitude and attainment of goals and rewards. The positive attitude tagged with increased attainment of goals further triggers increased attentiveness to rewards within the powerful individuals (Sutton and Davidson, 1997). On the contrary, the absence of power triggers an inhabitation-related process within the individuals. Consequently, with reduced power individuals focus more on negative consequences, avoiding punishment, and achieving others' goals.

3.3 Hypothesis development

There is an increasing debate on the role of the CEO's social network position in shaping different firm-level decisions. In the context of corporate liquidity management, the CEO social network position could be an important source of variation as it could lead to increased uncertainty among the investors regarding the outcomes attributed to the increased cash holdings. However, the relationship between such CEO connectedness and corporate cash holdings cash is unclear ex-ante. Depending on the decision setting, a more centrally connected CEO can both increase or decrease the cash holdings of the corporations. To deduce the predicted relationship between CEO connections and the value of cash, we consider two alternate hypotheses.

Firstly, this paper considers the relation between CEO connections and cash holding under the theoretical framework of reduced information asymmetry. Researchers focusing on the trust dimension of social capital (Dasgupta, 1988; Fukuyama, 1995) posit that increased trust among the network members lowers the risk of incomplete transactions (Grossman and Hart, 1986). Personal connection, in the spectrum of social networks, works as an effective channel for exchanging information, ideas, knowledge, suggestions, or even private information. The central benefit of having a personal tie is that it fosters an environment to enhance trust and value for the participants within that network. Increased trust among economic agents means that there will be a more optimal investment horizon while deploying more resources on innovation and production instead of diverting resources against violation of laws and rights. Social capital can also improve economic efficiency in

decision makings through the information dissemination channel (e.g., Larcker et al., 2013; Singh and Schonlau, 2009).

There is growing literature on how the social capital measured as increased connection, trust, and information within the firm- and manager-level social networks (Woolcock, 1998), affect different corporate policies. Recent literature in corporate finance emphasizes that hierarchical position in a social network shapes the way managers make important corporate decisions by influencing factors like dissemination of information, cost of doing business, access to external funds, and portfolio allocation choices (Cohen et al., 2008; Engelberg et al., 2012; Hochberg et al., 2007; Kuhnen, 2009; Rauch and Casella, 2001). Information shared within a network also works as a mechanism of peer influence to moderate managerial decision-making (e.g., Ellison and Fudenberg, 1995; DeMarzo et al., 2003). Shue (2013) theorizes that the information and belief transpiring through common social ties influence the executives to take similar decisions. Similarly, Fracassi (2016) creates pairs of firms based on similar social connections and finds that the greater the connections that two companies share via executives, the more similar are their corporate policies (e.g., capital investments, R&D expenses, cash reserves, and interest coverage ratios). Cohen et al. (2008) primarily focus on the connections between the mutual fund managers and the top executives to empirically show that mutual fund managers tend to invest more and perform better on the stocks of the companies with where they had previous ties.

Social ties sharing a common set of shared values, norms that foster cooperation, and mutual trust among the parties involved in a social network (Fukuyama, 1997; Guiso et al., 2004; Woolcock, 2010) can reduce the information asymmetry between the firms and relevant stakeholders within a network. (Cohen et al., 2008). Beside. firms facing reduced information asymmetry in financial markets have a greater chance of obtaining external financing. Moreover, the financial contract between the borrower and the lender is highly trust-sensitive. Increased trust between the parties can protect the lenders against any violation of the contracts by the borrowers. Additionally, investment in building social ties is a form of building trust in society (Dasgupta, 1988). In the context of this study, CEOs can reduce the information asymmetry in the market by effectively using their superior channels for disseminating information and can have easier access to external financing

(Engelberg et al., 2012), which in turn, mitigates their precautionary needs of holding additional cash. Consequently, focusing on the trust and superior information dissemination dimension of social capital (Dasgupta, 1988; Fukuyama, 1995) as the theoretical framework, the study posits the following hypothesis:

Hypothesis 1A: Firms managed by CEOs with higher (lower) connections hold less (more) cash than firms managed by CEOs with lower (higher) connections.

On the other hand, the CEO power hypothesis uses the theoretical framework of the approach inhabitation theory of power (Keltner et al., 2003) and agency theory of corporate cash holdings (Jensen, 1986) to explain the increased mechanism through which CEO connectedness affects corporate cash holdings. In line with the vast literature in social science that studies the origination of social power, this study proposes that the greater the number of connections a CEO incorporates in his social network, the more powerful the CEO is. For example, Raven (1993) proposes that informational or social influence is one of the bases of social power; the greater the access to information the individuals have, the more socially influential they are. Keltner et al. (2003) give a definition of power based on the individual's ability to change the state of others by providing or withholding social and financial resources. The authors here focus more on the ability to change others' states than the actual practice. Moreover, as powerful individuals have greater access to resources, they face less interference and social consequences (Keltner et al., 2003). Similarly, in the context of the social network, CEOs positioned higher in the social network hierarchy by having more direct links (nodes) with other executives, institutional agents, suppliers, and stakeholders can get better access to information, financial resources, and investment opportunities; superior access to these resources make highly connected CEOs more powerful than the less connected peers. Subsequently, this power also grows once a CEO gains more influential connections in his network, giving him greater access to exclusive information (Rowley, 1997). Furthermore, the superior social network also ensures that these CEOs are less likely to face personal consequences following failed corporate decisions; more connected managers can utilize their superior channels to improve their chances of re-employment, should they lose their jobs (Cingano and Rosolia, 2012; Mazerolle and Singh, 2004). Consequently, a network-powerful CEO can use his elevated position in the social

network to enjoy greater bargaining power, more loyalty, and conformity in the boardroom to steer different corporate policies and board decisions in their favor.

The approach inhabitation theory of power explains the channels through which power shapes the cognition and behavior of the CEOs; decisions taken by the network powerful CEOs are fundamentally different from the decisions taken by the less connected CEOs (Keltner et al., 2003). Elevated power triggers the behavioral approach inhabitation system within the network-powerful CEOs. This behavioral approach system deals with primitive drives like rewards and goal attainment mechanisms of the individuals. According to the behavioral approach system, increased power facilitates powerful CEOs with a positive attitude and goal-driven activities (Sutton and Davidson, 1997). The approach inhabitation theory proposes two mechanisms through which the approach-related process should affect the behavior of powerful CEOs. Firstly, CEOs residing higher in the social network hierarchy enjoy an information-rich environment giving them greater access to both financial and social resources. Secondly, elevated power that stems from being more connected enables the network-powerful CEOs to take actions without facing serious social consequences (Weber, 1947). This notion is further strengthened by the findings that better-connected CEOs enjoy greater labor market insurance and can get rehired even after forced departures (Cingano and Rosolia, 2012).

The sense of power also affects the managerial decision-making process of network-powerful CEOs. Being the central decision-makers in the reward-rich environment, free of any social consequence, network-powerful CEOs are more likely to take positive action while showing greater attentiveness to rewards through the attainment of goals (El-Khatib et al., 2015). On the contrary, in the absence of power, less connected CEOs are more likely to focus more on negative punishments, avoiding risky ventures, and achieving others' goals. For powerful managers, free of social consequences, shareholder wealth maximization is only a choice as they have substantial decision-making power over the board. Moreover, they have incentives to see firms grow as it increases resources under their control. (Murphy, 1985). Hence, CEOs in such powerful positions like to keep the majority of the assets under their control to veer different corporate decisions in their favor. (Jensen, 1986). However, the network-powerful CEOs prioritizing their individual goals and rewards ahead of maximizing shareholder's wealth create agency costs for the shareholders.

According to the agency theory of corporate cash holdings (Jensen, 1986), additional cash increases the level of assets that the network-powerful CEOs control, helps them avoid the external monitoring mechanism of the capital market, and finally allows them the flexibility to pursue their objectives. While these network powerful CEOs can use the excess cash whenever they want, they may not be able to raise additional capital according to their wish, especially for pursuing their objectives. Similarly, according to the trade-off model of corporate cash holding by Opler et al. (1999), cash holdings facilitate firms in availing investment opportunities and reducing the likelihood of financial distress and this benefit should be even greater (smaller) for the firms managed by more (less) centrally connected CEOs. The more centrally connected CEOs need to ensure that they don't cut back their investments due to liquidity shortages. This higher cost of being short on liquidity should increase the optimal cash balance in the firms managed by more centrally connected CEOs. Hence, according to the approach inhabitation theory of power and agency theory of corporate cash holdings, we propose the alternate hypothesis predicting the relationship between CEO connectedness and corporate cash holdings.

Hypothesis 1B: Firms managed by CEOs with higher (lower) connections hold more (less) cash compared to the firms managed by CEOs with lower (high) connections.

3.4. Sample development, data, and the measure of CEO connectedness

3.4.1 Sample construction

The study comprises S&P 1500 firms over the period 1990-2017. Following El-khatib et al. (2015), we choose the S&P 1500 firms to ensure that maximum CEO social connectedness data is available for our dataset. Moreover, it makes our study directly comparable to other CEO-level studies on cash holdings that use a similar dataset. For instance, Aktas et al. (2019) use the S&P 1500 firms to measure the effect of CEO overconfidence on the value of cash. Moreover, keeping the sample to S&P 1500 firms also ensures that our results will not be driven by the really small firms having large cash holdings resulting in outliers. For the North American public and private companies, Boardex by Management Diagnostics Limited gives comprehensive data for all the employees in 280 separate files. From this comprehensive firm-level connection data, we sort out the

connection data for the CEOs of the S&P 1500 companies. Next, we create the main independent variable CEO connectedness from 1990 to 2017, and this with the financial data downloaded from Compustat. From this sample of firm-year observations, we drop the observations with utilities (SIC 4900-4999), financial firms (SIC 6000-6999), and lastly, regulated telephone companies (SIC 4813). After filtering the data, we end up with 19,265 observations for the empirical analysis.

3.4.2 CEO connectedness

Following, the conceptual work of social network centrality by Freeman (1977), Borgatti et al. (1998), and Burt (1983), this study uses the independent variable CEO connectedness (degree centrality): the comparative position of a CEO in a social network hierarchy based on the total number of direct ties the CEO has with other members of the network where each CEO is represented as a node and these CEOs are linked with other nodes through common education, work, and social settings. These nodes and links together create our universe of social networks (Jackson, 2010). However, the positions of individual nodes are not randomly distributed (Jackson and Rogers, 2007) and a CEO is positioned higher in the social network hierarchy when he has more direct links through other nodes. Increased connectedness signifies a CEO's overall ability to access and utilize the information from the network participants, lead others and influence the outcome of different corporate decisions (Banerjee et al., 2012; Hanneman and Riddle, 2005; Jackson, 2010; Padgett and Ansell, 1993). According to El-Khatib et al. (2015), a powerful CEO in a network might be efficient to other members and transfer information, which leads to an improved position for bargaining and negotiation.

BoardEx database provides biographical information on current and past employment, the education, and other social activities of top corporate executives. BoardEx forms different network measures based on geographical locations and the way that people in the networks overlap. The entire network in BoardEx includes individuals from all geographical regions with common overlaps through employment, education, and other social activities. For the sample period of 1990 to 2017, we count the total number of connections the CEOs share based on three facets of social interaction: common education, employment, and social history. Two individuals share a common education when both

shared the same educational institutions. Common employment captures all the employees (both public and private firms) that the CEOs worked with. Lastly, social connection captures the connections that the CEOs have through different charities, social clubs, sports clubs, etc. The study assumes that, once a connection is formed, two individuals stay connected for the rest of the sample period. Effectively, the total number of connections does not decrease over time. Following Faleye et al. (2014), we construct the main independent variable CEO Connectedness by taking the 1 plus natural log of the total number of connections a CEO has. This CEO connectedness variable is constructed at the beginning of every year for each firm. In other words, CEO connectedness varies with both time and firms.

3.4.3 Measures of cash holdings

Following, Opler et al. (1999) and Itzkowitz (2013), this study takes the ratio of cash and equivalents to net assets as the main dependent variable. Opler et al. (1999) justify taking cash to net assets as a proxy for cash holdings as the ability of a firm to generate profit is strongly tied to its efficient use of non-cash assets. Net assets equal to the book value of total assets minus cash and equivalents. For robustness checks, this study takes two other variations of cash holdings. Bates et al. (2009) argue that the cash to net assets ratio as a proxy for cash holdings may have the problem of generating large outliers. Especially for the firms that hold a significantly large amount of cash compared to the overall assets. Foley et al. (2007) propose an alternate measure of cash holdings, the natural logarithm of one plus cash to net assets ratio that takes care of the outlier issue. Following Foley et. al., (2007) natural logarithm of one plus cash to net assets ratio is taken as another proxy of cash holdings. Lastly, the study also takes the cash to total assets ratio as the third proxy of the cash reserves.

3.4.4 Control variables

The vast literature on corporate cash holdings finds many factors that directly influence the amount of cash held by firms. This study controls for different firm-level variables which are used in previous studies such as, Opler et al. (1999), Harford et al. (2008), and Bates et al. (2009). More specifically the study adds the following firm-level

control variables: growth opportunity, cashflow, leverage, net working capital, acquisition expenditure, research and development costs, capital expenditure, sales, and market value. The description and predicted signs of control variables are given sequentially.

1. *Growth*: The first control variable growth equals the ratio of the market value of the assets to net assets. The market value of the assets is measured as total market value plus the book value of total liabilities. According to Opler et al. (1999), firms with significant growth opportunities hold more cash. Hence, we expect a positive relationship between cash holdings and growth opportunities.
2. *Cashflow*: Cashflow is measured as the ratio of net income plus depreciation to net assets. Bates et al. (2009) predict that firms with high cashflow save more cash to access better investment opportunities. Therefore, we expect a positive association between Cashflow and Cash.
3. *Sales*: Sales the proxy for firm size, is measured as the natural log of the total sales. Due to economies of scale, cash holdings are expected to be lower for larger firms. Hence, we expect a negative coefficient on Sales.
4. *Debt*: Firms having difficulty accessing external finance (debt) may hold additional cash as a precautionary measure, thus it is expected to have a negative coefficient on debt, calculated as the natural log of the sum of long-term debt and current debt.
5. *Market value:* Market value is calculated as the natural log of the total market value of the firms. Like sales, we expect a negative coefficient on market value.
6. *NWC to Assets:* This is measured as the ratio of net working capital (current assets net of cash, short-term investment, and current liabilities) to net assets. NWC to assets ratio captures the possibility that firms might be using other forms of current assets replacing cash. Thus, it is expected to have a negative coefficient on net working capital (Ozkan and Ozkan, 2004).
7. *R&D:* This variable is calculated as the ratio of research and development expenditures to net assets. For any missing value of research and development expenditures, it's set equal to zero. Firms with high R&D investments have greater opportunity costs of financial distress. Consequently, these firms deal with the increased uncertainties related to research and development projects by holding excess cash (Opler et al, 1999). Moreover, firms with high R&D projects show significant growth opportunities (Bates

et al., 2009). Hence, it is expected to have a positive association between R&D expenditures and cash holdings.

8. *Capital expenditures:* This variable is measured as the ratio of total capital expenditures to net assets. Investment in capital expenditures expands assets that can be used as collateral leading to increased debt capacity and reduced demand for cash (Bates et al., 2009). Moreover, Riddick and Whited (2009) conclude that productivity shocks can increase firm-level investments. which in turn may lower the cash balance. Hence, we predict a negative association between capital expenditures and cash.
9. *Acquisition Expenditure*: This variable is calculated as the ratio of acquisition expenditures to net assets. Bates et al. (2009) posit that as acquisitions are often associated with high cash outflows, it is expected to have a negative association between acquisition expenditures and cash.
10. *Dividend:* This a dummy variable that takes the value of 1 when a firm distributes common dividends to shareholders in a year and zero otherwise. Firms that cannot pay dividends are more likely to be financially constrained and hold more cash as a precautionary motive. Moreover, firms pay cash dividends by lowering down their cash balance as well. Therefore, it is predicted to have a negative sign on the coefficient of dividend.
11. *Industry Sigma:* It is calculated as the mean of standard deviations of cash flows to assets for 10 years and firms in the same industry defined by the same 2-digit SIC code. Firms operating in industries with high cash flow deviation should hold more cash as a precautionary motive. Hence, it is predicted to have a positive association between industry sigma and cash holdings.

3.4.5 Sample characteristics

Table 3.1 provides the summary statistics of CEO connectedness and other firm-level characteristics. Our main dependent variable cash to net assets has a mean of 28.2%, implying that in our sample firms on average hold 28.2% of their net assets as cash. The distribution of the cash holdings along with the other control variables are in line with the findings by Opler et al. (2009), Bates et al. (2009), and Aktas et al. (2019). Moreover, our average cash to net assets ratio is also in line with the findings by Jiang and Lie (2016) and

Deshmukh et al. (2018) who report the cash to net assets ratios of their samples to be .33 and .25 respectively.

In Table 3.2 we further decompose the summary statistics according to the level of CEO connectedness. The distribution of the sub-sample confirms that more connected CEOs manage bigger firms, as depicted by the higher sales and market value. Moreover, increased CEO connectedness results in greater R&D expenditures and acquisition expenditures. These statistics are consistent with the findings by El-Khatib et al. (2015) and Faleye et al. (2015) that network-powerful CEOs are more innovative and also show a greater tendency of acquiring firms. Besides, better-connected CEOs exhibit more growth tendency as well. Aktas et al. (2019) confirm that it is not unusual that firm-level variables vary significantly considerably across major CEO-level characteristics. To summarise, our overall sample is consistent with some of the vastly cited studies in cash holdings while there is a considerable difference in the firm characteristics in the firms managed by more-connected CEOs compared to firms managed by less connected CEOs.

[Please Insert Table 3.1 and 3.2 About Here]

3.5. Empirical analysis

3.5.1 Univariate results

For the first empirical analysis, the study compares the different proxies of cash holdings by the varying degrees of CEO connectedness in the univariate testing framework. In particular, the study takes three proxies of cash holdings: dollar value of total cash (millions), cash to net assets ratio, and cash to total assets ratio. To construct the high and low CEO connectedness, the total personal connections of the individual CEOs are calculated for each year. Next, CEOs having personal ties higher than the median connections each year are included in the high connectedness group. On the other hand, CEOs having total connections that fall below the median value, are included in the low CEO connectedness group.

The univariate results from Table 3.3, give initial confirmation of the CEO power hypothesis by reporting a positive association between CEO connectedness and corporate cash holdings. The mean differences in all the proxies of cash by the top and bottom 50% of CEO connections are statistically significant at the one percent level of significance. In terms of dollar value, CEOs with strong connections on average hold $957.67 million in cash. On the contrary, CEOs belonging to the bottom 50% of the social network hierarchy hold approximately $194.23 million in cash. However, directly comparing the cash and equivalents without considering the firm size, might lead to biased estimations. Consequently, for the next analysis, the study investigates the cash to net assets ratio by high and low CEO connectedness. The results show that CEOs belonging to the high connectedness group on average hold 31% of their net assets as cash. However, the percentage drops to 26% in the firms managed by less-connected CEOs. Lastly, the mean difference in the cash to total asset ratio by high and low CEO connectedness is .02 and statistically significant at the 1% level of significance.

In the univariate framework, all the proxies of corporate cash holdings indicate that network-powerful managers hold significantly more cash than the less connected managers. However, these univariate comparisons do not control for all the firm and CEO-specific factors that may also drive these results.

[Please Insert Table 3.3 About Here]

3.5.2 Multivariate analysis

For the baseline model estimating the role of CEO connections on corporate cash holding, the study controls for the variables suggested by Opler et al. (1999) and Bates et al. (2009). In particular, the baseline model explains the association between CEO connectedness and level of cash holdings after controlling for different firm-level constructs like growth, cashflow, sales, net working capital, debt, market value, dividend, R&D expenditures, capital expenditures, acquisition expenditures, and industry-standard deviation.

$$\frac{Cash_{i,t}}{Net\ Assets_{i,t}} = \alpha_t + \beta_1\, CEO\ Connectedness_{i,t} + \gamma X + \varepsilon_{i,t} \quad (3.1)$$

Here, the dependent variable is the level of cash holding of a firm i in time t, deflated by net assets of the firm in that year. As the main independent variable, the study adds CEO Connectedness which is the degree centrally measure of CEO social network centrality, the natural log of the total number of personal connections a CEO has in the fiscal year t. β_1 is the coefficient of interest that empirically captures the influence of the total number of direct connections that the CEOs have on the firm-level cash reserves. A statistically significant and positive β1 coefficient supports the CEO power hypothesis whereas a significantly negative β1 confirms the reduced information asymmetry hypothesis. Additionally, to control for the outliers that may affect the results, all the continuous variables are winsorized at 1% and 99% percentile.

Table 3.4 presents the multivariate baseline regressions investigating the effect of CEO connectedness on firm-level cash holdings. The pooled OLS regression analysis in the specification (1) does not incorporate any year and industry dummies. Specification (2) includes the year and industry dummies. Lastly, specification (3) includes industry and year fixed dummies, and standard errors are also clustered at the firm level. Supporting the CEO power hypothesis, all the specifications from Table 3.4 confirm a positive coefficient on CEO connectedness in explaining corporate cash holdings. In addition, coefficients on the CEO connectedness are statistically significant at the 1% level of significance (P-value < .01). The strength of the coefficients on the main independent variable CEO connectedness ranges from .027 in model 1, to .0190 in model 3. The positive coefficient on the CEO connectedness rejects the reduced information asymmetry hypothesis which means for the overall sample, it's the CEO power mechanism through which CEO connectedness affects the corporate cash holdings.

All the firm-level control variables have the expected signs and are in line with the findings by Opler et al. (1999) and Bates et al. (2009). Among the firm-level control variables, growth, cash flow, R&D and industry sigma positively affects the level of cash holdings. On the other hand, control variables such as sales, debt, net working capital, market value, acquisition expenditures, and capital expenditures are negatively associated with the level of cash holdings. Moreover, they are also statistically significant at the 1% level of significance, apart from industry sigma. The adjusted R-squared values range from .67 in model 1 without any industry and year dummies to .69 in model 3 inclusive of the dummies

and clustered standard errors. Hence, about 67-69% variations in the level of cash holdings can be explained through the proposed models.

[Please Insert Table 3.4 About Here]

3.5.3 Robustness tests

In this part of our analysis, we run a series of tests to give robustness to the baseline results.

3.5.3.1 Propensity score matching

One potential criticism of our empirical model is the distribution of the network-powerful CEOs in the sample. In particular, it is plausible that CEOs with more influential connections have an improved chance of employment in bigger corporations, compared to the less-connected CEOs (Cingano and Rosolia, 2012; Mazerolle and Singh, 2004; Rowley, 1997). Consequently, the firm-level characteristics may significantly be different for the firms that are managed by network-powerful CEOs compared to firms that are managed by the less-connected CEOs, implying that the baseline results could be affected by the biased sample. Under such assumptions, only controlling for the firm-level control variables may not be enough to deal with the potentially biased sample. To empirically control for such inconsistencies, this study conducts the propensity score matching (PSM) analysis by following the method suggested by Drucker and Puri (2005). In particular, the study constructs a sample of firms managed by network-powerful CEOs (the treatment group) with similar characteristics to the less-connected CEOs (the control group).

The matching sample is constructed by matching each firm with a control firm. The control firm is a firm that is not managed by a network-powerful CEO (i.e., does not belong to the high CEO connection group), however, has a close propensity score to the treated firms based on the one-to-one nearest neighbor matching with replacement. For the matching process, the covariates are all the control variables used by the baseline regression models presented in Table 3.4. Next, for each firm-year observation with a network-powerful CEO, a similar firm is matched by a less-connected CEO based on the nearest neighbor matching technique. Finally, using the matched sample, specifications (1)- (3) from Table 3.4 are re-

estimated. Specifications (1)-(3) from table 3.5 confirm that the positive association between CEO connectedness and corporate cash reserve remains robust for the matched sample. These findings also assure us that the moderating role of CEO connectedness on cash holdings is not driven by any functional form of misspecification biases.

To explicitly address the concern that big firms tend to appoint more-connected CEOs in our sample, we construct another sample of firms managed by network-powerful CEOs (the treatment group) with similar characteristics to the less-connected CEOs (the control group) based on the firm size (total assets). Specifications (4)- (6) confirm that the coefficients on CEO connectedness remain statistically significant for the matched sample based on the firm size as well.

[Please Insert Table 3.5 About Here]

3.5.3.2 Alternate models of cash holdings

In this section, the study further checks the association between CEO connectedness and level of cash holdings by taking alternate proxies of firm-level cash holdings. Bates et al. (2009) argue that cash to net assets ratios as a cash holdings proxy may have the problem of generating large outliers. Especially for the firms that have significantly large cash reserves compared to the overall assets. To mitigate any potential specification biases that might arise from these outliers, the study follows Itzkowitz (2013) and Foley et al., (2007) to take the natural logarithm of one plus cash to net assets ratio as an alternate proxy for cash holdings. For further robustness, the cash to total assets ratio is also taken as a second alternate proxy of cash holdings.

Specifications (1) and (2) in Table 3.6 repeat the baseline regression models for the two alternate proxies of cash holdings. In all the specifications, the results confirm that the coefficients on the CEO connectedness remain positive and economically significant even after controlling for the alternate proxies of cash holdings. Moreover, the signs and statistical significance of the firm-level control variables are also similar to the findings from the baseline regression models. The adjusted R-squared values also do not change drastically

from the previous findings. The models on average can predict from 68% to 74% variations in the level of cash holdings.

To summarize, the alternate proxies of CEO cash holdings also provide support of the CEO power hypothesis driving the predicted relation between CEO connectedness and the level of cash holdings. The statistical significance and direction of the independent variables along with most of the control variables remain fundamentally similar. Hence, we can infer that the initial findings from the baseline models in Table 3.4 are not driven by any specific measure of cash holdings.

[Please Insert Table 3.6 About Here]

3.5.3.3 Alternate specifications of CEO connectedness

In the part of the analysis, the study repeats the baseline specifications for two alternate specifications of CEO connectedness. First, following El-Khatib et al. (2015) we construct CEO connectedness rank as the percentile position (rank) of a CEO based on his/her total connections in a given year. According to this measure, the position of a CEO in a social network hierarchy of S&P 1500 firms, varies from 1 to 100 with 1 being the least connected and 100 being the most connected CEO of our sample in that year. Second, the High CEO connectedness is a dummy that takes a value of 1 if the CEO connections are higher than the median value of the connections in a year and zero otherwise. The High CEO connectedness dummy directly enables us to compare the liquidity position of the firms managed by network-powerful managers, compared to the less-connected CEOs.

The results from the specification (1) and (2) of Table 3.7 confirm that the estimated association between CEO connectedness and cash holdings is positive and statistically significant even after controlling for the alternate specifications of CEO connectedness. In particular, the positive coefficient on the CEO connectedness rank variable confirms that the CEOs increase their cash holding as they gradually move upwards in the social network hierarchy. The positive coefficient on the dummy variable High CEO Connectedness means network-powerful managers on average hold more cash compared to the firms managed by less-connected peers.

[Please Insert Table 3.7 About Here]

3.5.3.4 Firm-fixed effect

The large set of firm-level control variables that we include by following Opler et al. (1999) and Bates et al. (2009) may not be enough to control for the unobserved firm-heterogeneity that may drive the results of the baseline regressions. To mitigate this issue, we include the firm-fixed effect which empirically controls for this unobserved firm heterogeneity. The main variable of interest, CEO connectedness is not a persistent rather a time-varying trait as the CEOs can change their position in the social network hierarchy throughout their lifetime. Consequently, including the firm-fixed effect empirically does not put any additional restrictions on the coefficients on CEO connectedness.

In specification (1)-(3) of Table 3.8, the study re-estimates the baseline regression models for different variants of CEO connectedness controlling for firm-fixed effect. If the estimated positive coefficients on the different variants of CEO connectedness are primarily driven by the unobserved firm heterogeneity, then the strength of the coefficient may go down once controlling for the firm-fixed effect. The results from specifications confirm that the coefficients on all the variants of CEO connectedness remain both statistically significant and economically persistent even after controlling for the firm-fixed effect, implying that the baseline regression results are not driven by unobserved firm heterogeneity.

[Please Insert Table 3.8 About Here]

3.5.3.5 Controlling for managerial attributes

The baseline regression models in Table 3.4 already control for a series of firm-specific factors suggested by Opler et al. (1999) and Bates et al. (2009). Since this study is providing a CEO-specific behavioral explanation of corporate cash holdings, it is imperative to control for various unobserved managerial attributes that may ultimately drive the estimated association between CEO connectedness and corporate cash-holdings. Consequently, we control for a series of managerial attributes based on previous literature.

First, we control for the CEO gender. Previous studies take the gender of the CEO as a proxy for overconfidence and risk-tolerance. For instance, Barber and Odean (2001) find that men are more aggressive traders whereas Huang and Kisgen (2013) confirm that male executives are more likely to take on a major investment decision like acquisitions. In the context of cash holdings, (Liang et al., 2018) provide empirical evidence that risk-averse female CEOs hold significantly more cash than the male CEOs due to the precautionary motive of corporate cash holding. Zeng and Wang (2015) find similar results while explaining the role of CEO gender on corporate cash holding in Chinese firms. We construct the variable CEO gender, an indicator variable that takes the value of 1 if the firm is managed by a female CEO and 0 otherwise.

Second, we control for a CEO's ability to perform their tasks. Demerjian et al. (2012) construct a proxy for the CEO's ability based on managers' ability to generate revenue for the firms and find that the stock market reacts more negatively when the outgoing CEO is more able. The study also finds that appointing CEOs with more (less) able CEOs is associated with significant improvements (declines) in subsequent firm performance. Similarly, in the context of our study, more able managers holding excess cash for future investment opportunities might drive our estimations of the baseline regression. To control for such possibility, we use the managerial ability index developed by Demerjian et al. (2012) to control for managerial ability.

Third, we include the CEO pay slice as a proxy for CEO power. Following Bebchuk et al. (2011) we take the CEO pay slice, the fraction of the aggregate compensation of the top-five executive team captured by the CEO pay slice. A high value of CEO pay slice reflects increased CEO power measured as the relative importance of a CEO over the other board members as well as the CEO's ability to extracts rents. Bebchuk et al. (2011) further report that increased CEO power is associated with lower accounting profit, lower stock returns, lower merger announcement returns, lower performance sensitivity to stock returns. All these findings are consistent with the managerial agency problems. In the context of this study, network-powerful managers, due to their superior position in the social network hierarchy, are more likely to get a greater pay slice compared to the less-connected CEOs. Hence, it is intuitively correct to add the CEO pay slice as a control variable to rule out the possibility that the baseline regression results are driven by the CEO pay slice.

Fourth, we control for CEO duality, a dummy variable that takes a value of 1 when the CEO is also chairman of the board and 0 otherwise. CEO duality is associated with increased CEO power and weak corporate governance Dahya et al. (2002). Fifth, we control for CEO age, measured as the natural log of the age of the CEO. Serfling (2014) shows that younger CEOs tend to take more risks than older CEOs. Moreover, Orens and Reheul (2013) find that older CEOs and CEOs without experience in other industries are more concerned with the precautionary motive of cash and less concerned with the opportunity cost of cash. The CEO age variable is measured as the natural log of the age of the CEO. Last, the study controls for CEO tenure measured as the log of the total number of years the CEO is managing the firm.

Specifications (1)-(7) of Table 3.9 confirm that our main variable of interest CEO connectedness remains statistically significant even after controlling for different facets of managerial attributes. More importantly, even after including the additional CEO-specific characteristics, our coefficients on the CEO connectedness do not lose the strength. For instance, in specification (7) which includes different CEO-specific characteristics together in one model, the coefficient on the CEO connected (.021) remains qualitatively similar to the findings from the baseline regression models.

[Please Insert Table 3.9 About Here]

3.5.4 Economic mechanism

To further validate the finding that CEO power is indeed the economic mechanism that drives the positive association between CEO and connectedness and corporate cash holdings. results, the study conducts additional tests related to the firms' investment regime, financial constraint status, corporate governance mechanism, institutional ownership monitoring, and lastly cash regimes.

3.5.4.1 Investment regimes

The baseline regression models in Table 3.4 give the initial confirmation of the CEO power hypothesis that is network-powerful CEOs driven by personal ambitions hold more cash than the CEOs with less personal connections. To give further justification to the CEO

power hypothesis, it is imperative to show a direct link between excess cash held by the network-powerful CEOs is tied to their respective investment behaviors. Consequently, to disentangle the relationship between CEO connectedness and cash holdings, the study re-estimates the baseline regression models for different investment regimes.

To identify the investment regimes the study borrows the theoretical and empirical predictions from the recent study by Tsoukalas et al. (2017) where the authors propose a cash holdings model based on the premise that firms tend to invest in lumps. More specifically, an average firm goes through very low investment activities followed by large investment spikes. Due to this lumpy investment pattern, firms are more likely to show a non-linear cash holding behavior as they use cash as the vehicle through which resources are transferred from investment inactivity periods to investment spike periods. In other words, firms save more cash during the low investment periods so that they can have ease in funding the investments during the investment spikes. As a result, the average cash balance remains high during the low investment periods, and this balance is drawn down during the investment spikes. Moreover, this cash balance is replenished soon after the investment spike periods. Hence, the cash balance follows a high-low-high-low pattern depending on the investment regimes and the savings-cashflow sensitivity switches sign from positive to negative as the firms move from low investment periods to investment spikes.

In the context of this study, if the CEO power hypothesis truly explains the positive association between CEO connectedness and the cash holdings, then the estimated coefficient on CEO connectedness should vary significantly between these high and low investment periods. In line with the findings by Tsoukalas et al. (2017), during investment spikes, every CEO, network-powerful or not, is more likely to be investing by replenishing the cash balance. If the CEO power is indeed the economic mechanism, then the network-powerful CEOs should hold more cash during the quieter low investment periods which will facilitate their individual goal-driven investments during the spikes. Following, Tsoukalas et al. (2017) this study constructs the variable investment spikes, a dummy variable that takes the value of 1 for observations with investment rates greater than 50% and 0 otherwise.

Panel A of Table 3.10 re-estimates the baseline regression models for the sub-section of the investment regimes. Supporting our conjecture, the results confirm that the positive

relationship between CEO connectedness and corporate cash holdings is stronger in the low investment period. In particular, the strength of the coefficients on CEO connectedness (.022) is stronger and statistically significant at 1% during the low investment periods. On the contrary, this coefficient becomes economically weaker and statistically insignificant during the investment spikes. Moreover, the adjusted R-squared value is significantly higher for the firms during the low investment periods. The proposed model can explain 70% of the variations on the level of cash holdings during the low investment periods whereas the percentage drops down to 51.7% during the investment spikes. Overall, these results concur that the CEO power hypothesis primarily dominates in the low investment regimes.

To get a clearer picture of the association involving CEO connectedness, cash holdings, and investment regimes, the study extends the analysis by introducing the role of internal cashflows. Tsoukalas et al. (2017) posit that firms use their internal cash flows during the investment spikes while they save from the cash flows during the low investment period. Specification (1) of Panel B shows that the coefficient on the interaction variable of Cash flow*Investment spikes without the influence of CEO connectedness. is -.560 (P-value <.01) which is in line with the results in Tsoukalas et al. (2017). In model 2, the dummy variable High Connectedness takes a value of 1 if the CEO belongs to the top 50% of the connection group in that year and 0 others. The introduction of the high CEO Connectedness dummy significantly changes the impact of cash flows during the investment spikes. The moderating role of network-powerful CEOs magnifies the impact of cashflow sensitivity during investment spikes. In specification (2), after the introduction of the high CEO connectedness dummy, the magnitude of the coefficient on the interaction variable High CEO connectedness*Cash flow* Investment spikes comes to -1.473 (P-value < .01) which is more than double of what is witnessed without the effect of high CEO connectedness in model 1. Moreover, after the introduction of the high CEO Connectedness dummy, the interaction variable Cashflow * Investment Spike in model 2 becomes positive and statistically insignificant, inferring that compared to less-connected CEOs, well-connected CEOs are more likely to spend heavily during investment spikes and draw down their internal cash flows more. Moreover, the interaction of High CEO connectedness*Cashflow in model 2 is positive and statistically significant implying that these network-powerful managers save from internal cashflows during the low investment periods. These findings are also in with the notion that by hoarding extra cash, network-powerful CEOs may avoid

the disciplinary mechanisms of the financial market and fund projects that are more in line with the personal ambitions of the CEOs.

[Please Insert 3.10 Table About Here]

3.5.4.2 Financial constraint status

For the second test related to the economic mechanism, baseline specification (3) of Table 3.4 is extended based on the financial constraint status of the firms. Previous literature shows that the cash holdings of the firms significantly vary based on the financial constraint status of the firms (precautionary motive). Fazzari, et al. (1988) find that financially constrained firms rely more on internal cash flows for making their investments. Similarly, Almeida et al. (2004) examining the cashflow sensitivity of cash conclude that under the presence of costly external finance, financially constrained firms with future investment opportunities save more cash from the internal cash flows. On the other hand, financially unconstrained firms do not need to worry about liquidity management as they have easier access to external finance. Likewise, Tsoukalas et al. (2017) propose that savings-cashflow sensitivity switches sign from positive to negative as the firms move from low investment periods to investment spikes. However, this relationship is only applicable to the financially constrained firms under costly external finance; the coefficients do not switch signs for financially unconstrained firms.

In the context of this study, the strength of the main independent variable, CEO connectedness is expected to vary according to the financial constraint status of the firms. If network-powerful CEOs indeed hold additional cash to facilitate future investment opportunities, this positive association should be stronger in the presence of costly external finance as excess cash will alleviate the need of finding external financing while implementing this project. On the contrary, centrally connected CEOs in financially unconstrained firms do not need to hold additional cash to implement their investment choices as these firms are already endowed. Hence, the positive association between CEO connectedness and cash holdings should be stronger for financially constrained firms and remain insignificant for the financially unconstrained firms.

The study divides the whole sample into financially constrained and unconstrained firms based on the long-term debt rating, commercial paper rating, and firm size. The first criterion for determining the financial constraint status, long-term debt rating is taken by following Whited (1992) Kashyap et al. (1994), Gilchrist and Himmelberg (1995), and Almeida et al. (2004). One additional advantage of using long-term debt as a financial constraint measure is that it explicitly considers the capital market's valuation of the firms' debt quality. We classify the firms as financially constrained if they have positive debt in their balance sheet but never had their public debt rated during the sample period. We define the financially unconstrained group as the firms whose debt has been rated at least once during the whole sample period.

For the second criterion, we divide the firms into financially constrained and unconstrained groups based on commercial paper ratings. More specifically, following Almeida et al. (2004), we put the firms under a financially constrained group if they have positive debt but never had their commercial paper rated in our sample period. The financially unconstrained group includes the firms whose commercial papers were rated at least once during our sample period. Lastly, we construct our proxy for financially constrained firms according to firm size. Gilchrist and Himmelberg (1995) and Almeida et al. (2004), find that small firms having restricted exposures to the capital market and consequently are more vulnerable to any sudden shock to the capital market. Following these two studies, we rank all the firms in our sample based on their total assets. Next, we put all the firms in the financially constrained (unconstrained) group if they are in the bottom (top) quartiles of their size distribution.

Table 3.11 presents the main baseline regression model 3 from Table 3.4 for the subsample of financially constrained and unconstrained firms. Supporting our conjecture, the multivariate regression results from Table 3.11 show that the positive association between CEO connectedness and cash holdings is stronger for all the subsections of financially constrained firms. The positive association between CEO connectedness and cash holdings remains positive and statistically significant for all the subsections of the financially constrained firms. On the contrary, the positive coefficient of CEO connectedness gets either statistically or economically insignificant for the financially unconstrained firms.

[Please Insert Table 3.11 About Here]

3.5.4.3 Corporate governance mechanism

The conflict of interest between the managers and shareholders primarily stems from the decisions related to deploying the internal funds (i.e., cash). Hence, any discussion on the managerial corporate cash holdings must address the efficacy of corporate governance. During the business expansion periods, managers must make strategically important decisions about cash disbursements to shareholders, internal cash hoarding, or investment in outside acquisitions. For the managers, shareholder wealth maximization is not an obligation, rather a choice. Consequently, managers must trade-off between the private benefits of hoarding cash against the likelihood of getting disciplined by the corporate governance mechanism. For instance, Harford et al. (2008) find that excess cash in weakly governed firms leads to lower profitability and valuation. Moreover, in the weakly controlled firms, managers quickly deploy the excess cash in on capital expenditures, rather than hoarding it for a long time. Dittmar et al. (2003) and Kuan et al. (2011) provide similar evidence for the international market.

In the context of this study, network-powerful CEOs showing increased attentiveness to individual rewards instead of maximizing shareholder's wealth can create agency costs for the shareholders (Jensen, 1986). According to Jensen (1986), in the presence of agency costs, powerful managers like to steer different corporate decisions in their favor by keeping a higher portion of the firm's assets under their direct control to pursue their objectives at the expense of destroying shareholders' wealth. Similarly, if excess CEO power is indeed the mechanism that drives our results, we expect the positive association between CEO connectedness and cash holdings to be stronger in the absence of a strong corporate governance mechanism.

The study uses the entrenchment (E) index by Bebchuck et al. (2009) to proxy for the quality of the corporate governance of the firm. Bebchuck et al. (2009) suggest that the E index is a more accurate measure than the G index prescribed by Gompers et al. (2003). The authors further posit that all the elements of the G index are not relevant to corporate governance. Instead, the E-index is constructed as the sum of the binary variables of six

specific provisions: classified boards, limits to shareholder bylaw amendments, poison pills, golden parachutes, and supermajority requirements for mergers and charter amendments. A high value of E-index represents greater management entrenchment, and a low value of E-index represents low managerial entrenchment. The study constructs the variable good governance, a dummy that takes the value of 1 if the firm belongs to the bottom tercile of the entrenchment index and 0 otherwise. These are the firms where network-powerful managers are less likely to use their power to make personal-goal-driven decisions. Next, Weak Governance is constructed as a dummy variable that takes the value of 1 if it does not belong to the Good Governance, and 0 otherwise.

Specifications (1) and (2) of Table 3.12 report the sub-sample analysis according to the corporate governance strength of the firms based on the E-index. The coefficients on the CEO connectedness remain positive and statistically significant for the sub-sample of the weakly governed firm-years whereas the coefficient estimate on the CEO connectedness is statistically insignificant for the sub-sample of firm-years with strong corporate governance. These findings together imply that the CEO power hypothesis of corporate cash holdings is magnified in the absence of strong corporate governance. Whereas in the presence of strong corporate governance, excess cash holding behavior of the network-powerful CEOs is mitigated.

[Please Insert Table 3.12 About Here]

3.5.4.4 Institutional investor monitoring

For the next test related to the economic mechanism, this study examines the moderating role of institutional investor monitoring: an external monitoring mechanism of corporate governance. The role of institutional investors is particularly important due to its unprecedented growth in the US stock market in recent years (Ward et al., 2018). Ward et al. (2018) further find that institutional investors play a crucial role as a disciplinary mechanism to mitigate the agency problems related to corporate cash holdings. In the context of our study, if the conflict of interest between the network-powerful CEOs and shareholders drives the positive association between CEO connectedness and the cash holdings, it is

intuitive to investigate to what extent increased monitoring by the institutional investor can attenuate this association.

Following (Buchanan et al., 2018), the study constructs two measures of institutional investor monitoring: i) Top 5 institutional ownership and ii) Blockholder ownership. Top 5 institutional ownership variable is measured as the total percentage of a firm's shares held by the top 5 institutional investors. The blockholder ownership variable is measured as the total percentage of a firm's shares held by the investors with at least 5% ownership of that company. Next, we construct two dummy variables as the proxies for the firms with high institutional monitoring: i) High institutional ownership, a dummy variable equals 1 if top 5 institutional ownership is greater than the 75th percentile and 0 otherwise; ii) High blockholder ownership: a dummy variable equals 1 if blockholder ownership variable is higher than the 75th percentile value of our sample and 0 otherwise. Similarly, to proxy for weak institutional monitoring, we construct the following dummy variables: i) Low institutional ownership, a dummy variable equals 1 if top 5 institutional ownership is lower than the 25th percentile and 0 otherwise; ii) Low blockholder ownership: a dummy variable equals 1 if blockholder ownership variable is less than the 25th percentile value of our sample and 0 otherwise.

Specifications (1)-(4) of Table 3.13 report the sub-sample analysis according to the varying levels of institutional investor monitoring. Confirming our conjecture, the CEO power hypothesis dominates the firm-year observations with weak institutional monitoring whereas the positive association does not persist in the presence of strong institutional investor monitoring.

[Please Insert Table 3.13 About Here]

3.5.4.5 Cash regimes

Halford et al. (2017) emphasize the importance of controlling for cash regimes while estimating the value of cash as not controlling for cash regimes result in an inaccurate interpretation of the value of cash. Besides, Faulkender and Wang (2006) find that the marginal value of cash varies significantly depending on the cash regime. In particular, they

find that the marginal value of cash is higher for the firms that are in the raising cash regime requiring external capital, in comparison with the firms that are in the distributing cash regime, distributing cash to the shareholders. For this study, intuitively it makes sense to empirically test our hypotheses in the two different cash regimes. In line with, Faulkender and Wang (2006), CEOs in general, network-powerful or not, raise cash during the raising regime. If CEO power is indeed the mechanism that drives the positive association between CEO connectedness and the cash holdings, we expect the relationship to be stronger in the raising regime. In other words, to facilitate their private goal-driven investments, network-powerful CEOs should hold more cash in the raising cash regime, compared to the CEOs with fewer connections. On the contrary, the positive association between CEO connectedness and cash holdings should be less pronounced during the distributing cash regime.

To construct the raising and distributing the cash regimes we follow the ex-ante specifications of cash regimes suggested by Halford et al. (2017). First, we construct the raising regime variable, a dummy that takes a value of 1 if a firm issues equity and does not pay dividends, 0 otherwise. Second, we construct the distributing regime, a dummy variable that takes the value of 1 if a firm does not belong to the raising regime, and distributes dividends, 0 otherwise. Specifications (1)-(2) of Table 3.14 present the results of the sub-sample analysis of the firm-year observations according to the raising and distributing cash regimes. The results confirm that the estimated coefficient on the CEO connectedness and cash is statistically significant in the raising cash regime and remain negative in the distributing cash regime. The results are in line with the prediction that the CEO power hypothesis primarily dominates the raising cash regimes.

[Please Insert Table 3.14 About Here]

3.6. Conclusion

Managers may hoard cash in times of higher uncertainty or simply to have the flexibility to exploit the investment opportunities that may arise. From the managerial perspective, the exploitation of the cash holdings depends on the power they have over the board and external monitoring agencies. Power in the realm of social science is limited in

supply and therefore it is intuitive to investigate how increased power stemming from being in an authoritative position in a social network hierarchy may affect the managerial decision-making process.

Drawing theoretical predictions from the extensive literature in graph theory and approach inhabitation theory of power, we provide a behavioral explanation of how increased CEO connections affect a strategically important decision like corporate cash holdings. According to the approach inhabitation theory of power (Keltner et al., 2003), the behavioral cognition process of powerful CEOs affects the way they hold and utilize cash in the pursuit of their individual goals and achievements. The approach inhabitation theory of power also gives the theoretical justification of why centrally connected CEOs may fail to create value even with better access to information. In the empirical setting, the study provides robust evidence of CEO connectedness positively affects the corporate cash reserves. At the same time, the results reject the reduced information asymmetry hypothesis

A series of cross-sectional tests validate that CEO power is indeed the mechanism through which increased CEO connectedness affects the corporate cash holdings. In particular, we find that excess cash held by the network powerful managers are magnified for the firm-year observations with low investment regimes and raising cash regimes. In such cases, excess cash held by the network-powerful managers gives them the flexibility to fund their investments which might not be in line with the shareholder wealth maximization. This study also provides evidence related to the precautionary and agency theory of corporate cash holding motives of corporate cash holdings as the positive association becomes more pronounced increased financial constraint status, weak corporate governance, and low institutional investor monitoring. The baseline regressions further hold for a series of robustness tests such as the propensity score matching, firm-fixed effect, alternate proxies of the value of cash, alternate measures of CEO connectedness, and finally controlling for managerial characteristics. All these results mitigate the concern that the baseline regression results might be driven by sample bias or any unobserved firm heterogeneity.

These findings together have important implications for corporate finance policies. Firstly, we contribute to the debate on whether improved CEO connectedness can improve the corporate investment policies by providing evidence that increased cash holdings under

network-powerful managers lead to value-destructive investment outcomes. Thus, CEO connectedness is an additional factor that may contribute to corporate investment distortions. More importantly, these findings also have great implications for the literature related to corporate governance mechanism and managerial agency conflicts as the negative effect of having network-powerful managers on the board is amplified in the absence of strong corporate governance and institutional investor monitoring. Consequently, effective boards must ensure having proper corporate governance mechanisms and institutional investor monitoring in place if they are to select a network powerful CEO for their company.

Table 3. 1 Summary statistics (whole sample)

Table 3.1 reports summary statistics of all variables used in our baseline regression models. The sample consists of all the S&P 1500 firms between 1990 and 2017 that pass the filters described in section 3.4.1. The main dependent variable is the ratio of cash and equivalents to net assets. The main independent variable CEO connectedness is measured as the 1 plus natural log of the total number of connections the CEO of firm i has in the fiscal year t. The control variables are: (1) Growth equals the ratio of the market value of the assets to net assets where the market value of the assets is measured as total market value plus book value of total liabilities.; (2) Cashflow is measured as the ratio of net income plus depreciation to net assets; (3) Sales is measured as the natural log of the total sales; (4) Debt is calculated as the natural log of the sum of long-term debt and current debt; (5) Market value is calculated as the natural log of the total market value of the firms; (6) NWC to total assets is measured as the ratio of net working capital (current assets net of cash, short term investment, and current liabilities) to net assets; (7) Acquisition expenditure is calculated as the ratio of acquisition expenditures to net assets; (8) Capital Expenditure is measured as the ratio of total capital expenditures to net assets; (9) R&D is calculated as the ratio of research and development expenditures to net assets. For any missing value of research and development expenditures, it's set equal to zero; (10) Industry Sigma is calculated as the mean of standard deviations of cash flows to assets for 10 years and firms in the same industry defined by the same 2-digit SIC code; (11) Dividend is a dummy variable that takes the value of 1 when a firm distributes common dividends to shareholders in a year and zero otherwise. All the continuous control variables are winsorized at the 1st and 99th percentile. The number of observations, mean, 25th percentile, median, 75th percentile, and standard deviation are reported from left to right, in sequence for each variable.

	N	Mean	Q1	Median	Q3	Std. Dev.
Cash to net assets	19943	0.282	0.030	0.096	0.279	0.549
CEO connectedness	19950	6.885	5.970	7.143	7.976	1.393
Growth	19881	3.060	1.391	1.946	3.155	3.443
Cashflow	19910	0.065	0.037	0.055	0.083	0.044
Sales	19881	6.993	5.852	7.020	8.242	1.902
Debt	19885	4.067	2.583	5.288	6.884	4.130
Net working capital	19242	0.089	0.018	0.087	0.208	0.277
Market value	19917	7.232	6.038	7.149	8.442	1.879
Acquisition exp.	19943	0.031	0.000	0.000	0.026	0.069
Capital exp.	19943	0.068	0.026	0.047	0.086	0.064
R&D	19943	0.082	0.000	0.002	0.044	0.470
Industry std dev.	19923	0.100	0.038	0.059	0.100	0.223
Dividend	19950	0.539	0.000	1.000	1.000	0.499

Table 3. 2 Summary statistics by CEO connectedness

Table 3.2 reports summary statistics of all variables used in our baseline regression models by the varying level of CEO connectedness. The sample consists of all the S&P 1500 firms between 1990 and 2017 that pass the filters described in section 3.4.1. The control variables are: (1) Growth equals the ratio of the market value of the assets to net assets where the market value of the assets is measured as total market value plus book value of total liabilities.; (2) Cashflow is measured as the ratio of net income plus depreciation to net assets; (3) Sales is measured as the natural log of the total sales; (4) Debt is calculated as the natural log of the sum of long-term debt and current debt; (5) Market value is calculated as the natural log of the total market value of the firms; (6) NWC to assets is measured as the ratio of net working capital (current assets net of cash, short term investment, and current liabilities) to net assets; (7) Acquisition expenditure is calculated as the ratio of acquisition expenditures to net assets; (8) Capital Expenditure is measured as the ratio of total capital expenditures to net assets; (9) R&D is calculated as the ratio of research and development expenditures to net assets. For any missing value of research and development expenditures, it's set equal to zero; (10) Industry Sigma is calculated as the mean of standard deviations of cash flows to assets for 10 years and firms in the same industry defined by the same 2-digit SIC code; (11) Dividend is a dummy variable that takes the value of 1 when a firm distributes common dividends to shareholders in a year and zero otherwise. All the continuous control variables are winsorized at the 1st and 99th percentile.

	High CEO connectedness		Low CEO connectedness	
	Mean	Std. Dev.	Mean	Std. Dev.
Growth	3.254	3.753	2.865	3.090
Cashflow	0.064	0.044	0.065	0.043
Sales	7.464	2.003	6.522	1.668
Debt	4.863	4.092	3.272	4.013
NWC to assets	0.043	0.259	0.116	0.296
Market value	7.812	1.926	6.651	1.635
Acquisition exp.	0.039	0.067	0.032	0.071
Capital exp.	0.064	0.061	0.071	0.067
R&D	0.106	0.560	0.057	0.356
Industry std dev.	0.104	0.216	0.096	0.229
Dividend	0.581	0.493	0.496	0.500

Table 3. 3 Univariate analysis of CEO connectedness and cash holdings

Table 3.3 presents the univariate comparisons of different cash holdings proxies by the varying level of CEO connectedness. The sample consists of all the S&P 1500 firms between 1990 and 2017 that pass the filters described in section 3.4.1. The proxies of corporate cash holdings are (i) Dollar value of total cash (millions); (ii) Cash to net assets ratio; (iii) Cash to total assets ratio. High (low) CEO connectedness is a dummy that takes the value of 1 if CEOs' total connections are higher than the median connections each year and 0 otherwise.

	High CEO Connectedness (1)	**Low CEO Connectedness (2)**	**Mean Difference (1)-(2)**
Cash (Millions)	957.67***	194.23***	763.44***
Observations	9,965	9,978	
Cash to Net Assets	0.31***	0.26***	.05***
Observations	9,965	9,978	
Cash to Total Assets	.016***	.014***	.02***
Observations	9,965	9,978	

Table 3. 4 Multivariate analysis of CEO connectedness and cash holdings

Table 3.4 presents the OLS regressions of the estimates of the CEO connectedness and cash holdings. The sample consists of all the S&P 1500 firms between 1990 and 2017 that pass the filters described in section 3.4.1. In specifications (1)– (3), the dependent variable is the ratio of cash and equivalents to net assets. The main independent variable CEO connectedness is measured as the 1 plus natural log of the total number of connections the CEO of firm i has in the fiscal year t. The control variables are: (1) Growth equals the ratio of the market value of the assets to net assets where the market value of the assets is measured as total market value plus book value of total liabilities.; (2) Cashflow is measured as the ratio of net income plus depreciation to net assets; (3) Sales is measured as the natural log of the total sales; (4) Debt is calculated as the natural log of the sum of long-term debt and current debt; (5) Market value is calculated as the natural log of the total market value of the firms; (6) NWC to assets is measured as the ratio of net working capital (current assets net of cash, short term investment, and current liabilities) to net assets; (7) Acquisition expenditure is calculated as the ratio of acquisition expenditures to net assets; (8) Capital Expenditure is measured as the ratio of total capital expenditures to net assets; (9) R&D is calculated as the ratio of research and development expenditures to net assets. For any missing value of research and development expenditures, it's set equal to zero; (10) Industry Sigma is calculated as the mean of standard deviations of cash flows to assets for 10 years and firms in the same industry defined by the same 2-digit SIC code; (11) Dividend is a dummy variable that takes the value of 1 when a firm distributes common dividends to shareholders in a year and zero otherwise. All the continuous control variables are winsorized at the 1st and 99th percentile. All the specifications are adjusted for heteroskedasticity and in specification (3) standard errors are adjusted for firm clustering. ***, ** and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

	Base	**Time and industry dummy**	**Time and industry dummy with clustered standard errors**
	(1)	**(2)**	**(3)**
CEO connectedness	0.027***	0.019***	0.019***
	(14.024)	(9.505)	(3.208)
Growth	0.091***	0.094***	0.094***
	(90.233)	(89.358)	(22.287)
Cashflow	0.461***	0.773***	0.773***
	(7.172)	(11.103)	(3.721)
Sales	-0.019***	-0.012***	-0.012
	(-6.227)	(-3.403)	(-1.069)
Debt	-0.016***	-0.014***	-0.014***
	(-20.335)	(-17.241)	(-5.690)
NWC to assets	-0.200***	-0.224***	-0.224***
	(-19.336)	(-20.430)	(-3.926)
Market Value	-0.019***	-0.033***	-0.033***
	(-6.606)	(-10.343)	(-4.145)
Acquisition expenditure	-0.256***	-0.209***	-0.209***
	(-7.522)	(-6.229)	(-4.656)
Capital expenditure	-0.433***	-0.215***	-0.215**
	(-10.001)	(-4.463)	(-1.963)
R&D	0.217***	0.187***	0.187***
	(33.361)	(28.712)	(3.421)
Industry standard deviation	0.045***	0.006	0.006
	(4.107)	(0.532)	(0.768)
Dividend	-0.041***	-0.033***	-0.033***
Industry Fixed Effect	No	Yes	Yes
Time Fixed Effect	No	Yes	Yes
N	19,060	19,060	19,060
Adjusted R square	0.666	0.687	0.687

Table 3. 5 Propensity score matching

Table 3.5 presents the results of the propensity score matching (PSM) analysis of the estimates of CEO connectedness and cash holdings. The sample consists of all the S&P 1500 firms between 1990 and 2017 that pass the filters described in section 3.4.1. In specifications (1) – (6), the dependent variable is the ratio of cash and equivalents to net assets. The main independent variable CEO connectedness is measured as the 1 plus natural log of the total number of connections the CEO of firm i has in the fiscal year t. The control variables are: (1) Growth equals the ratio of the market value of the assets to net assets where the market value of the assets is measured as total market value plus book value of total liabilities.; (2) Cashflow is measured as the ratio of net income plus depreciation to net assets; (3) Sales is measured as the natural log of the total sales; (4) Debt is calculated as the natural log of the sum of long-term debt and current debt; (5) Market value is calculated as the natural log of the total market value of the firms; (6) NWC to assets is measured as the ratio of net working capital (current assets net of cash, short term investment, and current liabilities) to net assets; (7) Acquisition expenditure is calculated as the ratio of acquisition expenditures to net assets; (8) Capital Expenditure is measured as the ratio of total capital expenditures to net assets; (9) R&D is calculated as the ratio of research and development expenditures to net assets. For any missing value of research and development expenditures, it's set equal to zero; (10) Industry Sigma is calculated as the mean of standard deviations of cash flows to assets for 10 years and firms in the same industry defined by the same 2-digit SIC code; (11) Dividend is a dummy variable that takes the value of 1 when a firm distributes common dividends to shareholders in a year and zero otherwise. All the continuous control variables are winsorized at the 1st and 99th percentile. In specifications (1)-(3) the matching sample is constructed by matching each firm with a control firm. The control firm is a firm that is not managed by a network-powerful CEO (i.e, does not belong to the high CEO connection group), however, has a close propensity score to the treated firms based on the one-to-one nearest neighbor matching with replacement. To match the firms, we use covariates based on all the control variables in Table 3.4. Next, for each firm-year observation with a network-powerful CEO, we find a similar firm matched by a less-connected CEO based on the nearest neighbor matching technique. In specifications (4)-(6) the matching sample is constructed by matching each firm with a control firm based on total assets. Next, for each firm-year observation with a network-powerful CEO, we find a similar firm matched by a less-connected CEO based on the nearest neighbor matching technique. All the specifications are adjusted for heteroskedasticity and in the specification (3) and (6) standard errors are adjusted for firm clustering. ***, ** and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
CEO connectedness	0.032***	0.022***	0.022***	0.024***	0.015***	0.015***
	(10.382)	(6.839)	(3.135)	(9.026)	(5.654)	(2.782)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes
Industry fixed effect	No	Yes	Yes	No	Yes	Yes
Time Fixed effect	No	Yes	Yes	No	Yes	Yes
N	9,498	9,498	9,498	9,457	9,457	9,457
Adjusted R square	0.751	0.770	0.770	0.684	0.705	0.705

Table 3. 6 Alternate specifications of cash holdings

Table 3.6 presents the estimates of CEO connectedness and cash holdings for alternate models of cash holdings. The sample consists of all the S&P 1500 firms between 1990 and 2017 that pass the filters described in section 3.4.1. In specifications (1) the dependent variable is the natural logarithm of one plus cash to net assets ratio as an alternate proxy. In specification (2) the dependent variable is the cash to total assets ratio. The main independent variable CEO connectedness is measured as the 1 plus natural log of the total number of connections the CEO of firm i has in the fiscal year t. The control variables are: (1) Growth equals the ratio of the market value of the assets to net assets where the market value of the assets is measured as total market value plus book value of total liabilities.; (2) Cashflow is measured as the ratio of net income plus depreciation to net assets; (3) Sales is measured as the natural log of the total sales; (4) Debt is calculated as the natural log of the sum of long-term debt and current debt; (5) Market value is calculated as the natural log of the total market value of the firms; (6) NWC to assets is measured as the ratio of net working capital (current assets net of cash, short term investment, and current liabilities) to net assets; (7) Acquisition expenditure is calculated as the ratio of acquisition expenditures to net assets; (8) Capital Expenditure is measured as the ratio of total capital expenditures to net assets; (9) R&D is calculated as the ratio of research and development expenditures to net assets. For any missing value of research and development expenditures, it's set equal to zero; (10) Industry Sigma is calculated as the mean of standard deviations of cash flows to assets for 10 years and firms in the same industry defined by the same 2-digit SIC code; (11) Dividend is a dummy variable that takes the value of 1 when a firm distributes common dividends to shareholders in a year and zero otherwise. All the continuous control variables are winsorized at the 1st and 99th percentile. In all the specifications standard errors are adjusted for heteroskedasticity and firm clustering. ***, ** and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

	(1)	**(2)**
CEO connectedness	0.009***	0.007***
	(3.166)	(3.830)
Control variables	Yes	Yes
Industry fixed effect	Yes	Yes
Time Fixed effect	Yes	Yes
N	19,060	19,060
Adjusted R square	0.736	0.679

Table 3. 7 Alternate specifications of CEO connectedness

Table 3.7 presents the estimates of CEO connectedness and cash holdings for alternate models of cash holdings. The sample consists of all the S&P 1500 firms between 1990 and 2017 that pass the filters described in section 3.4.1. In specifications (1) -(2), the dependent variable is the ratio of cash and equivalents to net assets. CEO connectedness rank is the percentile position (rank) of a CEO based on his/her total connections in a given year. According to this measure, the position of a CEO in a social network hierarchy of S&P 1500 firms, varies from 1 to 100 with 1 being the least connected and 100 being the most connected. High CEO connectedness is a dummy that takes a value of 1 if the CEO connections are higher than the median value of the connections in a year and zero otherwise. The control variables are: (1) Growth equals the ratio of the market value of the assets to net assets where the market value of the assets is measured as total market value plus book value of total liabilities.; (2) Cashflow is measured as the ratio of net income plus depreciation to net assets; (3) Sales is measured as the natural log of the total sales; (4) Debt is calculated as the natural log of the sum of long-term debt and current debt; (5) Market value is calculated as the natural log of the total market value of the firms; (6) NWC to assets is measured as the ratio of net working capital (current assets net of cash, short term investment, and current liabilities) to net assets; (7) Acquisition expenditure is calculated as the ratio of acquisition expenditures to net assets; (8) Capital Expenditure is measured as the ratio of total capital expenditures to net assets; (9) R&D is calculated as the ratio of research and development expenditures to net assets. For any missing value of research and development expenditures, it's set equal to zero; (10) Industry Sigma is calculated as the mean of standard deviations of cash flows to assets for 10 years and firms in the same industry defined by the same 2-digit SIC code; (11) Dividend is a dummy variable that takes the value of 1 when a firm distributes common dividends to shareholders in a year and zero otherwise. All the continuous control variables are winsorized at the 1st and 99th percentile. In all the specifications standard errors are adjusted for heteroskedasticity and firm clustering. ***, ** and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

	(1)	**(2)**
CEO connectedness rank	0.001***	
	(3.802)	
High CEO connectedness		0.043***
		(3.892)
Control variables	Yes	Yes
Industry fixed effect	Yes	Yes
Time Fixed effect	Yes	Yes
N	19,060	19,060
Adjusted R square	0.687	0.687

Table 3. 8 Firm fixed effect

Table 3.8 shows the OLS regressions of the estimates of the CEO connectedness and cash holdings after controlling for firm-fixed effects. The sample consists of all the S&P 1500 firms between 1990 and 2017 that pass the filters described in section 3.4.1. In specifications (1)-(3), the dependent variable is the ratio of cash and equivalents to net assets. The main independent variable CEO connectedness is measured as the 1 plus natural log of the total number of connections the CEO of firm i has in the fiscal year t. The control variables are: (1) Growth equals the ratio of the market value of the assets to net assets where the market value of the assets is measured as total market value plus book value of total liabilities.; (2) Cashflow is measured as the ratio of net income plus depreciation to net assets; (3) Sales is measured as the natural log of the total sales; (4) Debt is calculated as the natural log of the sum of long-term debt and current debt; (5) Market value is calculated as the natural log of the total market value of the firms; (6) NWC to assets is measured as the ratio of net working capital (current assets net of cash, short term investment, and current liabilities) to net assets; (7) Acquisition expenditure is calculated as the ratio of acquisition expenditures to net assets; (8) Capital Expenditure is measured as the ratio of total capital expenditures to net assets; (9) R&D is calculated as the ratio of research and development expenditures to net assets. For any missing value of research and development expenditures, it's set equal to zero; (10) Industry Sigma is calculated as the mean of standard deviations of cash flows to assets for 10 years and firms in the same industry defined by the same 2-digit SIC code; (11) Dividend is a dummy variable that takes the value of 1 when a firm distributes common dividends to shareholders in a year and zero otherwise. All the continuous control variables are winsorized at the 1st and 99th percentile. In all the specifications standard errors are adjusted for heteroskedasticity and firm clustering. ***, ** and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

	(1)	**(2)**	**(3)**
CEO connectedness	0.026***		
	(5.042)		
CEO connectedness rank		0.000***	
		(3.747)	
High CEO connectedness			0.017***
			(2.947)
Control variables	Yes	Yes	Yes
Industry fixed effect	Yes	Yes	Yes
Time Fixed effect	Yes	Yes	Yes
N	19,050	19,050	19,050
Adjusted R square	0.791	0.790	0.790

Table 3. 9 Controlling for managerial attributes

Table 3.9 presents the OLS regressions of the estimates of the CEO connectedness and cash holdings after controlling for different managerial attributes. The sample consists of all the S&P 1500 firms between 1990 and 2017 that pass the filters described in section 3.4.1. In specifications (1)-(7), the dependent variable is the ratio of cash and equivalents to net assets. The main independent variable CEO connectedness is measured as the 1 plus natural log of the total number of connections the CEO of firm i has in the fiscal year t. The control variables are: (1) Growth equals the ratio of the market value of the assets to net assets where the market value of the assets is measured as total market value plus book value of total liabilities.; (2) Cashflow is measured as the ratio of net income plus depreciation to net assets; (3) Sales is measured as the natural log of the total sales; (4) Debt is calculated as the natural log of the sum of long-term debt and current debt; (5) Market value is calculated as the natural log of the total market value of the firms; (6) NWC to assets is measured as the ratio of net working capital (current assets net of cash, short term investment, and current liabilities) to net assets; (7) Acquisition expenditure is calculated as the ratio of acquisition expenditures to net assets; (8) Capital Expenditure is measured as the ratio of total capital expenditures to net assets; (9) R&D is calculated as the ratio of research and development expenditures to net assets. For any missing value of research and development expenditures, it's set equal to zero; (10) Industry Sigma is calculated as the mean of standard deviations of cash flows to assets for 10 years and firms in the same industry defined by the same 2-digit SIC code; (11) Dividend is a dummy variable that takes the value of 1 when a firm distributes common dividends to shareholders in a year and zero otherwise. CEO gender is a dummy variable that takes the value of 1 if the firm is managed by a female CEO and 0 otherwise. Managerial ability is the managerial ability index developed by Demerjian et al. (2012) as a proxy for managerial ability. CEO pay slice, the fraction of the aggregate compensation of the top-five executive team captured by the CEO pay slice. CEO duality, a dummy variable that takes a value of 1 when the CEO is also chairman of the board and O otherwise. CEO age is measured as the natural log of the age of the CEO. CEO tenure is the natural log of the tenure of the CEO. All the continuous control variables are winsorized at the 1st and 99th percentile. In all the specifications standard errors are adjusted for heteroskedasticity and firm clustering. ***, ** and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**
CEO connectedness	0.018***	0.022***	0.011**	0.019***	0.019***	0.019***	0.021***
	(3.028)	(3.197)	(2.157)	(3.208)	(3.178)	(3.176)	(2.820)
CEO gender	0.071						0.190
	(1.115)						(1.318)
Managerial ability		-0.196***					-0.200***
		(-3.932)					(-3.980)
CEO pay slice			0.046**				0.047*
			(2.069)				(1.693)
CEO duality				-0.004			-0.002
				(-0.496)			(-0.232)
CEO age					-0.024		-0.062
					(-0.568)		(-1.050)
CEO tenure						-0.002	0.004
						(-0.339)	(0.466)
Control Variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	19,060	11,762	19,060	19,060	18,988	19,060	11,721
Adjusted R square	0.687	0.705	0.721	0.687	0.689	0.687	0.708

Table 3. 10 Investment regimes

Table 3.10 presents the OLS regressions of the estimates of the CEO connectedness and corporate cash holdings for different investment regimes. The sample consists of all the S&P 1500 firms between 1990 and 2017 that pass the filters described in section 3.4.1. Both in Panel A and B, the dependent variable is the ratio of cash and equivalents to net assets. variable In Panel A CEO connectedness is measured as the 1 plus natural log of the total number of connections the CEO of firm i has in the fiscal year t. In Panel B High CEO connectedness is a dummy that takes a value of 1 if the CEO connections are higher than the median value of the connections in a year and zero otherwise. Both in Panel A and B, the control variables are: (1) Growth equals the ratio of the market value of the assets to net assets where the market value of the assets is measured as total market value plus book value of total liabilities.; (2) Cashflow is measured as the ratio of net income plus depreciation to net assets; (3) Sales is measured as the natural log of the total sales; (4) Debt is calculated as the natural log of the sum of long-term debt and current debt; (5) Market value is calculated as the natural log of the total market value of the firms; (6) NWC to assets is measured as the ratio of net working capital (current assets net of cash, short term investment, and current liabilities) to net assets; (7) Acquisition expenditure is calculated as the ratio of acquisition expenditures to net assets; (8) Capital Expenditure is measured as the ratio of total capital expenditures to net assets; (9) R&D is calculated as the ratio of research and development expenditures to net assets. For any missing value of research and development expenditures, it's set equal to zero; (10) Industry Sigma is calculated as the mean of standard deviations of cash flows to assets for 10 years and firms in the same industry defined by the same 2-digit SIC code; (11) Dividend is a dummy variable that takes the value of 1 when a firm distributes common dividends to shareholders in a year and zero otherwise. Investment spikes is a dummy variable that takes the value of 1 for observations with investment rates greater than 50% and 0 otherwise. We define an investment spike when the investment rate exceeds 50%. All the continuous control variables are winsorized at the 1st and 99th percentile. In all the specifications standard errors are adjusted for heteroskedasticity and firm clustering. ***, ** and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel A	**Investment spikes**	**Low investment regime (1-Investment spikes)**
	(1)	**(2)**
CEO connectedness	0.000	0.021***
	(0.081)	(3.327)
Control variables	Yes	Yes
Industry fixed effect	Yes	Yes
Time Fixed effect	Yes	Yes
N	2,468	16,592
Adjusted R square	0.517	0.695

Panel B	**(1)**	**(2)**
Investment spikes	-0.011	-0.057***
	(-0.749)	(-2.833)
Cashflow	0.939***	0.621***
	(12.893)	(6.559)
Investment spikes*cashflow	-0.572***	0.214
	(-3.547)	(0.900)

High CEO connectedness		0.009
		(1.010)
High CEO connectedness*Investment spikes		0.088***
		(3.221)
High CEO connectedness*Cashflow		0.553***
		(4.781)
High CEO connectedness*Investment spikes *Cashflow		-1.466***
		(-4.617)
Control variables	Yes	Yes
Industry fixed effect	Yes	Yes
Time fixed effect	Yes	Yes
N	19,060	19,060
Adjusted R square	0.687	0.688

Table 3. 11 Financial constraint status

Table 3.11 presents the OLS regressions of the estimates of the CEO connectedness and corporate cash holdings for different investment regimes. The sample consists of all the S&P 1500 firms between 1990 and 2017 that pass the filters described in section 3.4.1. In specifications (1)-(8), the dependent variable is the ratio of cash and equivalents to net assets. The main independent variable CEO connectedness is measured as the 1 plus natural log of the total number of connections the CEO of firm i has in the fiscal year t. The control variables are: (1) Growth equals the ratio of the market value of the assets to net assets where the market value of the assets is measured as total market value plus book value of total liabilities.; (2) Cashflow is measured as the ratio of net income plus depreciation to net assets; (3) Sales is measured as the natural log of the total sales; (4) Debt is calculated as the natural log of the sum of long-term debt and current debt; (5) Market value is calculated as the natural log of the total market value of the firms; (6) NWC to assets is measured as the ratio of net working capital (current assets net of cash, short term investment, and current liabilities) to net assets; (7) Acquisition expenditure is calculated as the ratio of acquisition expenditures to net assets; (8) Capital Expenditure is measured as the ratio of total capital expenditures to net assets; (9) R&D is calculated as the ratio of research and development expenditures to net assets. For any missing value of research and development expenditures, it's set equal to zero; (10) Industry Sigma is calculated as the mean of standard deviations of cash flows to assets for 10 years and firms in the same industry defined by the same 2-digit SIC code; (11) Dividend is a dummy variable that takes the value of 1 when a firm distributes common dividends to shareholders in a year and zero otherwise. A firm is classified as constrained (unconstrained) based on: i) Long term debt rating. Financially constrained firms are those that have positive debt in their balance sheet but never had their public debt rated during our sample period. Financially unconstrained are firms whose debt has been rated at least once during our sample period; ii) Commercial paper. The financially constrained firms have positive debt but never had their commercial paper rated in our sample period whereas the financially unconstrained firms had their commercial papers rated at least once during our sample period; (iii) Firm size. Firms are as financially constrained when it belongs to the top quartile of the total assets and financially unconstrained when it belongs to the bottom quartile of the total assets. All the continuous control variables are winsorized at the 1st and 99th percentile. In all the specifications standard errors are adjusted for heteroskedasticity and firm clustering. ***, ** and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

	Long term Debt Rating		**Commercial Paper**		**Firm Size**	
	Financially Constrained	**Financially unconstrained**	**Financially Constrained**	**Financially unconstrained**	**Financially Constrained**	**Financially unconstrained**
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
CEO connectedness	0.016***	-0.003	0.015***	0.003	0.023**	0.006
	(2.744)	(-1.015)	(3.299)	(0.514)	(1.976)	(1.525)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes
Industry fixed effect	Yes	Yes	Yes	Yes	Yes	Yes
Time Fixed effect	Yes	Yes	Yes	Yes	Yes	Yes
N	7,707	8,390	12,496	3,501	4,849	4,589
Adjusted R square	0.692	0.669	0.688	0.501	0.709	0.652

Table 3. 12 Corporate governance

Table 3.12 presents the OLS regressions of the estimates of the CEO connectedness and corporate cash holdings for sub-samples of corporate governance mechanism. The sample consists of all the S&P 1500 firms between 1990 and 2017 that pass the filters described in section 3.4.1. In specifications (1)-(2), the dependent variable is the ratio of cash and equivalents to net assets. The main independent variable CEO connectedness is measured as the 1 plus natural log of the total number of connections the CEO of firm i has in the fiscal year t. The control variables are: (1) Growth equals the ratio of the market value of the assets to net assets where the market value of the assets is measured as total market value plus book value of total liabilities.; (2) Cashflow is measured as the ratio of net income plus depreciation to net assets; (3) Sales is measured as the natural log of the total sales; (4) Debt is calculated as the natural log of the sum of long-term debt and current debt; (5) Market value is calculated as the natural log of the total market value of the firms; (6) NWC to assets is measured as the ratio of net working capital (current assets net of cash, short term investment, and current liabilities) to net assets; (7) Acquisition expenditure is calculated as the ratio of acquisition expenditures to net assets; (8) Capital Expenditure is measured as the ratio of total capital expenditures to net assets; (9) R&D is calculated as the ratio of research and development expenditures to net assets. For any missing value of research and development expenditures, it's set equal to zero; (10) Industry Sigma is calculated as the mean of standard deviations of cash flows to assets for 10 years and firms in the same industry defined by the same 2-digit SIC code; (11) Dividend is a dummy variable that takes the value of 1 when a firm distributes common dividends to shareholders in a year and zero otherwise. We use the entrenchment (E) index by Bebchuck et al. (2009) to proxy for the quality of the corporate governance of the firm. Bebchuck et al. (2009). Good governance is a dummy that takes the value of 1 if the firm belongs to the bottom tercile of the entrenchment index and 0 otherwise. Weak governance, a dummy variable that takes the value of 1 if it does not belong to the good governance, and 0 otherwise. All the continuous control variables are winsorized at the 1st and 99th percentile. In all the specifications standard errors are adjusted for heteroskedasticity firm clustering. ***, ** and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

	Good governance	**Weak governance**
	(1)	**(2)**
CEO connectedness	0.009	0.019***
	(0.666)	(3.374)
Control variables	Yes	Yes
Industry fixed effect	Yes	Yes
Time Fixed effect	Yes	Yes
N	2,898	16,162
Adjusted R square	0.550	0.704

Table 3. 13 Institutional investor monitoring

Table 3.13 presents the OLS regressions of the estimates of the CEO connectedness and corporate cash holdings for sub-samples of institutional investor monitoring. The sample consists of all the S&P 1500 firms between 1990 and 2017 that pass the filters described in section 3.4.1. In specifications (1)-(4), the dependent variable is the ratio of cash and equivalents to net assets. The main independent variable CEO connectedness is measured as the 1 plus natural log of the total number of connections the CEO of firm i has in the fiscal year t. The control variables are: (1) Growth equals the ratio of the market value of the assets to net assets where the market value of the assets is measured as total market value plus book value of total liabilities.; (2) Cashflow is measured as the ratio of net income plus depreciation to net assets; (3) Sales is measured as the natural log of the total sales; (4) Debt is calculated as the natural log of the sum of long-term debt and current debt; (5) Market value is calculated as the natural log of the total market value of the firms; (6) NWC to assets is measured as the ratio of net working capital (current assets net of cash, short term investment, and current liabilities) to net assets; (7) Acquisition expenditure is calculated as the ratio of acquisition expenditures to net assets; (8) Capital Expenditure is measured as the ratio of total capital expenditures to net assets; (9) R&D is calculated as the ratio of research and development expenditures to net assets. For any missing value of research and development expenditures, it's set equal to zero; (10) Industry Sigma is calculated as the mean of standard deviations of cash flows to assets for 10 years and firms in the same industry defined by the same 2-digit SIC code; (11) Dividend is a dummy variable that takes the value of 1 when a firm distributes common dividends to shareholders in a year and zero otherwise. The proxies for the institutional investor monitoring are: 1) High institutional ownership, a dummy variable equals to 1 if top 5 institutional ownership is greater than the 75th percentile and 0 otherwise; 2) Low institutional ownership, a dummy variable equals to 1 if top 5 institutional ownership is lower than the 25th percentile and 0 otherwise; 3) High blockholder ownership: a dummy variable equals if block holder ownership variable is higher than the 75th percentile value of our sample and 0 otherwise; 4) Low blockholder ownership: a dummy variable equals if block holder ownership variable is less than the 25th percentile value of our sample and 0 otherwise. All the continuous control variables are winsorized at the 1st and 99th percentile. In all the specifications standard errors are adjusted for heteroskedasticity and firm clustering. ***, ** and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

	Low IO	**High IO**	**Low Blockholder**	**High Blockholder**
	(1)	**(2)**	**(3)**	**(4)**
CEO connectedness	0.012**	0.001	0.019***	0.007
	(2.278)	(0.090)	(3.671)	(0.652)
Control variables	Yes	Yes	Yes	Yes
Industry fixed effect	Yes	Yes	Yes	Yes
Time Fixed effect	Yes	Yes	Yes	Yes
N	3,129	3,185	3,479	3,531
Adjusted R square	0.631	0.730	0.663	0.734

Table 3. 14 Cash Regimes

Table 3.14 presents the OLS regressions of the estimates of the CEO connectedness and corporate cash holdings for sub-samples of cash regimes. The sample consists of all the S&P 1500 firms between 1990 and 2017 that pass the filters described in section 3.4.1. In specifications (1)-(2), the dependent variable is the ratio of cash and equivalents to net assets. The main independent variable CEO connectedness is measured as the 1 plus natural log of the total number of connections the CEO of firm i has in the fiscal year t. The control variables are: (1) Growth equals the ratio of the market value of the assets to net assets where the market value of the assets is measured as total market value plus book value of total liabilities.; (2) Cashflow is measured as the ratio of net income plus depreciation to net assets; (3) Sales is measured as the natural log of the total sales; (4) Debt is calculated as the natural log of the sum of long-term debt and current debt; (5) Market value is calculated as the natural log of the total market value of the firms; (6) NWC to assets is measured as the ratio of net working capital (current assets net of cash, short term investment, and current liabilities) to net assets; (7) Acquisition expenditure is calculated as the ratio of acquisition expenditures to net assets; (8) Capital Expenditure is measured as the ratio of total capital expenditures to net assets; (9) R&D is calculated as the ratio of research and development expenditures to net assets. For any missing value of research and development expenditures, it's set equal to zero; (10) Industry Sigma is calculated as the mean of standard deviations of cash flows to assets for 10 years and firms in the same industry defined by the same 2-digit SIC code; (11) Dividend is a dummy variable that takes the value of 1 when a firm distributes common dividends to shareholders in a year and zero otherwise. Raising regime is a dummy that takes a value of 1 if a firm issues equity and does not pay dividends, 0 otherwise. Distributing regime, a dummy variable that takes the value of 1 if a firm does not belong to the raising regime, and distributes dividends, 0 otherwise. All the continuous control variables are winsorized at the 1st and 99th percentile. In all the specifications standard errors are adjusted for heteroskedasticity and firm clustering. ***, ** and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

	Raising Regime	**Distributing Regime**
	(1)	**(2)**
CEO connectedness	0.037***	-0.015***
	(3.948)	(-8.036)
Control variables	Yes	Yes
Industry fixed effect	Yes	Yes
Time Fixed effect	Yes	Yes
N	1,744	10,292
Adjusted R square	0.789	0.524

Chapter 4: CEO connectedness and the marginal value of cash

4.1 Introduction

The systematic increase in cash holdings by U.S. public companies has been the focal point of discussion among the financial press, policymakers, and academics (Bates et al., 2018). Despite having significant opportunity costs, the average cash holdings by U.S. firms have increased significantly in recent decades (Bates et al., 2009). At the end of the fiscal year 2015, the total cash holdings by the listed US firms are nearing $2.3 trillion, almost 12.5% of the annual U.S GDP (Ward et al., 2018). More recently, Bates et al. (2018) find that the average marginal value of cash of the US public firms is also increasing over the decades, primarily due to the investment opportunity set and cashflow volatility, the secular trends in product market competition, credit market risk, and within-firm diversification. The increase in the secular trend in the aggregate cash level and the value of cash means the managerial agency problems are also under the spotlight than before as the decisions related to how much cash would be held and where the cash would be utilized primarily remain strictly at the discretion of the top management (i.e., the CEO).

Faulkender and Wang (2006) and Pinkowitz et al. (2006) first introduce the concept of the marginal value of cash, the value that the market assigns to each additional dollar of cash held by the corporations[13]. How shareholders would react to the changes in corporate liquidity policy is primarily shaped by two related factors: i) What influences the managers to increase the liquidity position? ii) What is the value of the increased cash holdings for the corporation's investors? In a frictionless market when CEOs and investors both share a similar belief then the marginal value of a dollar in cash for shareholders should be exactly $1, implying that the cost of holding an additional dollar should equal its forecasted benefit. However, recent studies in behavioral corporate find that different managerial attributes and biases such as age (Serfling, 2014), gender (Liang et al., 2018; Zeng and Wang, 2015), risk-

[13]Building on these pioneering studies, the extant literature documents that the cross-sectional variation in the marginal value of cash is driven by either the increased information asymmetry in the market or the agency conflict arising from the misalignment of managerial and shareholders' interests. In particular, financial leverage and tax implications of corporate payout decisions (Faulkender and Wang, 2006), financial constraint status (Denis and Sibilkov, 2010), corporate governance (Dittmar and Mahrt-Smith, 2007), and loss of analyst coverage (Chen et al., 2015) significantly affect the value of cash.

taking propensity (Liu and Mauer, 2011), insider debt (Liu et al., 2014), optimism (Huang-Meier et al., 2016) and overconfidence (Deshmukh et al., 2018) shape the decisions related to corporate liquidity policies. Consequently, these managers may end up holding cash at a level that is not aligned with the shareholders' wealth maximization. This study contributes to the behavioral line of inquiry by examining the influence of CEO connectedness, the relative position of a CEO in the social network hierarchy, on the marginal value of cash. Specifically, the study asks what is the value that the market assigns to one additional dollar held by a network-powerful CEO.

As the principal decision-maker of the firm, a CEO is responsible for setting the future direction of the firm. Meaning, the strategies related to corporate liquidity also remain primarily under these top managers' discretion. They can even hoard the cash in the form of excessive salaries and benefits or invest in projects that are not aligned with shareholders' wealth maximization. However, the extent to which a CEO can implement his managerial vision also depends on his power to convince the board and other important stakeholders. There is an increasing debate on the role of the CEO's social network position in shaping different firm-level decisions. In the context of corporate liquidity management, the CEO social network position could be an important source of variation as it could lead to increased uncertainty among the investors regarding the outcomes attributed to the increased cash holdings. However, the relationship between such CEO connectedness and the value of cash is unclear ex-ante. Depending on the decision setting, each additional dollar held by a more connected CEO can have both value destructing or value-enhancing outcomes for the firms. Similar to our predictions in Chapter 3, we propose two alternate scenarios: (i) Reduced information asymmetry and (ii) CEO power hypothesis to test the moderating role of the well-connected CEOs on the marginal value of cash.

The reduced information asymmetry hypothesis focusing on the trust and information dissemination dimensions of social capital (Dasgupta, 1988; Fukuyama, 1995) posits that increased trust among the network members lowers the risk of incomplete transactions (Grossman and Hart, 1986). Moreover, the primary benefit of increased social ties that it creates an environment of enhanced trust and moral values for the participants within that network. Social capital can also improve economic efficiency in decision makings through effectively disseminating the information within their network (Larcker et

al., 2013; Schonlau and Singh, 2009). Moreover, increased trust among economic agents means that individuals allocate more resources on the productive inputs, instead of diverting resources against violation of laws and rights. Information shared within a network also works as a mechanism of peer influence to moderate managerial decision-making (DeMarzo et al., 2003; Ellison and Fudenberg, 1995). The increased personal connections provide a better platform for exchanging information, the transmission of knowledge, ideas, or even private information resulting in better loan deals, fewer covenant restrictions, higher R&D expenditures with more patent citations (Engelberg et al., 2012; Faleye et al., 2014; Fogel et al., 2018). Hence, under the reduced information asymmetry framework, having a well-connected CEO on board should be associated with more efficient decision-making resulting in a positive marginal value of cash.

On the other hand, the extensive literature on the origination of social power finds individuals with more influential connections in their social circle to be more powerful. Raven (1993) proposes the informational ability or social influence as the core bases of power along with coercion, expertise, charisma, authority, and rewards. Keltner et al. (2003) give a definition of power based on the individual's ability to change the state of others by providing or withholding social and financial resources. Moreover, as powerful individuals have greater access to resources, they face less interference and social consequences (Keltner et al., 2003). Similarly, in the context of the social network, a CEO positioned higher in the social network hierarchy is considered more powerful for having greater access to exclusive information, resources, investment opportunities, or even insider information from their superior connections. Subsequently, this power also grows once a CEO gains more influential connections in his network, giving him greater access to exclusive information (Rowley, 1997).

The approach inhabitation theory of power by Keltner et al. (2003) is primarily motivated by the finding that elevated power makes individuals corrupt (Kipnis, 1972; Rind and Kipnis, 1999). According to the approach inhabitation theory of power (Keltner et al., 2003), the behavioral cognition process of powerful CEOs is fundamentally different from that of the CEOs positioned lower in the social network hierarchy. Elevated power triggers the behavioral approach inhabitation system which is responsible for instilling the positive attitudes and emotions within the individuals that facilitate the pursuit of different goals and

rewards (Sutton and Davidson, 1997). Moreover, a network -powerful CEO can use his elevated position in the social network to enjoy greater bargaining power, more loyalty, and conformity in the boardroom to steer different corporate policies and board decisions in their favor. Moreover, following failed corporate decisions; more connected managers can utilize their superior channels to improve their chances of re-employment, should they lose their jobs (Cingano and Rosolia, 2012; Mazerolle and Singh, 2004). For network-powerful managers, free of social consequences, shareholder wealth maximization is only a choice as they have substantial decision-making power over the investments made. Keeping these findings as our backdrop, the CEO power hypothesis predicts that network-powerful CEOs taking personal reward-driven investment decisions create agency problems for the corporations and on average fail to create value for the shareholders in the long run. In other words, each additional dollar held by network-powerful CEOs may increase firm value by less than a dollar.

To test these predictions, we construct the main independent variable CEO connectedness for S&P 1500 firms using the BoardEx database which provides biographical information on current and past employment, the education, and other social activities of top corporate executives. The variable CEO connectedness captures the direct ties that the CEOs have with other members of the network based on three facets of social interaction: common education, employment, and social history. For the sample period of 1990 to 2017, CEO connectedness is constructed at the beginning of each year. In other words, CEO connectedness varies with both time and firms. Once a connection is formed, two individuals stay connected for the rest of the sample period. Effectively, the total number of connections does not decrease over time. Lastly, the main dependent variable high CEO connectedness takes a value of 1, if the total CEO connections are higher than the yearly median value and zero otherwise. The measure of CEO connectedness varies with both time and firms. The benefit of using the high CEO connectedness dummy as the main independent variable is the ease of interpretation. While the coefficient on CEO connectedness (degree centrality), the total number of personal connections a CEO has, will only tell us whether improved connection affects the marginal value of cash or not, the high CEO connectedness variable allows us to empirically investigate what is the marginal value of cash of an average firm managed by a network-powerful CEO compared to an average firm managed by a less-connected (network-weak) CEO.

To construct the estimates of our main dependent variable, the marginal value of cash, we follow the methodology introduced by Faulkender and Wang (2006). For each fiscal year t, the dependent variable captures a stock i's excess return over the stock i's benchmark return portfolio. Following the works of Grinblatt and Moskowitz (2004) and Daniel and Titman (1997), we take benchmark portfolios as the Fama-French (1993) 25-value-weighted portfolios constructed by the univariate sorting of the stocks based on the firm size and book-to-market value measures. The empirical results support our CEO power hypothesis. Controlling for the known determinants of the marginal value of cash in Faulkender and Wang (2006), the results from the baseline multivariate regression models confirm that increased CEO connectedness negatively affects the value of cash. In economic terms, each additional dollar held by the network-powerful CEOs results in a loss of 44 cents for the shareholders compared to the firm managed by less-connected peers.

To give further validation to the CEO power hypothesis, this study also makes predictions related to the economic mechanisms driving this negative association between CEO connectedness and the value of cash. First. we test for a direct link between the investment behavior of the network powerful CEOs and the marginal value of cash. In a recent study, Tsoukalas et al. (2017) propose a nonlinear model of corporate cash holdings on the premise that corporations tend to invest in lumps. Corporations save cash during the low-investment periods to fund their large investments during the investment spikes. In the context of this study, if the CEO power hypothesis truly holds, we expect the explanatory power of the CEO connectedness on the value of cash to vary based on the investment regimes. In particular, the negative coefficient on the CEO connectedness should be driven by the value-destroying investments made by the network powerful CEOs during the investment spikes. Indeed, we find that the negative effect of CEO connectedness on the value of cash is confined to the large investment spikes.

Second, the study looks into the moderating role of the quality of the corporate governance mechanism of the firms. For the managers, shareholder wealth maximization is only a choice and they are not obligated to do so. According to the agency theory of corporate cash holdings by Jensen (1986), in the presence of agency costs, powerful managers like to steer different corporate decisions in their favor by keeping a higher portion of the firm's

assets under their direct control [14]. Similarly, a network -powerful CEO can use his elevated position in the social network to enjoy greater bargaining power, more loyalty, and conformity in the boardroom to steer different corporate policies and board decisions in their favor. The goal-driven value destructive behavior of the network powerful CEOs should be stronger for the firms where the quality of the corporate governance is already weak. Consequently, the study predicts that the negative association between CEO connectedness and value of cash should be stronger for the sub-sample of firms with weak corporate governance. By taking E-index by Bebchuk et al. (2009) as the proxy of the quality of corporate governance, we find evidence to support our conjecture.

For the third test related to disentangling the economic mechanism, we investigate the moderating role of institutional ownership on the relationship between CEO connectedness and the value of cash. The role of institutional investors is particularly important due to its unprecedented growth in the US stock market in recent years Ward et al. (2018) show that increased institutional investor monitoring can reduce the agency conflict between the managers and investors which in turn results in a positive value of cash. In the absence of active monitoring by the strong institutional owners, managers are more likely to get away with raising additional cash for the value-destructive investments. Similarly, in our context, we expect the positive association of network-powerful managers on the cash level to be stronger for the firm-year observations with weak institutional monitoring. By taking two proxies of institutional investor monitoring based on top 5 institutional ownership and blockholder ownership, the results support the conjecture.

Lastly, following Halford et al. (2017) we further control for the different cash regimes. Halford et al. (2017) state that it is imperative to control for the different cash regimes when testing the significance of the marginal value of cash. The failure to do so may lead to a biased estimation of the role of CEO connectedness on the value of cash. Intuitively, we expect that the CEO power hypothesis to dominate in the distributing cash regimes than

[14] For example, Harford (1999) finds that firms with superior cash holding engages in more acquisitions but fail to create value for the firm in the process.

the raising cash regimes. Supporting our prediction, we find that the negative effect of network-powerful CEOs on the value of cash is strongest in distributing cash regimes.

Next, we do several robustness tests to validate the findings. First, we recognize that network-powerful CEOs in different corporations may not be distributed randomly. In that case, firms managed by high-centrality CEOs should be fundamentally different from the firms managed by less-connected CEOs. To account for such inconsistencies, we conduct the propensity score matching (PSM) analysis. In particular, we follow the method suggested by Drucker and Puri (2005) to construct a sample of firms managed by network-powerful CEOs (the treatment group) with similar characteristics to the less-connected CEOs (the control group). This method should take care of the potential biases while estimating the average treatment effects (Imbens and Wooldridge, 2009; Rosenbaum and Rubin, 1985). The matching sample is constructed by matching each firm with a control firm. The control firm is a firm that is not managed by a network-powerful CEO (i.e., does not belong to the high CEO connection group), however, has a close propensity score to the treated firms based on the one-to-one nearest neighbor matching with replacement. The results from the PSM analysis confirm that the negative association between CEO connectedness and value of cash remains robust for the matched sample, meaning the negative effect of the CEO connectedness on the marginal value of cash is not driven by any functional form misspecification biases.

Second, to address the potential critique that our results in the baseline regression models are driven by unobserved firm heterogeneity we include the firm-fixed effect in the baseline regression models. If the estimated coefficient on the interaction variable between CEO connectedness and change in cash is primarily due to the unobserved firm heterogeneity, then the strength of the coefficient should go down once controlling for the firm-fixed effect. The results remain both statistically significant and economically meaningful even after controlling for the firm-fixed effect. Third, to control for the possibility that our main independent variable high CEO connectedness can capture other unobserved CEO specific factors which may ultimately drive the negative association between CEO connectedness and the value of cash, we control for a series of managerial attributes such as the managerial ability, CEO gender, CEO pay slice, CEO duality, and CEO

age. Our baseline regression results hold even after controlling for all these managerial attributes.

For the fourth robustness test, we control for an alternate valuation model of the value of cash. In particular, we follow the valuation model introduced in Pinkowitz and Williamson (2004) and Pinkowitz et al. (2006) which uses the market-to-book-assets ratio as the dependent variable. The results confirm that the coefficient on the interaction between CEO connectedness and the value of cash remains strongly negative and economically meaningful even in the valuation model prescribed by Pinkowitz et al. (2006). For the fifth robustness test, we use alternate definitions of CEO connectedness. In particular, we use degree centrality measured as the natural logarithm of the total number of connections a CEO has in a particular year and CEO connectedness rank which captures the change in the cash holdings with a one-unit change in the comparative position of a CEO in the social network hierarchy. The results confirm that the alternate proxies of CEO connectedness remain negative and statistically significant in explaining the marginal value of cash.

Finally, we control for firm-level exposure to credit risk and total risk. (Ferris et al., 2017) find that well-connected CEOs are associated with riskier firms and corporate policies. Riskier firms, however, accumulate optimally higher cash reserves (Acharya et al., 2013) which may result in a negative value of cash for the corporation. The study uses the interest coverage ratio measured as the pretax income plus depreciation and amortization plus interest and related expense divided by the interest and related expense, as an inverse proxy for credit risk and the total risk measured as the standard deviation of monthly stock returns of the previous 24 months. The results remain consistent even after controlling for the risk exposures of the firms.

The study makes meaningful contributions to the existing literature. First, it contributes to the enriched literature of corporate cash holdings and the marginal value of cash. Previous literature shows that different firm- and CEO-level factors like financial constraint status (Faulkender and Wang, 2006), corporate governance (Dittmar and Mahrt-Smith, 2007), institutional ownership monitoring (Ward et al., 2018), CEO overconfidence (Aktas et al., 2019), CEO risk-taking incentives (Liu and Mauer, 2011) and cash regimes (Halford, et al., 2017) affects the value of cash. After controlling for the majority of these

known determinants of corporate cash holdings and in turn marginal value of cash, we document that increased CEO connectedness negatively affects the marginal value of cash. Moreover, the negative association is stronger in presence of investment spikes, distributing cash regimes, weak corporate governance, and weak institutional investor monitoring.

Second, we contribute to the growing debate on the literature regarding the key question, Are firms better off with well-connected CEOs? More specifically, we examine the role of CEO connectedness on the value of cash, the value that the market assigns to each additional dollar of cash holding by the managers (Faulkender and Wang, 2006; Pinkowitz et al., 2006). Intuitively, a strategically important decision like cash holdings provides an important platform to study to role of CEO connectedness. Liquidity management is not necessarily a stand-alone corporate strategy and plays a significant role in shaping other crucial corporate decisions like mergers (Almeida et al., 2011; Harford, 1999), R&D expenditures (Brown et al., 2009; Brown and Petersen, 2011), entries to new markets (Fresard, 2010) and investments in general (Almeida et al., 2004; Fazzari et al., 1988). We borrow the theoretical predictions from the approach inhabitation theory of power by Keltner et al. (2003) to give a behavioral explanation of the value-destroying investment behavior of the network-powerful managers.

Third, our study further contributes to the literature of different motives behind corporate cash holdings. For the managers, shareholder wealth maximization is only a choice, and they are not obligated to do so. This is especially true when managers have substantial decision-making power over the have incentives to see firms grow as it increases resources under their control (Murphy, 1985). Now, network-powerful CEOs showing increased attentiveness to individual rewards instead of maximizing shareholder's wealth can create agency costs for the shareholders (Jensen, 1986). We report that, in the presence of agency rift, the network powerful fails to create any value for investors with excess cash held by them.

Fourth, this study contributes to the literature related to CEO power and financial outcomes as well. Previous studies related to CEO power confirm that increased CEO power comes in the way of efficient corporate governance and is associated with value-destroying projects, larger bonuses, value-destructive acquisitions, rigged pay structure, corporate

fraudulence, biased earnings management, accounting manipulation, and increased stock price crash risk. (Daily and Johnson, 1997; Feng et al., 2011; Friedman, 2014; Grinstein and Hribar, 2004; Khanna et al., 2015; Morse et al., 2011). Our study contributes to this line of literature by showing network-powerful CEOs negatively affect the marginal value of cash.

Lastly, how firms grow has always been a fundamental query in corporate finance as it sheds light on the overall mechanism of the competitive process, strategic learning, the changes in the market structure, and aggregate economy (Carpenter and Petersen, 2002). This study directly contributes to knowledge of how network-powerful CEOs treat cash holding as a separate strategy in an attempt to grow their firm and reap personal benefits in the process. The next sections are organized as followed: section 4.2 includes the literature review, section 4.3 discusses the hypothesis development, section 4.4 includes data management and variable construction, section 4.5 includes the empirical results and section 4.6 includes the conclusion.

4.2 Literature review

4.2.1. Determinants of marginal value of cash

One of the interesting facts of the financial market is that some corporations hold cash even larger than their market value (Pinkowitz and Williamson, 2004), which leads to some of these firms having a negative enterprise value measured as the market value of a company plus its debt and preferred stock minus its cash. This leads to the imperative question: What is the value that investors put on the cash holdings of a firm? The shareholders' reaction to changes in the corporate liquidity strategy is primarily driven by two interconnected factors: i) Why managers change the liquidity position? ii) What does the change imply for the investors.

While there is already extensive literature on the impact of the value of debt on the capital structure, Faulkender and Wang (2006) first empirically estimates the value of cash. The marginal value of cash empirically captures the possibility that corporate cash holdings enable the firms to make investments in projects without having to excess external finance. Moreover, additional cash helps to ease the pressure of the financially distressed firms that

cannot generate consistent revenue to cover the debt obligations. However, additional corporate liquidity also comes at a cost as interest earned on the cash is taxed at a higher rather than the individual investors. Additionally, increased cash allows managers to invest in value-destroying projects (Jensen and Meckling, 1976). Faulkender and Wang (2006) consider all the possibilities while estimating the marginal value of cash. Based on the premise that corporate cash holdings vary significantly for the cross-sectional of firms (Harford, 1999; Opler et al., 1999), Faulkender and Wang (2006) make a series of assumptions involving the cross-sectional variations in the marginal value of cash. In particular, the authors posit that to equity holders value of one additional unit of cash holdings depends on whether the dollar is going to be used: (i) to pay the shareholders via dividend; (ii) to avoid the reliance on external financial market; (iii) servicing debt or other forms of liabilities.

For the firms with excess cash reserves, the additional cash is more likely to be distributed among the shareholders as dividends. The earnings from the dividends are taxable for the investors, implying that only a fraction of the additional dollar goes to the equity holders. Consequently, Faulkernder and Wang (2006) predict that if one additional dollar is raised to distribute as dividends, the marginal value of cash should be less than $1. Similarly, if the firm is raising an additional dollar to pay off the debt, the investors are likely to put a negative value on the additional dollar raised. On the contrary, if a financially constrained firm is raising cash for future investment opportunities, the market should assign a positive value on the additional dollar raised. To sum up, Faulkender and Wang (2006) make the cross-sectional predictions that the marginal value of the cash should be higher with financial constraint status and should decline with dividend distribution and debt payment. The empirical results support the theoretical predictions.

Faulkender and Wang (2006) further propose that the marginal value of cash depends on the firms belonging to one of the three cash regimes: (i) distributing regime; (ii) servicing regime and, (iii) raising regime. Firms carrying excess cash are more likely to distribute the cash as dividends to reduce the tax payment and agency cost of corporate cash holdings. Consequently, Faulkender and Wang (2006) find that investors put a negative valuation on each additional dollar raised in the distributing regime. For highly leveraged firms in the servicing regime, a small increase in the cash balance puts a positive valuation on the debt

valuation. Consequently, in firms with high risky leverage, additional cash-holdings are more likely to benefit the debtholders more instead of the equity holders, resulting in a negative value of cash. Lastly, the investors are more likely to put a positive valuation on each dollar raised in the firms which are in need of raising cash in the near future. The extent to which the investors put a positive valuation for each additional dollar raised in the raising regime depends on how likely the firm can raise the same amount from the external finance.

In a similar study, Pinkowitz and Williamson (2004) also make a series of empirical predictions and estimate the marginal value of cash. Similar to findings by Faulkender and (2006), the results in Pinkowitz and Williamson (2004) also report cross-sectional variation in the marginal value of cash. In particular, the authors find the marginal value of cash is higher for higher growth opportunities. The authors further find that access to external finance does not have any impact on the marginal value of cash, rather it's the investment opportunity set that drives the market value assigned by the investors on corporate cash holdings.

Denis and Sibilkov (2010) extend the works of Faulkender and Wang (2006) and ask the questions: (i) why the marginal value of cash is more important for the financially constrained firms and (ii) why some of the financially constrained firms hold significantly less cash holdings. Their empirical results reveal that greater cash holdings among the financially constrained firms are also associated with high investment opportunities. These findings imply that without the additional cash reserves, the financially constrained firms could have lost valuable investment opportunities. Consequently, investors in these firms react positively to each additional dollar raised by the firm. Moreover, the authors further find that some constrained firms hold low cash holdings because of persistently low cash flows. The results together support the notion that greater cash holdings of constrained firms are driven by a value-increasing response to costly external financing.

The agency conflict channel also explains the cross-sectional variations in the value of the cash. For example, Dittmar and Mahrt-Smith (2007) show that the marginal value of cash increases with greater shareholder rights and firms with significant outside blockholders. In particular, a dollar increase in poorly governed firms ranges from $0.42 to $0.88 whereas for the good governance firms the value of cash is almost doubled. Pinkowitz

et al. (2006) in a similar study find that the agency theory of corporate cash holdings explains the marginal value of cash in countries with poor investor protection. The results show that the relation between cash holdings and firm value is much weaker in countries with poor investor protection than in other countries, implying that in the countries with poor investor protection, corporations reap the private benefits from cash holdings by controlling the shareholders. In another study, Ward et al. (2018), take the motivation of the institutional investors in monitoring as a proxy for good corporate governance and report that more motivated monitoring of the institutional investors positively affects the value of cash. The results hold after controlling for the other measures of corporate governance measures. Chen et al. (2015) conclude that a loss of analyst coverage negatively affects the value of cash holdings. Taking brokerage closures and mergers as exogenous shocks to analyst coverage, the authors investigate the effects of analyst coverage on the managerial expropriation of the shareholders and confirm that with an exogenous decrease in analyst coverage, firms experience a decrease in the marginal value of cash. In particular, the effect is stronger for firms with less institutional coverage and less product market competition. Importantly, the study finds that most of these effects are mainly driven by firms with smaller initial analyst coverage and less product market competition. These findings confirm that financial analysts play a crucial role in reducing agency conflicts by inspecting the management behavior.

Drobetz et al. (2010) propose two opposing hypotheses, pecking order, and free cash flow, to empirically test the role of firm-specific and time-varying information asymmetry on the value of cash. Pecking order theory predicts that due to adverse selection problems, the external financing could be costly for the firms, implying a higher marginal value of cash in states with higher information asymmetry. On the contrary, according to the free cash flow theory, excessive cash holdings coupled with higher information asymmetry create moral hazard problems for the firms, leading to a lower marginal value of cash. For a large sample of international corporations, the study uses dispersion of analysts' earnings per share forecasts as the main measure of the firm-specific time-varying information asymmetry. The results, supporting the free cash flow hypothesis, confirm that the higher degree of information asymmetry negatively affects the value of the marginal value of cash.

The corporate diversification strategies of firms also affect the marginal value of cash. In particular, Tong (2011) empirically studies the impact of firm diversification on the

marginal value of cash. The study offers two opposing hypotheses, the efficient internal capital hypothesis, and the agency problem hypothesis. Confirming the agency problem hypothesis, the study finds that firm diversification negatively affects the marginal value of cash. The negative association holds for both the financially constrained and unconstrained firms. Moreover, firm diversification has a negative (zero) impact on the marginal value of cash for firms with a weak (strong) level of corporate governance. (Alimov, 2014) proposes that product market competition affects the marginal value of cash. Using the 1989 Canada–U.S. Free Trade Agreement as a source of an exogenous shock to product-market competition, the study finds that trade liberalization increases the value of cash for the firms exposed to a larger shock in their competitive environment. The association is stronger for the firms that have a greater risk of losing potential investment opportunities to the competitors.

Accounting conservatism is another firm-level factor that affects the marginal value of cash (Louis et al., 2012). The study hypothesizes that accounting conservatism can attenuate the value destructions associated with the increase in cash holdings. Supporting the conjecture, the results show that the marginal value of cash is higher in firms with greater accounting conservatism. The results remain strong even after controlling for corporate governance, earnings quality, past stock performance, potential unobserved firm heterogeneity, potential endogenous changes in conservatism, and other relevant variables. The findings further suggest that accounting conservatism as a substitution for strong corporate governance leads to more efficient utilization of cash holdings resulting in a positive value of cash. Gao and Jia (2016) find that internal control weakness over firm reporting negatively affects the value of cash. Their results indicate that investors value cash in weakly controlled firms is substantially less than they do in less weakly controlled firms. The strong negative association persists over the control environment or overall financial reporting process. Furthermore, the negative association remains significant even after controlling for existing governance mechanisms and accounting conservatism.

The firm-level exposure to the refinancing risk can also affect the way shareholders value, one additional dollar increase in cash. Harford et al. (2014) find that to alleviate exposure to the refinancing risk, firms react by increasing their corporate liquidity position. Consistent with the notion that the shareholders value the increase in cash more when the

firms are exposed to the refinancing risk, the results confirm that refinancing risk is positively associated with the value of cash. Fich et al. (2016) find that the adoption of state-level business combination laws is an important determinant of the firm-level marginal value of cash. In particular, the study investigates the value of cash following the major state-level antitakeover regulation events. However, the study also finds considerable heterogeneity in the findings. For instance, firms that are more exposed to quiet-life agency problems do not change show an increase in the value of cash. On the contrary, the marginal value of cash shows a positive association in companies where takeover protection helps bond important commitments.

Bates et al. (2018) document that just like average cash held by the U.S. public companies, the value of corporate cash holdings has also grown significantly over the decades. Compared to $0.61 in the 1980s, the value of $1 of cash holdings is $1.12 in the 2000s. After a series of empirical predictions, the study finds that the systematic increase in the marginal value of cash can be attributed to the increase in investment opportunities and cashflow volatility, secular trends in product market competition, credit market risk, and within-firm diversification. The study further documents that the speed of cash adjustment has gone down over the years especially for financially constrained firms, implying that the capital market already accounts for this secular increase in the value of cash.

Among the CEO-specific variable, Liu and Mauer (2011) empirically examine the effect of CEO compensation incentives on the value of cash. The authors find that there is a positive association between CEO risk-taking incentives (vega) and corporate cash holdings. To disentangle the positive relationship between CEO vega and corporate cash holdings, the study uses the investigative platform of the value of cash. In particular, the study proposes two opposite hypotheses: (i) costly external finance; (ii) costly contracting hypothesis. The costly external finance is in line with the shareholder wealth maximization framework whereas the costly contracting hypothesis focuses on the shareholder-bondholder conflict. Supporting the costly contracting hypothesis, the results show that CEO risk-taking propensity negatively affects the marginal value of cash. The negative effect of vega on the value of cash holds even after controlling for corporate governance is strongest for firms with high leverage. These results together imply that the risk lover CEOs by keeping excess

cash balances mitigate the risk to bondholders, resulting in a negative value of cash for the equity holders.

Liu et al. (2014) empirically investigate CEO pensions and deferred compensation also known as the insider debt on the corporate cash holdings and value of cash. Based on the premise that CEOs with a higher proportion of pensions and deferred compensation are more likely to behave like bondholders, the study finds that CEO insider debt positively affects the corporate cash holdings and negatively affects the marginal value of cash. The association is amplified under the presence of excess debt and mitigated under the presence of financial constraints. These results confirm the view that CEO insider debt can create bondholder-shareholder conflict resulting in a lower marginal value of cash. Gan and Park (2017) find that CEO ability affects the marginal value of cash. Using the managerial ability index of (Demerjian et al., 2012), the study finds that more able managers positively affect the marginal value of cash. The association is stronger for the financially constrained firms, firms with greater free cash flow and lower management entrenchment.

Aktas et al., (2019) empirically examine the role of CEO overconfidence on the value of cash. The authors propose two alternate hypotheses namely, CEO overinvestment, and the costly external finance hypothesis in assessing the impact of CEO overconfidence on the value of the cash. Under the overinvestment hypothesis, overconfident managers hold more cash to fund their excessive investments leading to a lower marginal value of cash. On the other hand, under the costly external financing hypothesis, if internal finance is not ensured, CEO overconfidence may not lead to overinvestment as overconfident CEOs tap risky external finance and overinvest only if the overestimated investment returns are larger than the perceived financing costs. If not, then overconfident CEOs may even underinvest. Aktas et al., (2019) find that the costly external finance hypothesis dominates the value of cash holdings. Controlling for other known determinants of the value of cash, the results show a strong positive relation between CEO overconfidence and the marginal value of an additional dollar of cash. Compared to the rational CEOs, having an overconfident CEO on board increased the firm value by $0.28 in the value of $1.00 cash holding. The positive effect of CEO overconfidence on the value of cash is strongest for financially constrained firms, whereas CEO overconfidence negatively the value of cash in financially unconstrained firms Further examining the validity of both hypotheses, the paper finds

overinvestment is more likely when the firm has abundant resources (i.e., financially unconstrained), while underinvestment is more likely when the firm has limited resources (i.e., financially constrained).

4.2.2 Social network centrality and corporate policies

Please refer to Chapter 3 section 3.2.2 for detailed literature on the social network centrality and different corporate policies.

4.2.3 Approach inhabitation theory of power

Please refer to Chapter 3 section 3.2.3 for detailed literature on the approach inhabitation theory of power.

4.3 Hypothesis development

The extant literature in corporate finance gives different explanations regarding why corporations hold cash. Despite having significant opportunity costs, the average cash holdings by U.S. firms are increasing significantly (Bates et al, 2009). At the end of fiscal 2015, the total cash holdings by the listed US firms are nearing $2.3 trillion, almost 12.5% of the annual U.S GDP (Ward et al., 2018). More recently, Bates et al. (2018) find that it's not only the average cash level, but the average marginal value of cash of the US public firms is also increasing over the decades, primarily due to the investment opportunity set and cashflow volatility, the secular trends in product market competition, credit market risk, and within-firm diversification. The increase in the secular trend in the aggregate cash level and the value of cash means the managerial agency problems are also under the spotlight than before as how much cash would be held and how it would be utilized primarily remain strictly at the discretion of the management (i.e., the CEO). CEO may either utilize to invest the money wisely to create value for the shareholders or take advantage of the excess cash to enjoy additional benefits, excessive salaries and invest in projects that maximize their utility.

When investors and managers share a similar belief, the marginal value of a dollar in cash for shareholders should be exactly $1. In the context of corporate liquidity management, the CEO social network position could be an important source of variation as it could lead to increased uncertainty among the investors regarding the outcomes attributed to the increased cash holdings. However, the relationship between such CEO connectedness and the value of cash is unclear ex-ante. Depending on the decision setting, each additional dollar held by a more connected CEO can have both value destructing or value-enhancing outcomes for the firms. Consequently, similar to the predictions made in chapter three we propose two alternate hypotheses in predicting the role of CEO connectedness on the marginal value of cash.

On the one hand, increased personal connections provide a better platform for exchanging information, ensuring the transmission of knowledge, ideas, or even private information resulting in better loan deals, fewer covenant restrictions, higher R&D expenditures with more patent citations (Engelberg et al., 2012; Faleye et al., 2014; Fogel, et al., 2016) Hence, under the reduced information asymmetry framework, having a well-connected CEO on board should be associated with more efficient decision-making resulting in a positive marginal value of cash.

Hypothesis 1A: Increased CEO connectedness positively affects the marginal value of cash.

On the other hand, contradicting the belief that well-connected managers are the better decision-makers, the recent studies find compelling evidence that the privileged position in the social network hierarchy may come in the way of efficient corporate governance and rational decision-making (Farcassi and Tate, 2012; Hwang and Kim, 2009; Chidambaran et al., 2012; El-Khatib et al., 2015). Being centrally positioned in the social network gives an informal sense of insurance and power to the managers by having greater access to exclusive information, resources, investment opportunities, or even insider information from their superior connections. At the individual level, high social power is associated with increased resources, control of the resources, and protection from adverse consequences (Keltner et al., 2003). According to Kipnis (1972, 1976), increased power corrupts the decision-making process of the individuals, and the results are more profound

for the managers with strong decision-making power. Kipnis (1976) further asserts that, through the perpetual utilization of power, powerful individuals are more likely to make decisions that are self-righteous and narcissistic.

The notion is further supported by approach inhabitation theory which proposes that elevated power increases the attentiveness to individual rewards of the individuals (Keltner et al., 2003). Hence, being the central decision-makers in the reward-rich environment, free of any social consequence, network-powerful CEOs are more likely to make more investment decisions while showing greater attentiveness to rewards through the attainment of goals. For powerful managers, free of social consequences, shareholder wealth maximization is only a choice as they have substantial decision-making power over the investments made. The studies conducted specifically on CEO power dynamics also suggest that increased power negatively affects firm performance and shareholder wealth[15]. According to the agency theory of corporate cash holdings (Jensen, 1986), the additional cash held network-powerful CEOs let them avoid the external monitoring mechanism of the capital market, and finally allows them the flexibility to pursue their objectives, creating agency cost for the shareholders. Keeping these theoretical predictions as our backdrop, we predict that network-powerful CEOs' investment decisions that are not consistent with shareholder wealth maximization and on average fail to create value for the shareholders in the long run. Hence, we propose the following hypothesis predicting the relationship between CEO connectedness and the value of cash:

Hypothesis 1B: Increased CEO connectedness negatively affects the marginal value of cash.

[15] By taking different proxies of CEO power, previous studies find that increased CEO power is associated with projects that are inconsistent with shareholder wealth maximization, larger bonuses, value-destructive acquisitions, rigged pay structure, corporate fraudulence, biased earnings management, accounting manipulation, and increased stock price crash risk (Daily and Johnson, 1997; Grinstein and Hribar, 2004; Morse et al., 2011; Khanna et al., 2015; Friedman , 2014; Feng et al., 2011).

4.4. Sample and data description

4.4.1 Sample development

The study uses the Center for Research in Security Prices (CRSP) to obtain stock returns, Compustat for the accounting data, BoardEx for CEO connection information, and ExecuComp for other CEO-related variables for the S&P 1500 companies. The sample period covers from 1990 to 2017. The initial sample of the study comprises the data available from the above-mentioned databases. Next, from this sample of firm-year observations, the observations with utilities (SIC 4900-4999), financial firms (SIC 6000-6999), and regulated telephone companies (SIC 4813) are excluded. Following, Faulkender and Wang (2006) all the firm-year observations with negative sales, negative net-assets, and negative dividends are also dropped from the sample. After all these restrictions, the final sample consists of 17,957 observations.

4.4.2 CEO connectedness

Please refer to section 3.4.2 for detailed information regarding the measure of CEO connectedness. In this chapter as the main independent variable, we construct the high CEO connectedness dummy which takes a value of 1, if the number of CEO connections is higher than the yearly median value and 0 otherwise. The advantage of using the high CEO connectedness variable in explaining the marginal value of cash is that it allows us to empirically compare what is the marginal value of cash of an average firm managed by a network-powerful CEO compared to an average firm managed by a less-connected (network-weak) CEO.

4.4.3 Value of cash

To construct the estimates of our main dependent variable value of cash, we follow the methodology introduced by Faulkender and Wang (2006). For each fiscal year t, the dependent variable captures a stock i's excess return over the stock i's benchmark return portfolio. Following the works of Grinblatt and Moskowitz (2004) and Daniel and Titman (1997), we take benchmark portfolios as the Fama and French (1993) 25-value-weighted

portfolios constructed by the univariate sorting of the stocks based on the firm size and book-to-market value measures. Fama and French (1993) suggest that the size and book-market ratio represent can capture the exposure to the common risk factors, implying that stocks belonging to different size and book-to-market portfolios would seek different returns. Consequently, stock i's benchmark return at the fiscal year t is the return of the portfolio that stock i belonged to at the beginning of the fiscal year t. Finally, for each fiscal year t, to estimate the size- and book-to-market excess return for stock i, we deduct the benchmark portfolio return of stock i from the realized return of stock i from the same period. Finally, to arrive at our desired estimate of the value of cash, the excess stock return is regressed on the ratio of the change in cash to lagged market equity. As the dependent variables are deflated by the lagged market value, the estimated coefficient of the value of cash measures the impact on the shareholder's wealth with the dollar change in corporate liquidity position.

4.4.4 Control variables

Whilst the focus of the study is on how CEO connectedness affects shareholders' wealth through the channel of corporate cash holdings, it is imperative to control for other factors that are correlated with the corporate liquidity policy. To address this concern, following Faulkender and Wang (2006), we control for changes in the firm's profitability, financing, and investment policies which are closely tied to corporate cash holdings. Under the profitability section, we include changes in the earnings before interest and extraordinary items. Under the investment section of control variables, we include changes in net assets and R&D expenditures. Lastly, under the financing policies, we include cash holdings, market leverage, net financing, changes in dividend policy. To account for the concern that the estimates might be driven by the small firms, all the variables are deflated by the lagged market value of equity (excluding leverage). Since excess returns are already deflated by the market value of the equity, dividing all the other variables by the market value of equity helps us with ease of interpretation as all the coefficients represent the dollar change in the shareholders' wealth with a corresponding change in the independent variable.

The details of the firm-specific variables are the following: Cash is the Compustat item (CHE) which equals cash plus marketable securities (CHE). Net assets are calculated as the total assets (Compustat item AT) minus cash and marketable securities (CHE). The

market value of the equity is calculated as share price at the end of the fiscal year times the number of shares outstanding ((PRCC x CSHO). Earnings are measured as earnings before extraordinary items plus interest, deferred tax credits, and investment tax credits (IB + XINT + TXDI +ITCI). Interest expense is Compustat item (XINT). Net financing is computed as the stock issuance minus stock repurchase plus debt issuance minus debt redemption (SSTK + PRSTKC + DLTIS -DLTR). Market leverage is the longterm debt plus short-term debt divided by the sum of long-term debt, short-term debt, and the market value of equity ((DLTT+ DLC)/((DLTT +DLC) + (PRCC F_CSHO))). All the control variables are winsorized at the 1st and 99th percentiles to mitigate the concern that extreme outliers might affect our findings.

4.4.5 Sample characteristics

Panel A of Table 4.1 presents the summary statistics of the variables included in our empirical analyses. High CEO connectedness represents the proportion of the CEOs having total connections greater than the median value. Even though most of our sample falls outside the time frame used in the study by Faulkender and Wang (2006), the summary statistics of the majority of the variables are relatively similar. For instance, the mean and median excess returns of our sample period are .6% and -4.5% whereas Faulkender and Wang report the mean and median excess return over the Fama French 25 portfolios to be -.5% and -8.5%. Our mean and median excess returns are also quite close to the mean and median excess reported by Ward et al. (2018), a study that uses a similar sample period (1995-2015) as ours. In unreported results, we find that our yearly construction of the marginal value of cash is qualitatively similar to the secular trend in the value of cash reported by Bates et al. (2018). For instance, the aggregate marginal value of cash goes up significantly in the year 1999, a year that is recognized as a high market valuation period with great investment and growth opportunities as a whole. The mean change in cash for our overall sample is 1.1% which is relatively close to the change in cash variable of .4% reported in Faulkender and Wang (2006) and .6% reported in Ward et al. (2018). The values of the remaining control variables are also very close to the summary statistics presented in Faulkender and Wang (2006) and Ward et al. (2018).

Panel B, Table 4.1 reports the summary statistics of the firm-level control variables according to the varying level of CEO connectedness. The mean excess returns for the better-connected CEOs are lower than the mean excess returns for the firms managed by less connected CEOs. Among other control variables, the changes in earnings and change in net financing are relatively lower for the firms managed by better-connected CEOs compared to the less connected CEOs. The other variables remain quite similar under both sub-groups.

4.5 Empirical analysis

4.5.1 Multivariate analysis

To estimate the impact of CEO connectedness on the value of cash, we follow the valuation model prescribed by Faulkender and Wang (2006). The model empirically examines if the unexpected change in cash level results in a loss of shareholders' wealth. We expand the baseline model by Faulkender and Wang (2006) and introduce our main independent variable "High CEO Connectedness" interacting with the change in cash. The augmented OLS regression model is:

$$r_{i,t} - R^{B}_{i,t} = \alpha + \beta_1 \times \frac{\Delta C_{i,t}}{M_{i,t-1}} + \beta_2 \times High\ CEO\ Connectedness + \beta_3 \times High\ CEO\ Connectedness \times \frac{C_{i,t}}{M_{i,t}} + \gamma' X + \varepsilon_{i,t} \quad (4.1)$$

where $r_{i,t} - R^{B}_{i,t}$ is the excess stock return of stock i in fiscal year t over the benchmark portfolio return $R^{B}_{i,t}$ in the same period. $\Delta C_{i,t}$ is the change in the level of cash holdings from year t-1 to t. $M_{i,t-1}$ is the lagged market value of equity. Standardizing the $\Delta C_{i,t}$ by $M_{i,t-1}$ allows us to directly interpret the change in shareholders' wealth with a dollar change in cash holdings. High CEO connectedness is a dummy variable that takes the value of 1 if the CEO's number of personal connections is greater than the median value of the sample that year or 0 otherwise. The vector of X includes all the firm-specific variables from the Faulkender and Wang (2006) valuation model to control for changes in the firm's profitability, financing, and investment policies that might be correlated with corporate liquidity policies. The control variables are : (1) $\Delta NA_{i,t}$, the yearly change in net assets; (2) $\Delta E_{i,t}$, the yearly change in earnings before extraordinary items; (3) $\Delta RD_{i,t}$, the yearly change

in research and development expenses; (4) $\Delta I_{i,t}$, the yearly change in interest expense; (5) $L_{i,t}$, leverage position of the firm; (6) $NF_{i,t}$, net financing position of the firm ; (7) $\Delta D_{i,t}$, the yearly change in common dividends; and (8) $C_{i,t-1}$, the lagged value of cash holdings. Apart from $L_{i,t}$, all the control variables are standardized $M_{i,t-1}$, the lagged market value of the equity. All the continuous control variables are winsorized at the 1st and 99th percentile. The detailed construction of these variables is given in section 4.4.4.

In equation (4.1), β_2 measures the effect of CEO connectedness on the excess stock returns whereas β_3 estimates our coefficient of interest, the effect of CEO connectedness on the marginal value of cash. A positive β_3 supports the reduced information asymmetry hypothesis whereas a negative β_3 supports the CEO power hypothesis. In particular, β_3 measures if shareholders react positively or negatively to one additional dollar increase in cash by the CEOs positioned higher in the social network hierarchy. In equation (1) the robust standard errors are further clustered by firms.

Table 4.2 reports the baseline multivariate regression results. Specification (1) includes the baseline model by Faulkender and Wang (2006), specification (2) includes additional industry and year fixed effect, and specification (3) is our main model which further includes interaction terms between change in cash and lagged level of cash and leverage. Supporting our CEO power hypothesis, the results confirm that, having a well-connected CEO at the office significantly decreases the value for the shareholders. The negative coefficient on the interaction variable between the high CEO connectedness and change in cash is both statistically and economically significant in all the specifications, ranging from -.41 in the specification (1) to -.44 in the specification (3). In economic terms having a network powerful CEO, reduces the value of $1 cash holding by an additional amount of $ 0.44 compared to a firm managed by a less-connected (network-weak) CEO. Additionally, most of the control variables are also in line with the findings by Faukender and Wang (2006). Especially, the coefficients on the change in cash remain positive and statistically significant in all of the models. The Adjusted R square of the models varies from 11.2% in the specification (1) to 15.4% in the specification (3).

The negative coefficient on the interaction variable between CEO connectedness and change in cash holding rejects the reduced information asymmetry hypothesis which means

on average, increased trust among the network members does not translate into value-creation for the shareholders. It's the sensation of power, stemming from being superiorly connected, primarily drives the negative value of cash. The results are also in line with the findings by El-Khatib et al. (2015) and Jandik et al. (2020). El-Khatib et al. (2015) show that M&A deals initiated by the high-centrality CEOs are more frequent but value-destroying in nature. The bidder CARs and combined CARs following the deals initiated by the high-centrality CEOs carry greater value loss. The results further infer that high-centrality CEOs use their superior power to reap private benefits while avoiding the disciplinary mechanism of the labor and financial market. Jandik et al. (2020) reach similar conclusions in the context of IPO outcomes. In particular, high centrality CEOs are associated with higher IPO underpricing, a lower likelihood of offer price increases, and a lower likelihood of positive wealth effects Besides, poor performing high-centrality CEOs are less likely to be replaced. We complement these findings by additionally reporting that, high-centrality CEOs negatively affect the marginal value of cash.

4.5.2 Economic mechanism

To further validate the finding that CEO power is indeed the economic mechanism that drives our results, we do additional tests related to the firms' investment regime, corporate governance mechanism, institutional ownership monitoring, and lastly cash regimes.

4.5.2.1 Investment regimes

The baseline regression models in Table 4.2 give the initial confirmation of the CEO power hypothesis: shareholders put a negative valuation for each dollar raised by a network-powerful CEO. The investor valuation following each dollar raised by a network-powerful CEO depends upon whether that dollar is more likely to be used for value-destroying or value-creating investments. Consequently, to give further validation to the CEO power hypothesis it is imperative to disentangle the relationship between CEO connectedness and the value of cash according to the different investment regimes.

In a recent study, Tsoukalas et al. (2017) propose a cash holding model based on the premise that firms tend to invest in lumps. Their theoretical model predicts that under the presence of costly external finance, an average firm goes through very low investment activities followed by investment spikes. Due to this lumpy investment pattern, firms are more likely to show a non-linear cash holding behavior as they use cash as the vehicle through which resources are transferred from investment inactivity periods to investment spike periods. In other words, firms save more cash during the low investment periods so that they can have ease in funding the investments during the investment spikes. In the context of this study, if the CEO power hypothesis truly explains the negative association between CEO connectedness and the marginal value of cash, then we expect that the shareholders to react more negatively following the value-destructive investments made by network-powerful managers during investment spikes, resulting in a negative coefficient on the between CEO connectedness and the marginal value of cash.

Following, Tsoukalas et al. (2017) this study constructs the variable investment spikes, a dummy variable that takes the value of 1 for observations with investment rates greater than 50% and 0 otherwise. Table 4.3 repeats the baseline regression model (3) from Table 4.2, controlling for investment spikes. Giving further justification to the CEO power hypothesis, the results in Table 3 confirm that the negative association between CEO connectedness and the marginal value of cash is indeed more pronounced during the investment spikes. In particular, the coefficient on ΔCash× High CEO connectedness×Investment spikes in the specification (2) remains negative and economically large. In economic terms, having a network-powerful CEO during investment spikes decreases the value of $1.00 cash holding by $.065. On the contrary, the coefficient on ΔCash×High CEO connectedness×(1-Investment spikes) remains positive and statistically significant. Meaning, the CEO power hypothesis predicting a negative value of cash, dominates our results during the investment spikes. Besides, these results also establish a link between cash policies and investments made by network-powerful managers by decomposing our results between high and low investment regimes.

[Please Insert Table 4.3 About Here]

4.5.2.2 Corporate governance

For the CEOs, shareholder wealth maximization is not an obligation, rather a choice. They can easily hold excess cash in the form of excessive benefits or invest in projects not maximizing shareholders' wealth, creating managerial agency problems. This is especially true when the top executives have substantial decision-making power over the other board members. Previous literature shows that managerial agency problems can be attenuated by good corporate governance. Specifically, the quality of the firm's corporate governance significantly alters the way shareholders assign value to one additional dollar increase in cash. For instance, Pinkowitz et al. (2006), Dittmar and Mahrt-Smith (2007), and Kalcheva and Lins (2007) find that firms that are under a strong corporate governance structure are more likely to experience the positive value of cash. On the contrary, in the absence of a strong governance structure, shareholders react negatively to each additional dollar raised by the firm.

In the context of this study, network-powerful CEOs showing increased attentiveness to individual rewards instead of maximizing shareholder's wealth can create agency costs for the shareholders (Jensen, 1986). According to Jensen (1986), in the presence of agency costs, powerful managers like to steer different corporate decisions in their favor by keeping a higher portion of the firm's assets under their direct control to pursue their objectives at the expense of destroying shareholders' wealth. Similarly, if excess CEO power is indeed the mechanism that drives our results, we expect the negative association to stronger in the absence of strong corporate governance.

We use the entrenchment (E) index by Bebchuck et al. (2009) to proxy for the quality of the corporate governance of the firm. Bebchuck et al. (2009), improve upon the work of the G index prescribed by Gompers et al. (2003) and posit that not all the elements of the G index are relevant for capturing the quality of corporate governance of the firm. Bebchuck et al. (2009) put forward the E-index based on six provisions: classified boards, limits to shareholder bylaw amendments, poison pills, golden parachutes, and supermajority requirements for mergers and charter amendment. The E-index is the sum of the binary variables of these six provisions, with a high value of E-index represents greater management entrenchment, and a low value of E- index represents low managerial entrenchment. We construct the variable good governance, a dummy that takes the value of 1 if the firm belongs to the bottom tercile of the entrenchment index, and 0 otherwise. These

are the firms where network-powerful managers are less likely to make value-destroying investments due to intense monitoring. Next, we construct the variable a dummy variable weak governance that takes the value of 1 if it does not belong to the good governance and 0 otherwise.

Specifications (1) and (2) of Table 4.4 report the sub-sample of firm-year observations according to the strength of corporate governance of the firms based on the E-index. The coefficient on the interaction between CEO connectedness and change in cash remains negative and statistically significant for the sub-sample of the weakly governed firm-years. On the contrary, the coefficient estimation on the interaction variable on CEO connectedness and change in cash is statistically insignificant for the sub-sample of firm-years with strong corporate governance. All these findings together, support our conjecture that the CEO power hypothesis dominates in the absence of a strong corporate governance mechanism. Whereas in the presence of strong corporate governance, the value-destructive behavior of the network-powerful is attenuated resulting in a non-significant coefficient on ΔCash × High CEO connectedness.

[Please Insert Table 4.4 About Here]

4.5.2.3 Institutional investor monitoring

In this part of the study, we separately investigate the moderating role of another facet of corporate governance, institutional investor monitoring on the relation between CEO connectedness, and the marginal value of cash. This role of the institutional investor is particularly important as recent years have seen unprecedented growth in the participation of the institutional investors in the US stock market, out of which the large investors actively participate in the firm governance process (Ward et al., 2018). Moreover, in the context of our study, if the conflict of interest between the network-powerful CEOs and shareholders drives the negative marginal value of cash, it is only natural to investigate that to what extent increased monitoring by the institutional investor can attenuate the personal ambition driven value-destructive behavior of the network-powerful CEOs.

Following Buchanan et al. (2018) we construct two measures of institutional investor monitoring: i) Top 5 institutional ownership and ii) Blockholder ownership. Top 5 institutional ownership variable is measured as the total percentage of a firm's shares held by the top 5 institutional investors. The blockholder ownership variable is measured as the total percentage of a firm's shares held by the investors with at least 5% ownership of that company. Next, we construct two dummy variables as the proxies for the firms with high institutional monitoring: i) High institutional ownership, a dummy variable equals 1 if top 5 institutional ownership is greater than the 75th percentile and 0 otherwise; ii) High blockholder ownership: a dummy variable equals 1 if block holder ownership variable is higher than the 75th percentile value of our sample and 0 otherwise. Similarly, to proxy for weak institutional monitoring, we construct the following dummy variables: i) Low institutional ownership, a dummy variable equals 1 if top 5 institutional ownership is lower than the 25th percentile and 0 otherwise; ii) Low blockholder ownership: a dummy variable equals 1 if block holder ownership variable is less than the 25th percentile value of our sample and 0 otherwise.

Specifications (1)-(4) of Table 4.5 report the sub-sample of firm-year observations according to the level of institutional investor monitoring. Confirming our predictions, the negative association between CEO connectedness and the value of cash is amplified for the firm-years with weak institutional investor monitoring. Specifically, specification (1) confirms that having a network-powerful CEO in firms with low institutional ownership decreases the $1.00 cash holding by an additional $0.98. The wealth loss is almost doubled in the specification (3) where low blockholder ownership is taken as the proxy of weak institutional investor monitoring. In contrast, in the presence of strong institutional investor monitoring, the negative effect of network-powerful managers is either mitigated or even turns value-enhancing. For instance, specification (2) confirms that for the sub-sample of high institutional ownership firms, a network powerful can increase the firm-value by $0.52 against each dollar's worth of cash holding. To summarise, the CEO power hypothesis dominates in the presence of weak institutional investor monitoring, however, the negative association does not persist in the presence of strong institutional investor monitoring.

[Please Insert Table 4.5 About Here]

4.5.2.4 Cash regimes

Halford et al., (2017) argue that taking excess market return as the dependent variable can lead towards biased estimations as market return captures future expectations of the firm as well. To account for that, Halford et al. (2017) emphasize the importance of controlling for cash regimes while estimating the value of cash. Not controlling for cash regimes may result in an inaccurate interpretation of the value of cash. Consequently, in this section, we repeat our baseline multivariate regression models by explicitly controlling for raising and distributing cash regimes.

Previously, Faulkender and Wang (2006) find that the marginal value of cash varies significantly depending on the cash regime. In particular, they find that the marginal value of cash is higher for the firms that are in raising cash regime requiring external capital, in comparison with the firms that are in distributing cash regime, distributing cash to the shareholders. In the context of our study, intuitively we expect that the CEO power hypothesis should dominate the distributing regime as the excess cash should lead to value-destroying investment by the network-powerful CEOs. On the contrary, the negative association between CEO connectedness and should be less pronounced during the raising cash regime. To construct the raising and distributing the cash regimes we follow the ex-ante specifications of cash regimes suggested by Halford et al. (2017). First, we construct the raising regime variable, a dummy that takes a value of 1 if a firm issues equity and does not pay dividends, 0 otherwise. Second, we construct the distributing regime, a dummy variable that takes the value of 1 if a firm does not belong to the raising regime, and distributes dividends, 0 otherwise.

Specifications (1) and (2) of Table 4.6 present the results of the sub-sample analysis of the observations according to the raising and distributing cash regimes. The results confirm that the estimated coefficient on the interaction variable between CEO connectedness and change in cash is statistically insignificant in the raising cash regime and remains negative and economically significant in the distributing cash regime. The results are in line with the CEO power hypothesis. In economic terms, for each dollar cash holding by a network-powerful CEO in the distributing cash regime, the firm loses an additional $0.31.

[Please Insert Table 4.6 About Here]

4.5.3. Robustness Test

In this part of our analysis, we run a series of tests to give robustness to our results.

4.5.3.1 Propensity score matching

One of the criticisms of our results could be that network-powerful CEOs in different corporations may not be distributed randomly. For instance, CEOs with influential connections having greater access to exclusive information can utilize their superior channels to improve their chances of employment in bigger corporations (Cingano and Rosolia 2012; Mazerolle and Singh, 2004; Rowley 1997). In that case, firms managed by more connected CEOs should be fundamentally different from the firms managed by less connected CEOs. Under these assumptions, controlling for the firm-specific variables that we add in the baseline specifications may still lead to biased estimations. To account for such inconsistencies, we conduct the propensity score matching (PSM) analysis. In particular, we follow the method suggested in Druker and Puri (2005) to construct a sample of firms managed by network-powerful CEOs (the treatment group) with similar characteristics to the less-connected CEOs (the control group). Next, we use the sample to retest our baseline regressions in Table 4.2. This method should take care of the potential biases while estimating the average treatment effects (Imbens and Wooldridge, 2009; Rosenbaum and Rubin, 1985).

The matching sample is constructed by matching each firm with a control firm. The control firm is a firm that is not managed by a network-powerful CEO (i.e, does not belong to the high CEO connection group), however, has a close propensity score to the treated firms based on the one-to-one nearest neighbor matching with replacement. To match the firms, we use the covariates based on all the control variables in the specification (3) of table 2 without including the interaction terms of change in cash. Next, for each firm-year observation with a network-powerful CEO, we find a similar firm matched by a less-connected CEO based on the nearest neighbor matching technique. Finally, using the

matched sample, we re-estimate the models (2) and (3) from Table 4.2. Specifications (1) and (2) from Table 4.7 confirm that the negative association between CEO connectedness and value of cash remains robust for the matched sample. These findings give the assurance that the moderating role of CEO connectedness on the marginal value of cash is not driven by any functional form misspecification biases.

[Please Insert Table 4.7 About Here]

4.5.3.2 Firm-fixed effect

One of the potential critiques could be that our results in the baseline regression models in Table 4.2 are driven by unobserved firm heterogeneity. The large set of firm-level control variables that we include by following Faulkender and Wang (2006) may not be enough to account for this unobserved heterogeneity. One of the potential solutions to mitigate this issue is to include the firm-fixed effect which empirically controls for this unobserved firm heterogeneity. Moreover, as CEO connectedness is not a persistent rather a time-varying trait, as the CEOs can change their position in the social network hierarchy through their lifetime, empirically there are no restrictions in including the firm-fixed effect in our baseline regression models.

To control for the unobserved heterogeneity of our baseline regression models, we re-estimate the specifications (2) and (3) from Table 4.2 after controlling for the firm-fixed effect. If the estimated coefficient on the interaction variable between CEO connectedness and change in cash is primarily due to the unobserved firm heterogeneity, we expect the strength of the coefficient to go down once controlling for the firm-fixed effect. The results from specifications (1) and (2) in Table 4.8 confirm that the coefficients on ΔCash $\times$ High CEO connectedness remain both statistically significant and economically meaningful even after controlling for the firm-fixed effect. In particular, specification (2) presents that each dollar held by a network-powerful CEO is associated with the value destruction of 53 cents. These results alleviate the concern that the results are driven by unobserved firm heterogeneity.

[Please Insert Table 4.8 About Here]

4.5.3.3 Controlling for managerial characteristics

Our baseline models already control for a series of firm-specific factors that may affect the value of cash. However, one potential concern could be that our main independent variable High CEO Connectedness is capturing some other unobserved CEO-specific factors which may ultimately drive the negative association between CEO connectedness and the value of cash. Consequently, in this part of the analysis, we further control for a battery of CEO-specific factors that may ultimately affect the value of cash through their involvement in the corporate liquidity policy.

First, we control for CEO gender as a proxy for CEO overconfidence. Malmendier and Tate (2005) confirm overconfident CEOs overestimate their ability to create future cashflows from their investments which ultimately turn out to be value-destructive projects for the firms in the long run. We use the gender-based proxy for CEO overconfidence used by Barber and Odean (2001), and Huang and Kisgen (2013). These studies posit that male executives are more overconfident compared to their female colleagues occupying similar positions which in turn shape their investment decisions. For instance, Barber and Odean (2001) find that men are more aggressive traders whereas Huang and Kisgen (2013) confirm that male executives are more likely to take on a major investment decision like acquisitions. Keeping these studies as the backdrop, we construct CEO gender, a dummy variable that takes the value of 1 if the firm is managed by a female CEO and 0 otherwise.

Second, we control for managerial ability. More able CEOs are expected to perform better than the comparatively less able CEOs. It might be the case that excess power comes in the way of network-powerful CEOs' ability to perform their duties properly, resulting in a negative value of cash. We use the managerial ability index developed by Demerjian et al. (2012) as a proxy for managerial ability. The authors construct this index based on managers' ability to generate revenue for the firms.

Third, we control for another proxy for CEO power in the form of CEO pay slice. Following Bebchuk et al. (2011) we take the CEO pay slice, the fraction of the aggregate compensation of the top-five executive team captured by the CEO pay slice. A high value of CEO pay slice reflects increased CEO power measured as the relative importance of a

CEO over the other board members as well as the CEO's ability to extracts rents. Fourth, we control for CEO duality, a dummy variable that takes a value of 1 when the CEO is also chairman of the board and O otherwise. CEO duality is associated is increased CEO power and weak corporate governance (Dahya et al., 2002). Fifth, we control for CEO age, measured as the natural log of the age of the CEO. Serfling (2014) shows that younger CEOs tend to take more risks than older CEOs. Moreover, Orens and Reheul (2013) find that older CEOs and CEOs without experience in other industries are more concerned with the precautionary motive of cash and less concerned with the opportunity cost of cash.

Specifications (1)-(6) in Table 4.9 present the multivariate regression models controlling for the CEO-specific variables mentioned above. Specifically, we include the interaction variable of CEO-specific control and the change in cash. The results confirm that our variable of interest remains statistically significant and economically meaningful after controlling for different proxies of CEO-power, ability, overconfidence, age, and tenure. In particular, specification (6) reports that controlling for all these CEO-level additional variables in the same model, for each dollar held by a network-powerful manager, the market decreases the value by an additional 62 cents. Consequently, these findings confirm that the CEO power hypothesis dominates even after controlling for several managerial characteristics.

[Please Insert Table 4.9 About Here]

4.5.3.4 Alternate construction of the value of cash

As suggested by Fama (1970), in an efficient market, stock prices reflect all the available information about the future value of the firm. Consequently, if the market is efficient, any potential change in the cash level should already be reflected in the stock price at the beginning of the fiscal year. In the baseline specifications $\Delta C_{i,t}$ is calculated based on the implicit assumption that the market expects the cash level between fiscal year t and t-1 to be unchanged. To alleviate any concerns regarding these assumptions, we repeat the baseline estimations following the valuation model introduced in Pinkowitz and Williamson (2004) and Pinkowitz et al. (2006), a variation of the model in Fama and French (1998). The alternate model uses the market-to-book-assets ratio as the dependent variable. Bates et al.

(2018), find that replacing with the book-to-market ratio gives a qualitatively similar trend of a 10-year moving average of the value of cash.

The results in specifications (1) and (2) of Table 4.10 show that our variable of interest, the coefficient on the interaction between CEO connectedness and the value of cash remains strongly negative and economically meaningful even in the valuation model prescribed by Pinkowitz et al. (2006). These results further ease the concern that our findings are driven by future expectations of the market.

[Please Insert Table 4.10 About Here]

4.5.3.5 Alternate proxies of CEO connectedness

The benefit of using the High CEO connectedness dummy as the main independent variable is the ease of interpretation. In particular, the dummy variable in our test settings of the value of cash allows us to empirically compare whether having a network-powerful CEO is more beneficial for the firms compared to a less-connected (network-weak) CEO. To address the concern that the results in the baseline regression models are not driven by the nature of our independent variables, we repeat the baseline model specification (3) of Table for two new proxies of CEO connectedness: (i) Degree Centrality; and (ii) CEO connectedness rank. Degree centrality is the natural logarithm of the total number of connections a CEO has in a particular year. CEO connectedness rank captures the change in the cash holdings with a one-unit change in the comparative position of a CEO in the social network hierarchy.

The specifications (1) and (2) in Table 4.11, confirm that the alternate proxies of CEO connectedness remain negative and statistically significant in explaining the marginal value of cash. The coefficient on the interaction variable between degree centrality and the change in cash shows that investors put a negative valuation on the cash holdings as CEOs increase their connections. Similarly, the negative coefficient on the interaction variable CEO connectedness rank and the change in cash confirms that as a CEO gradually goes higher in the social network hierarch, the investor put a negative valuation on the cash held by that particular CEO. In economic terms, for a one-unit change in the position of a CEO

of an S&P 1500 firm, investors decrease the value of $1 cash holding by an additional $0.006. In other words, the investors keep decreasing their valuation of the corporate cash holding as a CEO keeps going higher on the social network ladder. All these findings support the CEO power hypothesis.

[Please Insert Table 4.11 About Here]

4.5.3.6 Controlling for firm-risk

Ferris et al. (2017), find that well-connected CEOs are associated with riskier firms and corporate policies. Riskier firms, however, accumulate optimally higher cash reserves (Acharya et al.2012)), which may result in a negative value of cash for the corporation. To further account for the possibility that our results are driven by the value-destroying decisions taken in these risker firms, we further control for credit risk and total risk of the firms. The study uses the interest coverage ratio measured as the pre-tax income plus depreciation and amortization plus interest and related expense divided by the interest and related expense, as an inverse proxy for credit risk. Finally, the total risk of the firm is measured as the standard deviation of monthly stock returns of the previous 24 months.

The results in Table 4.12 confirm that our findings are not driven by the risk exposure of the firms. Specifications (1) and (2) confirm that our variable of interest, the coefficient on CEO connectedness, and change in cash remain negative and statistically negative even after controlling for the firm-level credit and total risk.

[Please Insert Table 4.12 About Here]

4.6. Conclusion

Are firms better off with more centrally connected CEOs? – it's a question that got significant attention in the corporate finance literature in recent times. This study addresses this question by empirically investigating the impact of CEO connectedness on the value of cash. The investigative platform of the value of cash to assess the performance of a network-powerful CEO for various reasons. First, the marginal value of cash is easily comparable among firms as it is measured as the value of $1 as perceived by the equity investors in the

firm. The panel sample can also capture both the cross-sectional and time-series variations in the total number of connections that CEOs have. Lastly, it is a well-documented phenomenon that U.S. corporations hold excessive cash reserves which cannot be explained with firm-specific determinants only (Bates et al., 2009). Consequently, it is only natural to empirically estimate the role of CEO connectedness, the hierarchical position of a CEO in a social network hierarchy, on a strategically important outcome like the marginal value of cash.

Top managers are primarily responsible for decisions related to how much cash to hold and where to use it. Managers may hoard cash in the anticipation of future uncertainty or simply to have the flexibility to exploit the investment opportunities that may arise. From the managerial perspective, the exploitation of the cash holdings depends on the power they have over the board and external monitoring agencies. Power in the realm of social science is limited in supply and therefore it is intuitive to investigate how increased power stemming from being in an authoritative position in a social network hierarchy may affect the corporate cash holdings. At the same time, corporate cash holdings remain one of the prime sources of agency conflict between the managers and shareholders (Jensen, 1986; Harford et al.,2008). Depending on how confident the investors are in the managers, the investors may assign a positive value or negative value to the increase in cash.

We test primarily two hypotheses. The reduced information asymmetry hypothesis argues that CEOs with more connections will be associated with a positive marginal value of cash. This hypothesis is based on the premise that more centrally connected managers have easier access to valuable information and hence, they can take better decisions. The CEO power hypothesis, in contrast, predicts that network powerful CEOs negatively affect the marginal value of cash. The CEO power hypothesis borrows the theoretical predictions from the approach inhabitation theory of power and provides a behavioral explanation of how increased CEO connectedness affects the marginal value of cash. According to the approach inhabitation theory of power (Keltner et al. (2003), the behavioral cognition process of powerful CEOs affects the way they hold and utilize cash in the pursuit of their individual goals and achievements. The approach inhabitation theory of power also gives the theoretical justification of why centrally connected CEOs may fail to create value even with better access to information. Supporting the CEO power hypothesis, the study finds that

controlling for the known determinants of the value of cash, having a network-powerful CEO on board is associated with a value loss of 44 cents in every $1.00 of cash holdings compared to a firm managed by a less-connected CEO.

A series of cross-sectional tests reinforce that CEO power is indeed the mechanism through which increased CEO connectedness affects the marginal value of cash. In particular, the study finds that the negative impact of network-powerful CEOs is amplified for firm-year observations with investment spikes and distributing cash regimes. In such cases, the negative association is driven by the excessive investments made by the network-powerful managers that might be aligned with shareholder holder maximization. This study also provides evidence related to agency motives of corporate cash holding as the negative association becomes more pronounced under weak corporate governance and low institutional investor monitoring. The baseline regressions further hold for a series of robustness tests such as the propensity score matching, firm-fixed effect, alternate proxies of the value of cash, alternate measures of CEO connectedness, managerial characteristics and finally controlling firm-risk. All these results mitigate the concern that the baseline regression results might be driven by sample bias or any unobserved firm heterogeneity.

These findings together have important implications for corporate finance policies. Firstly, we contribute to the debate on whether increased CEO connectedness can improve the corporate investment policies by providing evidence that increased cash holdings under network-powerful managers lead to value-destructive investment outcomes. Thus, CEO connectedness is an additional factor that may contribute to corporate investment distortions. More importantly, these findings also have great implications for the literature related to corporate governance mechanism and managerial agency conflicts as the negative effect of having network-powerful managers on the board is amplified in the absence of strong corporate governance and institutional investor monitoring. Consequently, effective boards must ensure having proper corporate governance mechanisms and institutional investor monitoring in place if they are to select a network powerful CEO for their company.

Table 4. 1 Summary statistics

Panel A of Table 4.1 shows the summary statistics of the variables used in the OLS regressions of the estimates of the value of cash by expanding the baseline model by Faulkender and Wang (2006) and introduces our main independent variable High CEO Connectedness interacting with the change in cash. The sample consists of all the S&P 1500 firms between 1990 and 2017 that pass the filters described in section 4.4.1. The dependent variable $r_{i,t} - R^B_{i,t}$ is the excess stock return of stock i in fiscal year t over the Fama and French (1993) benchmark portfolio return $R^B_{i,t}$ in the same period. $\Delta C_{i,t}$ is the change in the level of cash holdings from year t-1 to t. $M_{i,t-1}$ is the lagged market value of equity. High CEO Connectedness is a dummy variable that takes the value of 1 if the CEO's number of personal connections is greater than the median value of the sample that year or 0 otherwise. The vector of X includes all the firm-specific variables from the Faulkender and Wang (2006) valuation model to control for changes in the firm's profitability, financing, and investment policies that might be correlated with corporate liquidity policies. The control variables are : (1) $\Delta NA_{i,t}$, the yearly change in net assets; (2) $\Delta E_{i,t}$, the yearly change in earnings before extraordinary items; (3) $\Delta RD_{i,t}$, the yearly change in research and development expenses; (4) $\Delta I_{i,t}$, the yearly change in interest expense; (5) $L_{i,t}$, leverage position of the firm; (6) $NF_{i,t}$, net financing position of the firm ; (7) $\Delta D_{i,t}$, the yearly change in common dividends; and (8) $C_{i,t-1}$, the lagged value of cash holdings. Apart from $L_{i,t}$, all the control variables are standardized $M_{i,t-1}$, the lagged market value of the equity. All the continuous control variables are winsorized at the 1st and 99th percentile. The number of observations, mean, 25th percentile, median, 75th percentile, and standard deviation are reported from left to right, in sequence for each variable. Panel B presents the summary statistics according to High and Low CEO connectedness.

Panel A	N	Mean	Q1	Median	Q3	Std. Dev.
High CEO connectedness	20713	0.472	0.000	0.000	1.000	0.499
$r_{i,t} - R^B_{i,t}$	19420	0.006	-0.254	-0.045	0.176	0.438
Δ Cash	20109	0.011	-0.015	0.003	0.030	0.087
Δ Earnings	18667	0.038	-0.014	0.006	0.026	1.516
Δ Net assets	20109	0.051	-0.025	0.023	0.095	0.290
Δ Dividend	20069	-0.009	0.000	0.000	0.001	1.188
Δ Interest	18667	0.001	-.0002	0.000	0.002	0.350
Δ R&D	20123	0.001	0.000	0.000	0.001	0.009
Δ NF	20123	0.022	-0.039	-0.004	0.024	1.042
Lag cash	20115	0.129	0.028	0.073	0.161	0.171
Leverage	20699	0.190	0.028	0.139	0.286	0.193

	High CEO connectedness		Low CEO connectedness	
Panel B	Mean	Std. Dev	Mean	Std. Dev
$r_{i,t} - R^B_{i,t}$	0.004	0.418	0.008	0.457
Δ Cash	0.011	0.084	0.012	0.090
Δ Earnings	0.018	0.323	0.057	2.099
Δ Net assets	0.040	0.275	0.061	0.303
Δ Dividend	0.000	0.008	-0.017	0.010
Δ Interest	0.000	0.018	0.002	0.489
Δ R&D	0.001	0.009	0.001	0.009
Δ NF	0.009	0.357	0.034	1.410
Lag cash	0.130	0.163	0.128	0.177
Leverage	0.191	0.184	0.189	0.201

Table 4. 2 Multivariate analysis of CEO connectedness and the marginal value of cash

Table 4.2 shows the OLS regressions of the estimates of the value of cash by expanding the baseline model by Faulkender and Wang (2006) and introduces our main independent variable High CEO Connectedness interacting with the change in cash for the sample consists of all the S&P 1500 firms between 1990 and 2017 that pass the filters described in section 4.4.1. The augmented OLS regression model is:

$$r_{i,t} - R^{B}_{i,t} = \alpha + \beta_1 \times \frac{\Delta C_{i,t}}{M_{i,t-1}} + \beta_2 \times High\ CEO\ Connectedness + \beta_3 \times High\ CEO\ Connectedness \times \frac{C_{i,t}}{M_{i,t}} + \gamma' X + \varepsilon_{i,t}$$

In specifications (1) –(3), the dependent variable $r_{i,t} - R^{B}_{i,t}$ is the excess stock return of stock i in fiscal year t over the Fama and French (1993) benchmark portfolio return $R^{B}_{i,t}$ in the same period. $\Delta C_{i,t}$ is the change in the level of cash holdings from year t-1 to t. $M_{i,t-1}$ is the lagged market value of equity. High CEO Connectedness is a dummy variable that takes the value of 1 if the CEO's number of personal connections is greater than the median value of the sample that year or 0 otherwise. The vector of X includes all the firm-specific variables from the Faulkender and Wang (2006) valuation model to control for changes in the firm's profitability, financing, and investment policies that might be correlated with corporate liquidity policies. The control variables are : (1) $\Delta NA_{i,t}$, the yearly change in net assets; (2) $\Delta E_{i,t}$, the yearly change in earnings before extraordinary items; (3) $\Delta RD_{i,t}$, the yearly change in research and development expenses; (4) $\Delta I_{i,t}$, the yearly change in interest expense; (5) $L_{i,t}$, leverage position of the firm; (6) $NF_{i,t}$, net financing position of the firm ; (7) $\Delta D_{i,t}$, the yearly change in common dividends; and (8) $C_{i,t-1}$, the lagged value of cash holdings. Apart from $L_{i,t}$, all the control variables are standardized $M_{i,t-1}$, the lagged market value of the equity. All the continuous control variables are winsorized at the 1st and 99th percentile. Specification (3) further includes interaction terms between change in cash and lagged level of cash and leverage. Standard errors are adjusted for heteroskedasticity and firm clustering. ***, ** and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

	Base	**Time and Industry Dummy**	**Cash Level and Leverage**
	(1)	**(2)**	**(3)**
ΔCash	1.980***	1.918***	2.118***
	(20.783)	(20.074)	(26.726)
High CEO connectedness	-0.011	-0.015	-0.005
	(-0.880)	(-1.178)	(-0.394)
ΔCash × High CEO connectedness	-0.412***	-0.416***	-0.440***
	(-2.950)	(-2.982)	(-5.051)
Lag Cash			0.121***
			(10.835)
ΔCash × Lag Cash			-0.008***
			(-7.898)
Leverage			-0.375***
			(-11.114)
ΔCash × Leverage			-1.049***
			(-8.004)
ΔEarnings	0.677***	0.671***	0.617***
	(37.296)	(36.928)	(33.535)
ΔNet assets	-0.009	-0.006	0.050***

	(-1.229)	(-0.797)	(3.959)
ΔDividends	0.487***	0.489***	0.549***
	(3.737)	(3.748)	(3.654)
ΔInterest	-1.404***	-1.407***	-1.015***
	(-10.056)	(-10.060)	(-6.652)
ΔR&D	1.364**	1.584**	0.782
	(1.967)	(2.261)	(1.132)
ΔNet financing	0.053***	0.053***	-0.073***
	(3.638)	(3.604)	(-3.042)
Industry Fixed Effect	No	Yes	Yes
Time Fixed Effect	No	Yes	Yes
N	17,967	17,967	17,967
Adjusted R square	0.112	0.120	0.154

Table 4. 3 Investment regimes

Table 4.3 shows the OLS regressions of the estimates of the CEO connectedness and value of cash by interacting with the investment regimes. The sample consists of all the S&P 1500 firms between 1990 and 2017 that pass the filters described in section 4.4.1. In specifications (1) – (2), the dependent variable $r_{i,t} - R_{i,t}^{B}$ is the excess stock return of stock i in fiscal year t over the Fama and French (1993) benchmark portfolio return $R_{i,t}^{B}$ in the same period. $\Delta C_{i,t}$ is the change in the level of cash holdings from year t-1 to t. $M_{i,t-1}$ is the lagged market value of equity. High CEO Connectedness is a dummy variable that takes the value of 1 if the CEO's number of personal connections is greater than the median value of the sample that year or 0 otherwise. The vector of X includes all the firm-specific variables from the Faulkender and Wang (2006) valuation model to control for changes in the firm's profitability, financing, and investment policies that might be correlated with corporate liquidity policies. The control variables are : (1) $\Delta NA_{i,t}$, the yearly change in net assets; (2) $\Delta E_{i,t}$, the yearly change in earnings before extraordinary items; (3) $\Delta RD_{i,t}$, the yearly change in research and development expenses; (4) $\Delta I_{i,t}$, the yearly change in interest expense; (5) $L_{i,t}$, leverage position of the firm; (6) $NF_{i,t}$, net financing position of the firm ; (7) $\Delta D_{i,t}$, the yearly change in common dividends; and (8) $C_{i,t-1}$, the lagged value of cash holdings. Apart from $L_{i,t}$, all the control variables are standardized $M_{i,t-1}$, the lagged market value of the equity. All the continuous control variables are winsorized at the 1st and 99th percentile. Specifications (1) and (2) further include interaction terms between change in cash and lagged level of cash and leverage. Spikes is a dummy variable that takes the value of 1 for observations with investment rates greater than 50% and 0 otherwise. We define an investment spike when the investment rate exceeds 50%. Standard errors are adjusted for heteroskedasticity and firm clustering. ***, ** and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

	(1)	**(2)**
ΔCash	2.056***	2.432***
	(24.590)	(19.623)
High CEO connectedness	-0.008	0.019
	(-0.598)	(0.682)
ΔCash × High CEO connectedness	-0.371***	-1.611***
	(-3.932)	(-7.496)
ΔCash × High CEO connectedness× Investment spikes	-0.645*	
	(-1.823)	
Investment spikes	-0.032	
	(-1.247)	
ΔCash ×Investment spikes	0.264	
	(1.078)	
High CEO connectedness× Investment spikes	0.017	
	(0.471)	
ΔCash × High CEO connectedness× (1-Investment spikes)		1.380***
		(6.135)
(1-Investment spikes)		0.034
		(1.583)
ΔCash ×(1-Investment spikes)		-0.400***
		(-3.939)
High CEO connectedness× (1-Investment spikes)		-0.031
		(-1.002)
Control variables	Yes	Yes
Industry fixed effect	Yes	Yes
Time fixed effect	Yes	Yes
N	17,172	17,172
Adjusted R square	0.154	0.155

Table 4. 4 Corporate governance

Table 4.4 shows the OLS regressions of the estimates of the CEO connectedness and value of cash by the subsamples of corporate governance mechanism. The sample consists of all the S&P 1500 firms between 1990 and 2017 that pass the filters described in section 4.4.1. In specifications (1) – (2), the dependent variable $r_{i,t} - R_{i,t}^{B}$ is the excess stock return of stock i in fiscal year t over the Fama and French (1993) benchmark portfolio return $R_{i,t}^{B}$ in the same period. $\Delta C_{i,t}$ is the change in the level of cash holdings from year t-1 to t. $M_{i,t-1}$ is the lagged market value of equity. High CEO Connectedness is a dummy variable that takes the value of 1 if the CEO's number of personal connections is greater than the median value of the sample that year or 0 otherwise. The vector of X includes all the firm-specific variables from the Faulkender and Wang (2006) valuation model to control for changes in the firm's profitability, financing, and investment policies that might be correlated with corporate liquidity policies. The control variables are : (1) $\Delta NA_{i,t}$, the yearly change in net assets; (2) $\Delta E_{i,t}$, the yearly change in earnings before extraordinary items; (3) $\Delta RD_{i,t}$, the yearly change in research and development expenses; (4) $\Delta I_{i,t}$, the yearly change in interest expense; (5) $L_{i,t}$, leverage position of the firm; (6) $NF_{i,t}$, net financing position of the firm ; (7) $\Delta D_{i,t}$, the yearly change in common dividends; and (8) $C_{i,t-1}$, the lagged value of cash holdings. Apart from $L_{i,t}$, all the control variables are standardized $M_{i,t-1}$, the lagged market value of the equity. All the continuous control variables are winsorized at the 1st and 99th percentile. Specifications (1) and (2) further include interaction terms between change in cash and lagged level of cash and leverage. We use the entrenchment (E) index by Bebchuck et al. (2009) to proxy for the quality of the corporate governance of the firm. Bebchuck et al. (2009). Good governance is a dummy that takes the value of 1 if the firm belongs to the bottom tercile of the entrenchment index and 0 otherwise. Weak Governance, a dummy variable that takes the value of 1 if it does not belong to the Good Governance, and 0 otherwise. Standard errors are adjusted for heteroskedasticity and firm clustering. ***, ** and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

	Weak governance	**Good governance**
	(1)	**(2)**
ΔCash	2.099***	2.072***
	(26.987)	(5.117)
High CEO connectedness	-0.002	-0.018
	(-0.130)	(-0.431)
ΔCash × High CEO connectedness	-0.393***	-0.465
	(-4.535)	(-1.122)
Control variables	Yes	Yes
Industry fixed effect	No	Yes
Time Fixed effect	No	Yes
N	15,264	2,703
Adjusted R square	0.188	0.036

Table 4. 5 Institutional investor monitoring

Table 4.5 shows the OLS regressions of the estimates of the CEO connectedness and value of cash by the subsamples of institutional investor monitoring. The sample consists of all the S&P 1500 firms between 1990 and 2017 that pass the filters described in section 4.4.1 In specifications (1) –(4), the dependent variable $r_{i,t} - R_{i,t}^{B}$ is the excess stock return of stock i in fiscal year t over the Fama and French (1993) benchmark portfolio return $R_{i,t}^{B}$ in the same period. $\Delta C_{i,t}$ is the change in the level of cash holdings from year t-1 to t. $M_{i,t-1}$ is the lagged market value of equity. High CEO Connectedness is a dummy variable that takes the value of 1 if the CEO's number of personal connections is greater than the median value of the sample that year or 0 otherwise. The vector of X includes all the firm-specific variables from the Faulkender and Wang (2006) valuation model to control for changes in the firm's profitability, financing, and investment policies that might be correlated with corporate liquidity policies. The control variables are : (1) $\Delta NA_{i,t}$, the yearly change in net assets; (2) $\Delta E_{i,t}$, the yearly change in earnings before extraordinary items; (3) $\Delta RD_{i,t}$, the yearly change in research and development expenses; (4) $\Delta I_{i,t}$, the yearly change in interest expense; (5) $L_{i,t}$, leverage position of the firm; (6) $NF_{i,t}$, net financing position of the firm ; (7) $\Delta D_{i,t}$, the yearly change in common dividends; and (8) $C_{i,t-1}$, the lagged value of cash holdings. Apart from $L_{i,t}$, all the control variables are standardized $M_{i,t-1}$, the lagged market value of the equity. All the continuous control variables are winsorized at the 1st and 99th percentile. Specifications (1)-(4) further include interaction terms between change in cash and lagged level of cash and leverage. The proxies for the institutional investor monitoring are: 1) High institutional ownership, a dummy variable equals to 1 if top 5 institutional ownership is greater than the 75th percentile and 0 otherwise; 2) Low institutional ownership, a dummy variable equals to 1 if top 5 institutional ownership is lower than the 25th percentile and 0 otherwise; 3) High blockholder ownership: a dummy variable equals 1 if block holder ownership variable is higher than the 75th percentile value of our sample and 0 otherwise; 4) Low blockholder ownership: a dummy variable equals 1 if block holder ownership variable is less than the 25th percentile value of our sample and 0 otherwise. Standard errors are adjusted for heteroskedasticity and firm clustering. ***, ** and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

	Low IO	**High IO**	**Low Blockholder**	**High Blockholder**
	(1)	**(2)**	**(1)**	**(2)**
ΔCash	1.721***	0.785***	2.622***	1.362***
	(11.460)	(8.933)	(8.629)	(8.844)
High CEO connectedness	-0.035	0.048***	0.016	0.047*
	(-1.482)	(3.264)	(0.433)	(1.848)
ΔCash × High CEO connectedness	-0.978***	0.520***	-1.958***	-0.000
	(-6.648)	(4.221)	(-6.496)	(-0.000)
Control variables	Yes	Yes	Yes	Yes
Industry fixed effect	No	Yes	No	Yes
Time Fixed effect	No	Yes	No	Yes
N	3,602	3,720	3,321	3,303
Adjusted R square	0.172	0.413	0.243	0.128

Table 4. 6 Cash regimes

Table 4.6 shows the OLS regressions of the estimates of the CEO connectedness and value of cash by the subsamples of cash regimes. The sample consists of all the S&P 1500 firms between 1990 and 2017 that pass the filters described in section 4.4.1. In specifications (1) – (2), the dependent variable $r_{i,t} - R_{i,t}^{B}$ is the excess stock return of stock i in fiscal year t over the Fama and French (1993) benchmark portfolio return $R_{i,t}^{B}$ in the same period. $\Delta C_{i,t}$ is the change in the level of cash holdings from year t-1 to t. $M_{i,t-1}$ is the lagged market value of equity. High CEO Connectedness is a dummy variable that takes the value of 1 if the CEO's number of personal connections is greater than the median value of the sample that year or 0 otherwise. The vector of X includes all the firm-specific variables from the Faulkender and Wang (2006) valuation model to control for changes in the firm's profitability, financing, and investment policies that might be correlated with corporate liquidity policies. The control variables are : (1) $\Delta NA_{i,t}$, the yearly change in net assets; (2) $\Delta E_{i,t}$, the yearly change in earnings before extraordinary items; (3) $\Delta RD_{i,t}$, the yearly change in research and development expenses; (4) $\Delta I_{i,t}$, the yearly change in interest expense; (5) $L_{i,t}$, leverage position of the firm; (6) $NF_{i,t}$, net financing position of the firm ; (7) $\Delta D_{i,t}$, the yearly change in common dividends; and (8) $C_{i,t-1}$, the lagged value of cash holdings. Apart from $L_{i,t}$, all the control variables are standardized $M_{i,t-1}$, the lagged market value of the equity. All the continuous control variables are winsorized at the 1st and 99th percentile. Specifications (1) and (2) further include interaction terms between change in cash and lagged level of cash and leverage. Raising regime is a dummy that takes a value of 1 if a firm issues equity and does not pay dividends, 0 otherwise. Distributing regime, a dummy variable that takes the value of 1 if a firm does not belong to the raising regime, and distributes dividends, 0 otherwise. Standard errors are adjusted for heteroskedasticity and firm clustering. ***, ** and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

	Raising regime	**Distributing regime**
	(1)	**(2)**
ΔCash	2.546***	0.822***
	(4.665)	(13.203)
High CEO connectedness	-0.062	0.003
	(-0.503)	(0.471)
ΔCash × High CEO connectedness	-0.178	-0.309***
	(-0.230)	(-3.425)
Control variables	Yes	Yes
Industry fixed effect	No	Yes
Time Fixed effect	No	Yes
N	1,321	10,325
Adjusted R square	0.226	0.090

Table 4. 7 Propensity score matching

Table 4.7 table presents the results of propensity score matching (PSM) analysis of the estimates of the value of cash by expanding the baseline model by Faulkender and Wang (2006) and introduces our main independent variable High CEO Connectedness interacting with the change in cash. The sample consists of all the S&P 1500 firms between 1990 and 2017 that pass the filters described in section 4.4.1. In specifications (1) –(3), the dependent variable $r_{i,t} - R_{i,t}^{B}$ is the excess stock return of stock i in fiscal year t over the Fama and French (1993) benchmark portfolio return $R_{i,t}^{B}$ in the same period. $\Delta C_{i,t}$ is the change in the level of cash holdings from year t-1 to t. $M_{i,t-1}$ is the lagged market value of equity. High CEO Connectedness is a dummy variable that takes the value of 1 if the CEO's number of personal connections is greater than the median value of the sample that year or 0 otherwise. The vector of X includes all the firm-specific variables from the Faulkender and Wang (2006) valuation model to control for changes in the firm's profitability, financing, and investment policies that might be correlated with corporate liquidity policies. The control variables are : (1) $\Delta NA_{i,t}$, the yearly change in net assets; (2) $\Delta E_{i,t}$, the yearly change in earnings before extraordinary items; (3) $\Delta RD_{i,t}$, the yearly change in research and development expenses; (4) $\Delta I_{i,t}$, the yearly change in interest expense; (5) $L_{i,t}$, leverage position of the firm; (6) $NF_{i,t}$, net financing position of the firm ; (7) $\Delta D_{i,t}$, the yearly change in common dividends; and (8) $C_{i,t-1}$, the lagged value of cash holdings. Apart from $L_{i,t}$, all the control variables are standardized $M_{i,t-1}$, the lagged market value of the equity. All the continuous control variables are winsorized at the 1st and 99th percentile. Specification (3) further includes interaction terms between change in cash and lagged level of cash and leverage. The matching sample is constructed by matching each firm with a control firm. The control firm is a firm that is not managed by a network-powerful CEO (i.e, does not belong to the high CEO connection group), however, has a close propensity score to the treated firms based on the one-to-one nearest neighbor matching with replacement. To match the firms, we use the following covariates based on all the control variables in the specification (3) of table 2 without including the interaction terms of change in cash. Next, for each firm-year observation with a network-powerful CEO, we find a similar firm matched by a less-connected CEO based on the nearest neighbor matching technique. Standard errors are adjusted for heteroskedasticity and firm clustering. ***, ** and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

	(1)	**(2)**	**(3)**
ΔCash	2.129***	2.058***	2.121***
	(12.025)	(11.609)	(15.748)
High CEO connectedness	0.025	0.026	0.005
	(0.915)	(0.929)	(0.200)
ΔCash × High CEO connectedness	-0.471**	-0.483**	-0.516***
	(-2.244)	(-2.306)	(-5.721)
Control variables	Yes	Yes	Yes
Industry fixed effect	No	Yes	Yes
Time Fixed effect	No	Yes	Yes
N	8,645	8,645	8,645
Adjusted R square	0.164	0.173	0.283

Table 4. 8 Firm fixed effect

Table 4.8 shows the OLS regressions of the estimates of the CEO connectedness and value of cash after controlling for firm-fixed effects. The sample consists of all the S&P 1500 firms between 1990 and 2017 that pass the filters described in section 4.4.1. In specifications (1) – (3), the dependent variable $r_{i,t} - R^B_{i,t}$ is the excess stock return of stock i in fiscal year t over the Fama and French (1993) benchmark portfolio return $R^B_{i,t}$ in the same period. $\Delta C_{i,t}$ is the change in the level of cash holdings from year t-1 to t. $M_{i,t-1}$ is the lagged market value of equity. High CEO Connectedness is a dummy variable that takes the value of 1 if the CEO's number of personal connections is greater than the median value of the sample that year or 0 otherwise. The vector of X includes all the firm-specific variables from the Faulkender and Wang (2006) valuation model to control for changes in the firm's profitability, financing, and investment policies that might be correlated with corporate liquidity policies. The control variables are : (1) $\Delta NA_{i,t}$, the yearly change in net assets; (2) $\Delta E_{i,t}$, the yearly change in earnings before extraordinary items; (3) $\Delta RD_{i,t}$, the yearly change in research and development expenses; (4) $\Delta I_{i,t}$, the yearly change in interest expense; (5) $L_{i,t}$, leverage position of the firm; (6) $NF_{i,t}$, net financing position of the firm ; (7) $\Delta D_{i,t}$, the yearly change in common dividends; and (8) $C_{i,t-1}$, the lagged value of cash holdings. Apart from $L_{i,t}$, all the control variables are standardized $M_{i,t-1}$, the lagged market value of the equity. All the continuous control variables are winsorized at the 1st and 99th percentile. Specification (3) further includes interaction terms between change in cash and lagged level of cash and leverage. Standard errors are adjusted for heteroskedasticity and firm clustering. ***, ** and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

	(1)	**(2)**	**(3)**
ΔCash	1.958***	1.895***	2.111***
	(20.006)	(19.320)	(25.989)
High CEO connectedness	0.000	-0.002	0.009
	(0.011)	(-0.093)	(0.469)
ΔCash × High CEO connectedness	-0.480***	-0.480***	-0.516***
	(-3.335)	(-3.347)	(-5.721)
Control variables	Yes	Yes	Yes
Firm Fixed Effect	Yes	Yes	Yes
Industry fixed effect	No	Yes	Yes
Time Fixed effect	No	Yes	Yes
N	17,941	17,941	17,941
Adjusted R square	0.114	0.121	0.164

Table 4. 9 Controlling for managerial characteristics

Table 4.9 shows the OLS regressions of the estimates of the CEO connectedness and value of cash after controlling for managerial attributes. The sample consists of all the S&P 1500 firms between 1990 and 2017 that pass the filters described in section 4.4.1.In specifications (1) –(3), the dependent variable $r_{i,t} - R^{B}_{i,t}$ is the excess stock return of stock i in fiscal year t over the Fama and French (1993) benchmark portfolio return $R^{B}_{i,t}$ in the same period. $\Delta C_{i,t}$ is the change in the level of cash holdings from year t-1 to t. $M_{i,t-1}$ is the lagged market value of equity. High CEO Connectedness is a dummy variable that takes the value of 1 if the CEO's number of personal connections is greater than the median value of the sample that year or 0 otherwise. The vector of X includes all the firm-specific variables from the Faulkender and Wang (2006) valuation model to control for changes in the firm's profitability, financing, and investment policies that might be correlated with corporate liquidity policies. The control variables are : (1) $\Delta NA_{i,t}$, the yearly change in net assets; (2) $\Delta E_{i,t}$, the yearly change in earnings before extraordinary items; (3) $\Delta RD_{i,t}$, the yearly change in research and development expenses; (4) $\Delta I_{i,t}$, the yearly change in interest expense; (5) $L_{i,t}$, leverage position of the firm; (6) $NF_{i,t}$, net financing position of the firm ; (7) $\Delta D_{i,t}$, the yearly change in common dividends; and (8) $C_{i,t-1}$, the lagged value of cash holdings. Apart from $L_{i,t}$, all the control variables are standardized $M_{i,t-1}$, the lagged market value of the equity. Specifications (1)-(6) further include interaction terms between change in cash and lagged level of cash and leverage. CEO gender is a dummy variable that takes the value of 1 if the firm is managed by a female CEO and 0 otherwise. Managerial ability is the managerial ability index developed by Demerjian et al. (2012) as a proxy for managerial ability. The authors construct this index based on managers' ability to generate revenue for the firms. CEO pay slice is the fraction of the aggregate compensation of the top-five executive team captured by the CEO pay slice. CEO duality is a dummy variable that takes a value of 1 when the CEO is also chairman of the board and O otherwise. CEO age is measured as the natural log of the age of the CEO. All the continuous control variables are winsorized at the 1st and 99th percentile. Standard errors are adjusted for heteroskedasticity and firm clustering. ***, ** and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
ΔCash	2.083***	2.178***	1.888***	2.552***	1.052***	2.249**
	(25.480)	(18.607)	(8.848)	(20.000)	(3.480)	(2.478)
High CEO connectedness	-0.005	-0.031*	0.006	0.004	-0.008	-0.002
	(-0.403)	(-1.651)	(0.479)	(0.329)	(-0.615)	(-0.109)
ΔCash× High CEO connectedness	-0.419***	-0.256**	-0.293**	-0.373***	-0.441***	-0.615***
	(-4.603)	(-2.014)	(-2.538)	(-3.210)	(-4.809)	(-2.846)
CEO gender	-0.040					-0.049
	(-0.995)					(-0.611)
ΔCash × CEO gender	-0.046					0.662
	(-0.117)					(0.648)
Managerial ability		-0.051				-0.038
		(-0.740)				(-0.464)
ΔCash ×Managerial ability		0.789*				0.756
		(1.711)				(1.048)
CEO pay slice			-0.009			-0.080
			(-0.207)			(-1.164)
ΔCash × CEO pay slice			1.299***			0.755
			(2.868)			(0.891)
CEO duality				-0.007		-0.008
				(-0.547)		(-0.369)

ΔCash × CEO duality				-0.325***		-0.774***
				(-2.657)		(-3.576)
CEO age					-0.002***	-0.001
					(-2.587)	(-0.369)
ΔCash × CEO age					0.019***	0.010
					(3.582)	(0.649)
Industry Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes
Time Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes
N	17,172	10,538	12,999	13,539	17,104	6,663
Adjusted R square	0.154	0.142	0.236	0.237	0.156	0.183

Table 4. 10 Alternate valuation model

Table 4.10 shows the OLS regressions of the estimates of the CEO connectedness and value of cash for an alternate valuation model following Pinkowitz et al. (2006). The sample consists of all the S&P 1500 firms between 1990 and 2017 that pass the filters described in section 4.4.1. In specifications (1) and (2) the dependent variable is the market-to-book-assets ratio. $\Delta C_{i,t}$ is the change in the level of cash holdings from year t-1 to t. High CEO Connectedness is a dummy variable that takes the value of 1 if the CEO's number of personal connections is greater than the median value of the sample that year or 0 otherwise. The control variables are from the Pinkowitz et al. (2006) modelAll the continuous control variables are winsorized at the 1st and 99th percentile. Standard errors are adjusted for heteroskedasticity and firm clustering. ***, ** and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

	(1)	**(2)**
ΔCash	1.137***	1.182***
	(11.082)	(11.684)
High CEO connectedness	0.077***	0.058**
	(3.100)	(2.364)
ΔCash × High CEO connectedness	-0.492***	-0.486***
	(-2.742)	(-2.765)
Control variables	Yes	Yes
Industry fixed effect	No	Yes
Time Fixed effect	No	Yes
N	18,191	18,191
Adjusted R square	0.551	0.569

Table 4. 11 Alternate constructions of CEO connectedness

Table 4.11 shows the OLS regressions of the estimates of the CEO connectedness and value of cash for alternate constructions of CEO connectedness. The sample consists of all the S&P 1500 firms between 1990 and 2017 that pass the filters described in section 4.4.1. In specifications (1) and (2), the dependent variable $r_{i,t} - R^B_{i,t}$ is the excess stock return of stock i in fiscal year t over the Fama and French (1993) benchmark portfolio return $R^B_{i,t}$ in the same period. $\Delta C_{i,t}$ is the change in the level of cash holdings from year t-1 to t. $M_{i,t-1}$ is the lagged market value of equity. Degree centrality is the natural logarithm of the total number of connections a CEO has in a particular year. CEO connectedness rank captures the change in the cash holdings with a one-unit change in the comparative position of a CEO in the social network hierarchy. The vector of X includes all the firm-specific variables from the Faulkender and Wang (2006) valuation model to control for changes in the firm's profitability, financing, and investment policies that might be correlated with corporate liquidity policies. The control variables are : (1) $\Delta NA_{i,t}$, the yearly change in net assets; (2) $\Delta E_{i,t}$, the yearly change in earnings before extraordinary items; (3) $\Delta RD_{i,t}$, the yearly change in research and development expenses; (4) $\Delta I_{i,t}$, the yearly change in interest expense; (5) $L_{i,t}$, leverage position of the firm; (6) $NF_{i,t}$, net financing position of the firm ; (7) $\Delta D_{i,t}$, the yearly change in common dividends; and (8) $C_{i,t-1}$, the lagged value of cash holdings. Apart from $L_{i,t}$, all the control variables are standardized $M_{i,t-1}$, the lagged market value of the equity. All the continuous control variables are winsorized at the 1st and 99th percentile. Specifications (1) and (2) further include interaction terms between change in cash and lagged level of cash and leverage. Standard errors are adjusted for heteroskedasticity and firm clustering. ***, ** and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

	(1)	**(2)**
ΔCash	2.877***	2.214***
	(15.753)	(20.943)
Degree centrality	0.005	
	(1.026)	
ΔCash × Degree centrality	-0.170***	
	(-5.713)	
CEO connectedness rank		-0.000
		(-0.134)
ΔCash × CEO connectedness rank		-0.006***
		(-3.817)
Control variables	Yes	Yes
Industry fixed effect	Yes	Yes
Time Fixed effect	Yes	Yes
N	17,466	17,967
Adjusted R square	0.158	0.153

Table 4. 12 Controlling for firm-risk

Table 12 shows the OLS regressions of the estimates of the CEO connectedness and value of cash after controlling for firm risk. The sample consists of all the S&P 1500 firms between 1990 and 2017 that pass the filters described in section 4.4.1. In specifications (1) and (2), the dependent variable $r_{i,t} - R_{i,t}^{B}$ is the excess stock return of stock i in fiscal year t over the Fama and French (1993) benchmark portfolio return $R_{i,t}^{B}$ in the same period. $\Delta C_{i,t}$ is the change in the level of cash holdings from year t-1 to t. $M_{i,t-1}$ is the lagged market value of equity. High CEO Connectedness is a dummy variable that takes the value of 1 if the CEO's number of personal connections is greater than the median value of the sample that year or 0 otherwise. The vector of X includes all the firm-specific variables from the Faulkender and Wang (2006) valuation model to control for changes in the firm's profitability, financing, and investment policies that might be correlated with corporate liquidity policies. The control variables are : (1) $\Delta NA_{i,t}$, the yearly change in net assets; (2) $\Delta E_{i,t}$, the yearly change in earnings before extraordinary items; (3) $\Delta RD_{i,t}$, the yearly change in research and development expenses; (4) $\Delta I_{i,t}$, the yearly change in interest expense; (5) $L_{i,t}$, leverage position of the firm; (6) $NF_{i,t}$, net financing position of the firm ; (7) $\Delta D_{i,t}$, the yearly change in common dividends; and (8) $C_{i,t-1}$, the lagged value of cash holdings. Apart from $L_{i,t}$, all the control variables are standardized $M_{i,t-1}$, the lagged market value of the equity. All the continuous control variables are winsorized at the 1st and 99th percentile. Specifications (1) and (2) further include interaction terms between change in cash and lagged level of cash and leverage. The interest coverage ratio is measured as the pretax income plus depreciation and amortization plus interest and related expense divided by the interest and related expense, as an inverse proxy for credit risk. The total risk of the firm is measured as the standard deviation of monthly stock returns of the previous 24 months. Standard errors are adjusted for heteroskedasticity and firm clustering. ***, ** and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

	(1)	**(2)**
ΔCash	1.944***	0.258***
	(23.454)	(2.671)
High CEO connectedness	-0.005	0.028**
	(-0.434)	(2.372)
ΔCash × High CEO connectedness	-0.477***	-0.778***
	(-5.311)	(-9.151)
Interest coverage ratio	-0.000	
	(-1.511)	
ΔCash × Interest coverage ratio	-0.000	
	(-0.376)	
Total risk		2.125***
		(19.116)
ΔCash × Total Risk		7.404***
		(29.138)
Control variables	Yes	Yes
Industry fixed effect	Yes	Yes
Time Fixed effect	Yes	Yes
N	16,899	17,966
Adjusted R square	0.150	0.214

Chapter 5: Conclusion

This thesis employs both the irrational investor-rational manager and rational investor-irrational manager frameworks to offer behavioral explanations to three distinct corporate outcomes: (i) bidder abnormal returns, (ii) corporate cash holdings, and (iii) marginal value of cash. Neoclassical theorists while identifying various determinants of bidder abnormal returns and corporate cash holdings inherently assume that the primary agents of a financial contract, the investors and the managers always make rational decisions. In contrast, the behavioral literature finds that under the presence of different cognitive biases, both irrational investors and irrational managers undertake less than efficient decisions. We use the behavioral settings of the irrational investor-rational manager and the irrational manager-rational investor to provide an in-depth analysis of how the different behavioral biases of the investors and managers can affect the decisions related to corporate takeovers and cash holdings.

In the first empirical study in chapter 2, we use the irrational investor-rational manager framework to propose a previously unexplored behavioral dimension of investor attention- overnight returns in explaining bidder abnormal returns. Previous literature (i.e., Barber and Odean 2012; Berkman et al., 2012) finds a positive association between attention and stock market returns. However, our study goes beyond this reaction between retail investor trading and stock market returns in the normal period and focuses on the merger announcement period when the market value of the bidder is more susceptible to the subjective valuations by the retail investors. We propose AOR as a new proxy of retail investor attention based on the recent findings on overnight returns: investor heterogeneity drives the contrasting returns pattern between the overnight and intraday periods while the retail traders are more likely to place orders in the overnight period for the stocks that have grabbed their attention, especially when the significance of the news is such that these trades are too costly to delay (Berkman et al., 2012; Lou et al., 2019).

To proxy for investor attention faced by US bidders, we estimate the average AOR from -20 to -3 days before the takeover announcement. We argue that in the presence of overnight attention, retail investors overestimate their ability to make a correct prediction and underestimate the risks associated with mergers. Supporting the conjecture, we find robust evidence of AOR positively affecting bidder abnormal returns. In particular, 1 % increase in AOR before the announcement leads to a 0.42% percent increase in the bidder

CARs. The found positive association between the AOR and bidder CARs supports the price pressure hypothesis of investor attention as the AOR-induced short-term overreaction in the market is followed by returns reversals in the post-announcement days.

Moreover, we exploit the research setting of the stock swap deals and find that AOR positively affects the bidder abnormal returns of the private stocks and at the same time, negatively affects the bidder abnormal returns of public stock announcements. The alternate reaction to stock swap deals means that AOR indeed captures retail investor attention, not sentiment. Additionally, several other cross-sectional tests show that the positive impact of AOR on bidder abnormal returns is stronger for bidders with low institutional ownership and bidders that are hard to value. The moderating role of AOR around the bidder abnormal returns further holds for several robustness tests including alternate windows of CARs, alternate definitions of AOR, propensity score matching, and instrumental variable analysis.

Our first empirical investigation in Chapter 2 makes several important implications for academics, investors, and even policymakers. To our knowledge, this is the first paper that uses this research setting of divergent investors between the overnight and intraday periods on the bidder abnormal returns. For empirical researchers, especially in behavioral finance, finding an appropriate proxy to capture a behavioral bias remains a daunting challenge. While the search volume index proposed by Da et al. (2011) can capture retail investor attention, however, the lack of data remains a hurdle, especially for the deals that fail to generate significant news. Our proposed proxy of investor attention can be constructed easily for all the publicly traded stocks and use in other research contexts.

The behavioral findings offered in Chapter 2 have practical implications for both the professional and retail investor. Professional investors can monitor the attention-driven investor biases captured through extreme overnight returns and make additional profit by trading against the retail investors. Moreover, financial service firms can inform their fintech teams to integrate such biases and update their product offerings accordingly. Based on the knowledge that the AOR-driven trading strategies may lead to higher short-term gains followed by long-term underperformance, the retail investors can use this information to adjust their trading strategies accordingly. Besides, the market regulators and the policymakers can use these findings to inform and train the individual investors not to initiate

trades that are driven by attention bias. Finally, in a period characterized by great uncertainty, these findings have great implications for the corporate managers who regularly assess the prevailing risks while strategically timing their corporate announcements including mergers.

Chapters 3 and 4 use the behavioral framework of irrational manager-rational investors to empirically estimate the role of CEO connectedness on the outcomes related to corporate cash holdings. Starting from the pioneering proposition by Roll (1986), the extant literature finds that different managerial biases lead to less than efficient corporate outcomes. More recently, the moderating role of the CEO connectedness, the relative position of the CEOs in their social network hierarchy in explaining various corporate outcomes has gained momentum in the corporate finance literature. Corporate liquidity gives us an interesting research setting because managers may simply hoard cash in times of higher uncertainty or to have the flexibility to exploit the investment opportunities that may arise. From the managerial perspective, the exploitation of the cash holdings depends on the power they have over the board and external monitoring agencies. Power in the realm of social science is limited in supply and therefore it is intuitive to investigate how increased power stemming from being in an authoritative position in a social network hierarchy may affect the managerial decision-making process. Lastly, it is a well-documented phenomenon that U.S. corporations hold excessive cash reserves which cannot be explained with firm-specific determinants only (Bates et al., 2009). Consequently, it is only natural to empirically estimate the role of CEO connectedness, in a strategically important decision like cash holdings.

We test primarily two hypotheses. The reduced information asymmetry hypothesis argues that CEOs with more connections will be associated with lower cash holdings. This hypothesis is based on the premise that more centrally connected managers have easier access to valuable information and hence, they have easier access to cash, reducing the precautionary need of cash holdings. In contrast, the CEO power hypothesis borrows the theoretical predictions approach inhabitation theory of power and provides a behavioral explanation of how network-powerful CEOs hold more cash. According to the approach inhabitation theory of power (Keltner et al. (2003), the behavioral cognition process of powerful CEOs affects the way they hold and utilize cash in the pursuit of their individual goals and achievements. The approach inhabitation theory of power also gives the theoretical

justification of why centrally connected CEOs may fail to create value even with better access to information. This is also in line with the propositions by Kipnis (1972, 1976) that increased power corrupts the decision-making process of the individuals and the results are more profound for the managers with strong decision-making power.

Supporting the CEO power hypothesis, we find that network-powerful CEOs hold more cash. We further report a series of cross-sectional tests that confirm that CEO power is indeed the mechanism through which the CEO social network position affects the corporate cash holdings. In particular, we find that the positive association between CEO social network hierarchy and level of cash holdings to be stronger for firm-year observations with low investments, high financial constraint status, weak corporate governance, weak institutional investor monitoring, and raising cash regimes. Our baseline regression model further holds for a battery of robustness tests including propensity score matching, firm-fixed effect, alternate proxies of the value of cash, alternate measures of CEO connectedness, and finally controlling for managerial characteristics.

Managers may hoard cash in the anticipation of future uncertainty or simply to have the flexibility to exploit the investment opportunities that may arise. From the managerial perspective, the exploitation of the cash holdings depends on the power they have over the board and external monitoring agencies. At the same time, corporate cash holdings remain one of the prime sources of agency conflict between the managers and shareholders (Jensen, 1986; Harford et al., 2008). Depending on how confident the investors are in the managers, the investors may assign a positive value or negative value to the increase in cash. The CEO power mechanism predicts that increased CEO connectedness may affect the corporate cash holdings due to both the precautionary and agency motive of cash holdings. To disentangle to relationship and get a clearer picture of why more centrally connected CEOs hold more cash holdings, in Chapter 4 we empirically investigate the impact of CEO connectedness on the marginal value of cash. The investigative platform of the value of cash allows us to empirically evaluate if the additional 1 dollar raised by the network-powerful CEO leads to value-enhancing or value-destructive outcomes for the firms.

The results from the baseline regression models in Chapter 4 confirm that controlling for the known determinants of the value of cash, having a network-powerful CEO on board

is associated with a value loss of 44 cents in every $1.00 of cash holdings compared to a firm managed by a less-connected CEO. The negative coefficient on CEO connectedness confirms the notion that network powerful managers hold excess cash to invest in projects with non-pecuniary benefits. A series of cross-sectional tests reinforce that CEO power is indeed the mechanism through which increased CEO connectedness affects the marginal value of cash. Specifically, we find that the detrimental effect of network-powerful CEOs on the marginal value of cash is more severe in the firm-year observations with investment spikes and distributing cash regimes. This study also provides evidence related to agency motives of corporate cash holding as the negative association becomes more pronounced under weak corporate governance and low institutional investor monitoring. The baseline regressions further hold for a series of robustness tests such as the propensity score matching, firm-fixed effect, alternate proxies of the value of cash, alternate measures of CEO connectedness, managerial characteristics and finally controlling firm-risk. All these results mitigate the concern that the baseline regression results might be driven by sample bias or any unobserved firm heterogeneity.

Our findings from Chapters 3 and 4 contribute to the growing debate on whether appointing network-powerful CEOs can benefit the corporations in the long run. The less than efficient decision outcomes of the network-powerful CEOs in managing corporate liquidity imply that increased CEO connectedness is one additional factor that distorts corporate investments. Besides, these findings also have great implications for the literature related to corporate governance mechanism and managerial agency conflicts as the negative effect of having network-powerful managers on the board is amplified in the absence of strong corporate governance and strong institutional investor monitoring. To sum up, one of the main conclusions discussed in this thesis is that network-powerful managers are more likely to destroy values in the outcomes related to corporate cash holdings. However, good corporate governance and strong institutional monitoring can attenuate the wealth destruction of the network-powerful CEOs. Consequently, effective boards must ensure having proper corporate governance mechanisms and institutional investor monitoring in place if they are to appoint a network powerful CEO for their company.

From the rational stockholders' perspective, they need to be extra prudent while investing in the firms managed by network-powerful CEOs as one additional dollar raised

by them is more likely to be invested in value-destroying investments. Institutional investors should also be stricter while monitoring the investment activities of network powerful managers. Besides, creating a portfolio of by holdings stocks of the firms managed by less connected CEOs and selling the stocks managed by network powerful CEOs should result in a profit for the arbitragers.

Our analysis of investor- and CEO-specific behavioral factors that affect the corporate outcomes related to takeover announcements and corporate liquidity provide important future research directions for academicians and policymakers. For instance, our proxy for retail investor attention, AOR shows validity in the context of M&As. It is only intuitive to test the impact of AOR on other important corporate events like earnings announcements, seasoned equity offering (SEO), debt issuance, and dividend announcements. Moreover, the role of AOR can be extended to explain other important behavioral anomalies like IPO performance. Historically, IPOs are systematically underpriced as IPOs have higher returns in the initial days of stock-market trading (compared to the offer price), followed by long-term underpricing (Ritter and Welch, 2002). These findings suggest that investors initially overestimate the share price of the recent IPO shares, but realize and correct their mistakes later on. It would be interesting to test if the retail investor attention proxied by AOR can explain the initial overreaction followed by the underperformance in the later period. Another important research avenue could be the dissection of the bidder CARs between the overnight and intraday periods. Thus far, the majority of studies on finding the determinants of the bidder CARs focus on the total abnormal returns. However, our research findings provide the motivation to empirically investigate if the bidder CARs show different trends between the overnight and intraday periods.

Additionally, our finding that increased CEO connectedness results in CEOs holding excess cash which ultimately leads to value decrease for the shareholders provides further directions for future research. In particular, an integral question remains why board members still prefer to appoint the network-powerful CEOs when these managers are destroying almost half the cash that they are holding. What values do these CEOs add that convince the board members to keep them in the position even after they destroying so much value for the investors? Another interesting line of research could be to investigate whether the

sensation of being powerful is a permanent state of mind for the CEOs or does it change following a negative turn of events? In other words, following series of failed investments, do the network-powerful CEOs continue making decisions that are driven by personal ambitions or they use their superior position in the social network hierarchy to make decisions that are more in line with the shareholder wealth maximization. Next, our analysis can be expanded the analysis for firm-level connectedness, which may capture the power dynamics of overall firms in the context of different corporate decisions. It would be interesting to see if firm-level power dynamics affect the decisions related to M&As or corporate liquidity in the same manner or differently. Moreover, our measure of CEO connectedness primarily focuses on the number of connections each CEO has. This measure can be further enhanced by also focusing on how exclusive and important these connections are.

There are certain limitations in our research. Firstly, just like the majority of anomalies in behavioral finance, AOR, our proxy of retail investor attention is backward-looking. Meaning, we can primarily observe the trend once the event had already taken place. Next, the validity of the proxy AOR remains a potential concern. For instance, even though AOR is supposed to capture the attention of the retail investor attention, there is still a possibility of trade orders being put by the institutional investors in the overnight period as well. Moreover, for the comparatively less known bidders, the opening price of the stock might not be available or does not change much. So, data constraint may remain a valid concern for the construction of AOR. Even though in the context of M&As, AOR captures retail investor attention, Aboody et al. (2018) show that overnight returns may capture investor sentiment as well. So, academics need to be cautious while using this proxy.

One potential pitfall of the CEO connectedness measure is that there is not a great variability in the sense that it does not decrease over the life span of a CEO. In our sample, a CEO can only grow to be more network-powerful over time. However, once becoming network-powerful, there is no scope of becoming network-weak again. Moreover, even though our proxy of CEO connectedness captures the total number of connections the CEOs have according to the data presented by the BoardEx, there is no way of actually verifying that if a CEO is actually in touch with the connections. Hence, in reality, the number of connections may not be the best way of capturing how connected a CEO is. To avoid these

pitfalls and have a more accurate interpretation of these proxies, retail investors and managers could be surveyed or interviewed. Another limitation is that there is a lack of previous studies that borrow the theoretical concepts from social science in the managerial decision-making setting. There needs to be further development in the realm of behavioral finance where more relevant cross-disciplinary frameworks are introduced to explain investor and managerial behavior.

There are also certain limitations in terms of the robustness tests. In chapter 2, one of the challenges was to find a proper instrumental variable that affects our proxy AOR, however, does not have any impact on the bidder CARs. The instrumental variable we use, the percentage of broadband internet users in the US, does not cover the whole sample period as the data is only available from the year 2000 onwards. A better instrumental variable that covers our whole sample period may tackle this issue. In Chapters 3 and 4, there could be some potential sample selection bias as it is likely that network-power CEOs, due to their superior connectedness, are more likely to be hired by the bigger and more reputed companies. To deal with this potential bias, we conduct a series of propensity score matching tests. However, these tests may not be enough to completely rule out the possibility of a biased sample.

Overall, this thesis adds to the growing literature in behavioral corporate finance. In particular, it highlights how the behavioral biases of the financial market participants lead to undesirable corporate outcomes. The thesis further provides empirical evidence that should stimulate discussion among academics, investors, corporates, and even policymakers. Especially, the policymakers can use these findings as a guideline to reduce the loss that occurs to the shareholders in the context of corporate takeovers or managerial agency conflicts. The shareholders can use also this information to adjust their trading strategies as well.

6.Reference

Aboody, D, Even-Tov, O, Lehavy, R, Trueman, B. Overnight returns and firm-specific investor sentiment. Journal of Financial and Quantitative Analysis 2018;53;485-505.

Acharya, VV, Almeida, H, Campello, M. Aggregate risk and the choice between cash and lines of credit. The journal of finance 2013;68;2059-2116.

Adra, S, Barbopoulos, LG. The valuation effects of investor attention in stock-financed acquisitions. Journal of Empirical finance 2018;45;108-125.

Agrawal, A, Jaffe, JF, Mandelker, GN. The post-merger performance of acquiring firms: a re-examination of an anomaly. The journal of finance 1992;47;1605-1621.

Akbas, F, Boehmer, E, Jiang, C, Koch, PD. Overnight Returns, Daytime Reversals, and Future Stock Returns. Daytime Reversals, and Future Stock Returns (January 1, 2020) 2020.

Aktas, N, Louca, C, Petmezas, D. CEO overconfidence and the value of corporate cash holdings. Journal of Corporate finance 2019;54;85-106.

Alexandridis, G, Petmezas, D, Travlos, NG. Gains from mergers and acquisitions around the world: New evidence. Financial management 2010;39;1671-1695.

Alimov, A. Product market competition and the value of corporate cash: Evidence from trade liberalization. Journal of Corporate finance 2014;25;122-139.

Almeida, H, Campello, M, Hackbarth, D. Liquidity mergers. Journal of financial economics 2011;102;526-558.

Almeida, H, Campello, M, Weisbach, MS. The cash flow sensitivity of cash. The journal of finance 2004;59;1777-1804.

Amihud, Y, Lev, B, Travlos, NG. Corporate control and the choice of investment financing: The case of corporate acquisitions. The journal of finance 1990;45;603-616.

Anderson, C, John, OP, Keltner, D, Kring, AM. Who attains social status? Effects of personality and physical attractiveness in social groups. Journal of Personality and Social Psychology 2001;81;116.

Andrade, G, Mitchell, M, Stafford, E. New evidence and perspectives on mergers. Journal of economic perspectives 2001;15;103-120.

Ang, JS, Cheng, Y. Direct evidence on the market-driven acquisition theory. Journal of Financial Research 2006;29;199-216.

Antoniou, A, Petmezas, D, Zhao, H. Bidder gains and losses of firms involved in many acquisitions. Journal of Business Finance & Accounting 2007;34;1221-1244.

Asquith, P, Bruner, RF, Mullins Jr, DW. The gains to bidding firms from merger. Journal of financial economics 1983;11;121-139.

Baker, M, Ruback, RS, Wurgler, J 2007. Behavioral corporate finance, Handbook of empirical corporate finance. Elsevier; 2007.

Baker, M, Wurgler, J. The equity share in new issues and aggregate stock returns. The journal of finance 2000;55;2219-2257.

Baker, M, Wurgler, J. Appearing and disappearing dividends: The link to catering incentives. Journal of financial economics 2004;73;271-288.

Baker, M, Wurgler, J. Investor sentiment and the cross-section of stock returns. The journal of finance 2006;61;1645-1680.

Baker, M, Wurgler, J. Investor sentiment in the stock market. Journal of economic perspectives 2007;21;129-152.

Baker, M, Wurgler, J 2013. Behavioral corporate finance: An updated survey, Handbook of the Economics of Finance. Elsevier; 2013.

Baldi, G, Bodmer, A. R&D investments and corporate cash holdings. Economics of Innovation and New Technology 2018;27;594-610.

Bamber, LS, Barron, OE, Stober, TL. Trading volume and different aspects of disagreement coincident with earnings announcements. Accounting Review 1997;575-597.

Banerjee, A, Breza, E, Chandrasekhar, AG, Duflo, E, Jackson, MO. Come play with me: Experimental evidence of information diffusion about rival goods. Work in Progress 2012.

Barber, BM, Odean, T. The courage of misguided convictions. Financial Analysts Journal 1999;55;41-55.

Barber, BM, Odean, T. Boys will be boys: Gender, overconfidence, and common stock investment. The Quarterly Journal of Economics 2001;116;261-292.

Barber, BM, Odean, T. Online investors: do the slow die first? The Review of Financial Studies 2002;15;455-488.

Barber, BM, Odean, T. All that glitters: The effect of attention and news on the buying behavior of individual and institutional investors. The Review of Financial Studies 2008;21;785-818.

Baskin, J. Corporate liquidity in games of monopoly power. The Review of Economics and Statistics 1987;312-319.

Bates, TW, Chang, CH, Chi, JD. Why has the value of cash increased over time? Journal of Financial and Quantitative Analysis (JFQA) 2018;53;749-787.

Bates, TW, Kahle, KM, Stulz, RM. Why do US firms hold so much more cash than they used to? The journal of finance 2009;64;1985-2021.

Bebchuk, L, Cohen, A, Ferrell, A. What matters in corporate governance? The Review of Financial Studies 2009;22;783-827.

Bebchuk, LA, Cremers, KM, Peyer, UC. The CEO pay slice. Journal of financial economics 2011;102;199-221.

Benartzi, S, Thaler, RH. How much is investor autonomy worth? The journal of finance 2002;57;1593-1616.

Berger, J, Cohen, BP, Zelditch Jr, M. Status characteristics and social interaction. American Sociological Review 1972;241-255.

Berkman, H, Koch, PD, Tuttle, L, Zhang, YJ. Paying attention: overnight returns and the hidden cost of buying at the open. Journal of Financial and Quantitative Analysis 2012;715-741.

Bhagwat, V, Dam, R, Harford, J. The real effects of uncertainty on merger activity. The Review of Financial Studies 2016;29;3000-3034.

Black, F. Noise. The journal of finance 1986;41;528-543.

Black, F, Scholes, M 1973. The pricing of options and corporate liabilities, World Scientific Reference on Contingent Claims Analysis in Corporate Finance: Volume 1: Foundations of CCA and Equity Valuation. World Scientific; 1973.

Bloch, F, Genicot, G, Ray, D. Informal insurance in social networks. Journal of Economic Theory 2008;143;36-58.

Bonacich, P. Technique for analyzing overlapping memberships. Sociological methodology 1972;4;176-185.

Bonaime, A, Gulen, H, Ion, M. Does policy uncertainty affect mergers and acquisitions? Journal of financial economics 2018;129;531-558.

Bond, S, Van Reenen, J. Microeconometric models of investment and employment. Handbook of econometrics 2007;6;4417-4498.

Borgatti, SP, Jones, C, Everett, MG. Network measures of social capital. Connections 1998;21;27-36.

Bourdieu, P, Distinction: A social critique of the judgement of taste. Harvard university press; 1984.

Bourdieu, P. The forms of capital. 1986.

Bourdieu, P. Social space and symbolic power. Sociological theory 1989;7;14-25.

Boutin, X, Cestone, G, Fumagalli, C, Pica, G, Serrano-Velarde, N. The deep-pocket effect of internal capital markets. Journal of financial economics 2013;109;122-145.

Bouwman, CH, Fuller, K, Nain, AS. Market valuation and acquisition quality: Empirical evidence. The Review of Financial Studies 2009;22;633-679.

Bradley, M, Desai, A, Kim, EH. Synergistic gains from corporate acquisitions and their division between the stockholders of target and acquiring firms. Journal of financial economics 1988;21;3-40.

Bramoullé, Y, Kranton, R. Public goods in networks. Journal of Economic Theory 2007;135;478-494.

Branch, BS, Ma, AJ. Overnight return, the invisible hand behind intraday returns? Journal of Applied Finance (Formerly Financial Practice and Education) 2012;22.

Brewer, MB. In-group bias in the minimal intergroup situation: A cognitive-motivational analysis. Psychological bulletin 1979;86;307.

Brown, DT, Ryngaert, MD. The mode of acquisition in takeovers: Taxes and asymmetric information. The journal of finance 1991;46;653-669.

Brown, JR, Fazzari, SM, Petersen, BC. Financing innovation and growth: Cash flow, external equity, and the 1990s R&D boom. The journal of finance 2009;64;151-185.

Brown, JR, Petersen, BC. Cash holdings and R&D smoothing. Journal of Corporate finance 2011;17;694-709.

Buchanan, B, Cao, CX, Chen, C. Corporate social responsibility, firm value, and influential institutional ownership. Journal of Corporate finance 2018;52;73-95.

Burt, RS, Corporate profits and cooptation: Networks of market constraints and directorate ties in the American economy. Academic Press New York; 1983.

Buss, DM, Craik, KH. The act frequency analysis of interpersonal dispositions: Aloofness, gregariousness, dominance and submissiveness 1. Journal of Personality 1981;49;175-192.

Busse, JA, Green, TC. Market efficiency in real time. Journal of financial economics 2002;65;415-437.

Cai, Y, Sevilir, M. Board connections and M&A transactions. Journal of financial economics 2012;103;327-349.

Carpenter, RE, Petersen, BC. Capital market imperfections, high-tech investment, and new equity financing. The Economic Journal 2002;112;F54-F72.

Chang, S. Takeovers of privately held targets, methods of payment, and bidder returns. The journal of finance 1998;53;773-784.

Chemmanur, T, Yan, A. Product market advertising and new equity issues. Journal of financial economics 2009;92;40-65.

Chen, T, Harford, J, Lin, C. Do analysts matter for governance? Evidence from natural experiments. Journal of financial economics 2015;115;383-410.

Chidambaran, N, Kedia, S, Prabhala, N. CEO director connections and corporate fraud. Fordham University Schools of Business Research Paper 2011.

Chudson, WA. The pattern of corporate financial structure: a cross-section view of manufacturing, mining, trade, and construction, 1937. 1945.

Cingano, F, Rosolia, A. People I know: job search and social networks. Journal of Labor Economics 2012;30;291-332.

Clark, C. Emotions and micropolitics in everyday life: Some patterns and paradoxes of “place.”. Research agendas in the sociology of emotions 1990;305-333.

Cliff, M, Cooper, MJ, Gulen, H. Return differences between trading and non-trading hours: Like night and day. SSRN eLibrary 2008;32.

Cohen, L, Frazzini, A, Malloy, C. The small world of investing: Board connections and mutual fund returns. Journal of political economy 2008;116;951-979.

Copeland, JT. Prophecies of power: Motivational implications of social power for behavioral confirmation. Journal of Personality and Social Psychology 1994;67;264.

Croci, E, Petmezas, D, Vagenas-Nanos, E. Managerial overconfidence in high and low valuation markets and gains to acquisitions. International Review of Financial Analysis 2010;19;368-378.

D'avolio, G. The market for borrowing stock. Journal of financial economics 2002;66;271-306.

Da, Z, Engelberg, J, Gao, P. In search of attention. The journal of finance 2011;66;1461-1499.

Dahya, J, McConnell, JJ, Travlos, NG. The Cadbury committee, corporate performance, and top management turnover. The journal of finance 2002;57;461-483.

Daily, CM, Johnson, JL. Sources of CEO power and firm financial performance: A longitudinal assessment. Journal of Management 1997;23;97-117.

Danbolt, J, Siganos, A, Vagenas-Nanos, E. Investor sentiment and bidder announcement abnormal returns. Journal of Corporate finance 2015;33;164-179.

Daniel, K, Hirshleifer, D, Subrahmanyam, A. Investor psychology and security market under-and overreactions. The journal of finance 1998;53;1839-1885.

Daniel, K, Titman, S. Evidence on the characteristics of cross sectional variation in stock returns. The journal of finance 1997;52;1-33.

Dasgupta, P. Trust as a commodity in D. Gambetta (ed.) Trust: Making and breaking cooperative relations. Basil Blackwell, New York 1988;49;72.

DellaVigna, S, Pollet, JM. Investor inattention and Friday earnings announcements. The journal of finance 2009;64;709-749.

DeMarzo, PM, Vayanos, D, Zwiebel, J. Persuasion bias, social influence, and unidimensional opinions. The Quarterly Journal of Economics 2003;118;909-968.

Demerjian, P, Lev, B, McVay, S. Quantifying managerial ability: A new measure and validity tests. Management science 2012;58;1229-1248.

Denis, DJ, Sibilkov, V. Financial constraints, investment, and the value of cash holdings. The Review of Financial Studies 2010;23;247-269.

Deshmukh, S, Goel, AM, Howe, KM. Do CEO beliefs affect corporate cash holdings? Available at SSRN 2566808 2018.

Dittmar, A, Mahrt-Smith, J. Corporate governance and the value of cash holdings. Journal of financial economics 2007;83;599-634.

Dittmar, A, Mahrt-Smith, J, Servaes, H. International corporate governance and corporate cash holdings. Journal of Financial and Quantitative Analysis 2003;111-133.

Domhoff, GW, Who rules America?: power and politics in the year 2000. McGraw-Hill Humanities, Social Sciences & World Languages; 1998.

Dong, M, Hirshleifer, D, Richardson, S, Teoh, SH. Does investor misvaluation drive the takeover market? The journal of finance 2006;61;725-762.

Draper, P, Paudyal, K. Acquisitions: private versus public. European Financial Management 2006;12;57-80.

Drobetz, W, Grüninger, MC, Hirschvogl, S. Information asymmetry and the value of cash. Journal of Banking & Finance 2010;34;2168-2184.

Drucker, S, Puri, M. On the benefits of concurrent lending and underwriting. The journal of finance 2005;60;2763-2799.

Duchin, R. Cash holdings and corporate diversification. The journal of finance 2010;65;955-992.

Eckbo, BE, Giammarino, RM, Heinkel, RL. Asymmetric information and the medium of exchange in takeovers: Theory and tests. The Review of Financial Studies 1990;3;651-675.

El-Khatib, R, Fogel, K, Jandik, T. CEO network centrality and merger performance. Journal of financial economics 2015;116;349-382.

Ellison, G, Fudenberg, D. Word-of-mouth communication and social learning. The Quarterly Journal of Economics 1995;110;93-125.

Elton, EJ, Gruber, MJ, Busse, JA. Are investors rational? Choices among index funds. Journal of Finance 2004;59;261-288.

Emerson, RM. Power-dependence relations. American Sociological Review 1962;31-41.

Emery, GW, Switzer, JA. Expected market reaction and the choice of method of payment for acquistions. Financial management 1999;73-86.

Engelberg, J, Gao, P, Parsons, CA. Friends with money. Journal of financial economics 2012;103;169-188.

Erel, I, Jang, Y, Weisbach, MS. Do acquisitions relieve target firms' financial constraints? The journal of finance 2015;70;289-328.

Evans, MD, Kelley, P, Kelley, J. Identifying the best times for cognitive functioning using new methods: matching university times to undergraduate chronotypes. Frontiers in human neuroscience 2017;11;188.

Faleye, O, Kovacs, T, Venkateswaran, A. Do better-connected CEOs innovate more? Journal of Financial and Quantitative Analysis 2014;49;1201-1225.

Fama, EF. Efficient capital markets: A review of theory and empirical work. The journal of finance 1970;25;383-417.

Fama, EF, French, KR. Common risk factors in the returns on stocks and bonds. Journal of 1993.

Fama, EF, French, KR. Industry costs of equity. Journal of financial economics 1997;43;153-193.

Fama, EF, French, KR. Value versus growth: The international evidence. The journal of finance 1998;53;1975-1999.

Faulkender, M, Wang, R. Corporate financial policy and the value of cash. The journal of finance 2006;61;1957-1990.

Fazzari, S, Hubbard, RG, Petersen, B. Investment, financing decisions, and tax policy. The American economic review 1988;78;200-205.

Fazzari, SM, Hubbard, RG, Petersen, BC. Investment-cash flow sensitivities are useful: A comment on Kaplan and Zingales. The Quarterly Journal of Economics 2000;115;695-705.

Feng, M, Ge, W, Luo, S, Shevlin, T. Why do CFOs become involved in material accounting manipulations? Journal of Accounting and Economics 2011;51;21-36.

Ferris, SP, Javakhadze, D, Rajkovic, T. CEO social capital, risk-taking and corporate policies. Journal of Corporate finance 2017;47;46-71.

Fich, EM, Harford, J, Yore, AS. The effect of takeover protection on the value of cash: Evidence from a natural experiment. Drexel University and University of Washington and University of Missouri Working Paper 2016.

Firth, M. Takeovers, shareholder returns, and the theory of the firm. The Quarterly Journal of Economics 1980;94;235-260.

Fiske, ST. Controlling other people: The impact of power on stereotyping. American psychologist 1993;48;621.

Fogel, K, Jandik, T, McCumber, WR. CFO social capital and private debt. Journal of Corporate finance 2018;52;28-52.

Foley, CF, Hartzell, JC, Titman, S, Twite, G. Why do firms hold so much cash? A tax-based explanation. Journal of financial economics 2007;86;579-607.

Fracassi, C. Corporate finance policies and social networks. Management science 2017;63;2420-2438.

Fracassi, C, Petry, S, Tate, G. Does rating analyst subjectivity affect corporate debt pricing? Journal of financial economics 2016;120;514-538.

Fracassi, C, Tate, G. External networking and internal firm governance. The journal of finance 2012;67;153-194.

Freeman, LC. A set of measures of centrality based on betweenness. Sociometry 1977;35-41.

French, JR, Raven, B 1959. The bases of social power. In: Cartwright, D (Ed), Studies in social power. 1959.

Fresard, L. Financial strength and product market behavior: The real effects of corporate cash holdings. The journal of finance 2010;65;1097-1122.

Friedman, HL. Implications of power: When the CEO can pressure the CFO to bias reports. Journal of Accounting and Economics 2014;58;117-141.

Fukuyama, F, Trust: The social virtues and the creation of prosperity. Free press New York; 1995.

Fuller, K, Netter, J, Stegemoller, M. What do returns to acquiring firms tell us? Evidence from firms that make many acquisitions. The journal of finance 2002;57;1763-1793.

Gamm, F. A surprise that keeps you awake: Overnight returns after earnings announcements. Available at SSRN 3293638 2019.

Gan, H, Park, MS. CEO managerial ability and the marginal value of cash. Advances in accounting 2017;38;126-135.

Gao, X, Jia, Y. Internal control over financial reporting and the safeguarding of corporate resources: Evidence from the value of cash holdings. Contemporary Accounting Research 2016;33;783-814.

Genicot, G, Ray, D. Informal insurance, enforcement constraints, and group formation. Group Formation in Economics; Networks, Clubs and Coalitions 2005;430-446.

Gervais, S, Kaniel, R, Mingelgrin, DH. The high-volume return premium. The journal of finance 2001;56;877-919.

Ghosh, A, Ruland, W. Managerial ownership, the method of payment for acquisitions, and executive job retention. The journal of finance 1998;53;785-798.

Gilchrist, S, Himmelberg, CP. Evidence on the role of cash flow for investment. Journal of monetary Economics 1995;36;541-572.

Gompers, P, Ishii, J, Metrick, A. Corporate governance and equity prices. The Quarterly Journal of Economics 2003;118;107-156.

Gorton, G, Kahl, M, Rosen, RJ. Eat or be eaten: A theory of mergers and firm size. The journal of finance 2009;64;1291-1344.

Gottfredson, MR, Hindelang, MJ. Sociological aspects of criminal victimization. Annual Review of Sociology 1981;7;107-128.

Gough, HG. The California psychological inventory. Testing and assessment in counseling practice 2000;45871.

Graham, JR, Harvey, CR. The theory and practice of corporate finance: Evidence from the field. Journal of financial economics 2001;60;187-243.

Green, DP, Strolovitch, DZ, Wong, JS. Defended neighborhoods, integration, and racially motivated crime. American journal of sociology 1998;104;372-403.

Grinblatt, M, Moskowitz, TJ. Predicting stock price movements from past returns: The role of consistency and tax-loss selling. Journal of financial economics 2004;71;541-579.

Grinstein, Y, Hribar, P. CEO compensation and incentives: Evidence from M&A bonuses. Journal of financial economics 2004;73;119-143.

Grossman, SJ, Hart, OD. The costs and benefits of ownership: A theory of vertical and lateral integration. Journal of political economy 1986;94;691-719.

Gruenfeld, DH. Status, ideology, and integrative complexity on the US Supreme Court: Rethinking the politics of political decision making. Journal of Personality and Social Psychology 1995;68;5.

Grullon, G, Kanatas, G, Weston, JP. Advertising, breadth of ownership, and liquidity. The Review of Financial Studies 2004;17;439-461.

Haidt, J, Rodin, J. Control and efficacy as interdisciplinary bridges. Review of general psychology 1999;3;317-337.

Halford, JT, McConnell, JJ, Sibilkov, V, Zaiats, NS. Cash regimes and the marginal value of cash. Available at SSRN 2761699 2017.

Hall, JA, Halberstadt, AG. “Subordination” and sensitivity to nonverbal cues: A study of married working women. Sex Roles 1994;31;149-165.

Han, S, Qiu, J. Corporate precautionary cash holdings. Journal of Corporate finance 2007;13;43-57.

Hanneman, RA, Riddle, M 2005. Introduction to social network methods. University of California Riverside; 2005.

Hansen, RG, Lott Jr, JR. Externalities and corporate objectives in a world with diversified shareholder/consumers. Journal of Financial and Quantitative Analysis 1996;43-68.

Hao, Z, Prapan, AA, Gavriilidis, K, Petmezas, D, Vagenas-Nanos, E. Does Geopolitical Risk Affect Acquisitions? Available at SSRN 3475537 2020.

Harford, J. Corporate cash reserves and acquisitions. The journal of finance 1999;54;1969-1997.

Harford, J. What drives merger waves? Journal of financial economics 2005;77;529-560.

Harford, J, Klasa, S, Maxwell, WF. Refinancing risk and cash holdings. The journal of finance 2014;69;975-1012.

Harford, J, Mansi, SA, Maxwell, WF. Corporate governance and firm cash holdings in the US. Journal of financial economics 2008;87;535-555.

Harris, M, Raviv, A. Corporate control contests and capital structure. Journal of financial economics 1988;20;55-86.

He, Z, Wintoki, MB. The cost of innovation: R&D and high cash holdings in US firms. Journal of Corporate finance 2016;41;280-303.

Henley, NM, LaFrance, M. Gender as culture: Difference and dominance in nonverbal behavior. 1984.

Heron, RA, Lie, E. A comparison of the motivations for and the information content of different types of equity offerings. The Journal of Business 2004;77;605-632.

Hickson, DJ, Hinings, CR, Lee, CA, Schneck, RE, Pennings, JM. A strategic contingencies' theory of intraorganizational power. Administrative science quarterly 1971;216-229.

Higson, C, Elliott, J. Post-takeover returns: The UK evidence. Journal of Empirical finance 1998;5;27-46.

Hirshleifer, D, Shumway, T. Good day sunshine: Stock returns and the weather. The journal of finance 2003;58;1009-1032.

Hirshleifer, DA, Myers, JN, Myers, LA, Teoh, SH. Do individual investors cause post-earnings announcement drift? Direct evidence from personal trades. The Accounting Review 2008;83;1521-1550.

Hochberg, YV, Ljungqvist, A, Lu, Y. Whom you know matters: Venture capital networks and investment performance. The journal of finance 2007;62;251-301.

Hou, K, Xiong, W, Peng, L. A tale of two anomalies: The implications of investor attention for price and earnings momentum. Available at SSRN 976394 2009.

Hribar, P, McInnis, J. Investor sentiment and analysts' earnings forecast errors. Management science 2012;58;293-307.

Huang-Meier, W, Lambertides, N, Steeley, JM. Motives for corporate cash holdings: the CEO optimism effect. Review of quantitative finance and accounting 2016;47;699-732.

Huang, J, Kisgen, DJ. Gender and corporate finance: Are male executives overconfident relative to female executives? Journal of financial economics 2013;108;822-839.

Hubbard, RG 1997. Capital-market imperfections and investment. National Bureau of economic research; 1997.

Hwang, B-H, Kim, S. It pays to have friends. Journal of financial economics 2009;93;138-158.

Imbens, GW, Wooldridge, JM. Recent developments in the econometrics of program evaluation. Journal of economic literature 2009;47;5-86.

Itzkowitz, J. Customers and cash: How relationships affect suppliers' cash holdings. Journal of Corporate finance 2013;19;159-180.

Jackson, MO, Social and economic networks. Princeton university press; 2010.

Jackson, MO, Rogers, BW. Relating network structure to diffusion properties through stochastic dominance. The BE Journal of Theoretical Economics 2007;7.

Jandik, DG, Jandik, T, Xu, W. CEO Social Capital and IPO Performance. 2020.

Jarrell, GA, Poulsen, AB. The returns to acquiring firms in tender offers: Evidence from three decades. Financial management 1989;12-19.

Javakhadze, D, Ferris, SP, French, DW. Social capital, investments, and external financing. Journal of Corporate finance 2016;37;38-55.

Jensen, MC. Agency costs of free cash flow, corporate finance, and takeovers. The American economic review 1986;76;323-329.

Jensen, MC. The agency cost of overvalued equity and the current state of corporate finance. European Financial Management 2004;10;549-565.

Jensen, MC, Meckling, WH. Theory of the firm: Managerial behavior, agency costs and ownership structure. Journal of financial economics 1976;3;305-360.

Jensen, MC, Ruback, RS. The market for corporate control: The scientific evidence. Journal of financial economics 1983;11;5-50.

Jiang, Z, Lie, E. Cash holding adjustments and managerial entrenchment. Journal of Corporate finance 2016;36;190-205.

John, TA. Accounting measures of corporate liquidity, leverage, and costs of financial distress. Financial management 1993;91-100.

Jost, JT, Banaji, MR. The role of stereotyping in system-justification and the production of false consciousness. British journal of social psychology 1994;33;1-27.

Jovanovic, B, Rousseau, PL, Mergers and Technological Changes: 1885-1998. Citeseer; 2001.

Jurado, K, Ludvigson, SC, Ng, S. Measuring uncertainty. American economic review 2015;105;1177-1216.

Kahneman, D, Attention and effort. Citeseer; 1973.

Kalcheva, I, Lins, KV. International evidence on cash holdings and expected managerial agency problems. The Review of Financial Studies 2007;20;1087-1112.

Kaplan, SN, Weisbach, MS. The success of acquisitions: Evidence from divestitures. The journal of finance 1992;47;107-138.

Karpoff, JM. The relation between price changes and trading volume: A survey. Journal of Financial and Quantitative Analysis 1987;109-126.

Kashyap, AK, Lamont, OA, Stein, JC. Credit conditions and the cyclical behavior of inventories. The Quarterly Journal of Economics 1994;109;565-592.

Keltner, D, Gruenfeld, DH, Anderson, C. Power, approach, and inhibition. Psychological review 2003;110;265.

Kemper, TD. Predicting emotions from social relations. Social Psychology Quarterly 1991;330-342.

Keynes, JM, The applied theory of money. Macmillan and Company; 1934.

Khanna, V, Kim, EH, Lu, Y. CEO connectedness and corporate fraud. The journal of finance 2015;70;1203-1252.

Kim, C-S, Mauer, DC, Sherman, AE. The determinants of corporate liquidity: Theory and evidence. Journal of Financial and Quantitative Analysis 1998;335-359.

Kipnis, D. Does power corrupt? Journal of Personality and Social Psychology 1972;24;33.

Kipnis, D. The powerholders. 1976.

Klasa, S, Maxwell, WF, Ortiz-Molina, H. The strategic use of corporate cash holdings in collective bargaining with labor unions. Journal of financial economics 2009;92;421-442.

Kuan, T-H, Li, C-S, Chu, S-H. Cash holdings and corporate governance in family-controlled firms. Journal of Business Research 2011;64;757-764.

Kuhnen, CM. Business networks, corporate governance, and contracting in the mutual fund industry. The journal of finance 2009;64;2185-2220.

LaFrance, M, Banaji, M. Toward a reconsideration of the gender-emotion relationship. Emotion and social behavior 1992;14;178-201.

Larcker, DF, So, EC, Wang, CC. Boardroom centrality and firm performance. Journal of Accounting and Economics 2013;55;225-250.

Lee, CM. Earnings news and small traders: An intraday analysis. Journal of Accounting and Economics 1992;15;265-302.

Lee, CM, Shleifer, A, Thaler, RH. Investor sentiment and the closed-end fund puzzle. The journal of finance 1991;46;75-109.

Liang, S-h, Hsieh, Y-t, Lin, H-c, Chi, P-w. The Effect of CEO Gender on Corporate Cash Holdings and Over-investment Problems-Evidence from Taiwan. Advances in Economics and Business 2018;6;26-35.

Lintner, J. Security prices, risk, and maximal gains from diversification. The journal of finance 1965;20;587-615.

Liu, Y, Mauer, DC. Corporate cash holdings and CEO compensation incentives. Journal of financial economics 2011;102;183-198.

Liu, Y, Mauer, DC, Zhang, Y. Firm cash holdings and CEO inside debt. Journal of Banking & Finance 2014;42;83-100.

Lou, D, Polk, C, Skouras, S. A tug of war: Overnight versus intraday expected returns. Journal of financial economics 2019;134;192-213.

Louis, H, Sun, A. Investor inattention and the market reaction to merger announcements. Management science 2010;56;1781-1793.

Louis, H, Sun, AX, Urcan, O. Value of cash holdings and accounting conservatism. Contemporary Accounting Research 2012;29;1249-1271.

Malamuth, NM. The confluence model of sexual aggression: Feminist and evolutionary perspectives. Sex, power, conflict: Evolutionary and feminist perspectives 1996;269-295.

Malmendier, U, Tate, G. CEO overconfidence and corporate investment. The journal of finance 2005;60;2661-2700.

Malmendier, U, Tate, G. Who makes acquisitions? CEO overconfidence and the market's reaction. Journal of financial economics 2008;89;20-43.

Markowitz, H. The utility of wealth. Journal of political economy 1952;60;151-158.

Martin, KJ. The method of payment in corporate acquisitions, investment opportunities, and management ownership. The journal of finance 1996;51;1227-1246.

Martynova, M, Renneboog, L. Mergers and acquisitions in Europe. Advances in corporate finance and asset pricing 2006;13-75.

Mazerolle, MJ, Singh, G. Economic and Social Correlates of Re-Employment Following Job Displacement: Evidence from 21 Plant Closures in Ontario. American Journal of Economics and Sociology 2004;63;717-730.

Merton, RK. The role-set: Problems in sociological theory. The British Journal of Sociology 1957;8;106-120.

Milgram, S. Behavioral study of obedience. The Journal of abnormal and social psychology 1963;67;371.

Miller, EM. Risk, uncertainty, and divergence of opinion. The journal of finance 1977;32;1151-1168.

Miller, MH, Orr, D. A Model of the Demand for Money by Firms. The Quarterly Journal of Economics 1966;80;413-435.

Mitchell, ML, Mulherin, JH. The impact of industry shocks on takeover and restructuring activity. Journal of financial economics 1996;41;193-229.

Modigliani, F, Miller, MH. The cost of capital, corporation finance and the theory of investment. The American economic review 1958;48;261-297.

Moeller, SB, Schlingemann, FP, Stulz, RM. Firm size and the gains from acquisitions. Journal of financial economics 2004;73;201-228.

Morck, R, Shleifer, A, Vishny, RW. Do managerial objectives drive bad acquisitions? The journal of finance 1990;45;31-48.

Morellec, E, Nikolov, B, Zucchi, FM 2013. Cash holdings and competition. 2013.

Morse, A, Nanda, V, Seru, A. Are incentive contracts rigged by powerful CEOs? The journal of finance 2011;66;1779-1821.

Moskowitz, DS. Cross-situational generality and the interpersonal circumplex. Journal of Personality and Social Psychology 1994;66;921.

Murphy, KJ. Corporate performance and managerial remuneration: An empirical analysis. Journal of Accounting and Economics 1985;7;11-42.

Myers, SC, Majluf, NS 1984. Corporate financing and investment decisions when firms have informationthat investors do not have. National Bureau of Economic Research; 1984.

Nguyen, NH, Phan, HV. Policy uncertainty and mergers and acquisitions. Journal of Financial and Quantitative Analysis 2017;52;613-644.

Nguyen, T, Petmezas, D, Karampatsas, N. Does Safety Uncertainty Affect Acquisitions? Available at SSRN 3250400 2020.

Odean, T. Are investors reluctant to realize their losses? The journal of finance 1998;53;1775-1798.

Odean, T. Do investors trade too much? American economic review 1999;89;1279-1298.

Opler, T, Pinkowitz, L, Stulz, R, Williamson, R. The determinants and implications of corporate cash holdings. Journal of financial economics 1999;52;3-46.

Orens, R, Reheul, A-M. Do CEO demographics explain cash holdings in SMEs? European Management Journal 2013;31;549-563.

Ozkan, A, Ozkan, N. Corporate cash holdings: An empirical investigation of UK companies. Journal of Banking & Finance 2004;28;2103-2134.

Padgett, JF, Ansell, CK. Robust Action and the Rise of the Medici, 1400-1434. American journal of sociology 1993;98;1259-1319.

Peng, L, Xiong, W. Investor attention, overconfidence and category learning. Journal of financial economics 2006;80;563-602.

Petty, RE, Cacioppo, JT 1986. The elaboration likelihood model of persuasion, Communication and persuasion. Springer; 1986.

Pfeffer, J. Understanding power in organizations. California management review 1992;34;29-50.

Pinkowitz, L, Stulz, R, Williamson, R. Does the contribution of corporate cash holdings and dividends to firm value depend on governance? A cross-country analysis. The journal of finance 2006;61;2725-2751.

Pinkowitz, L, Stulz, RM, Williamson, R. Is there a US high cash holdings puzzle after the financial crisis? Fisher College of Business working paper 2013;07.

Proctor, CH, Loomis, CP. Analysis of sociometric data. Research methods in social relations 1951;2;561-585.

Rau, PR, Vermaelen, T. Glamour, value and the post-acquisition performance of acquiring firms. Journal of financial economics 1998;49;223-253.

Rauch, JE, Casella, A, Networks and markets. Russell Sage Foundation; 2001.

Raven, BH. The bases of power: Origins and recent developments. Journal of social issues 1993;49;227-251.

Reyes, T. Limited attention and M&A announcements. Journal of Empirical finance 2018;49;201-222.

Rhodes-Kropf, M, Viswanathan, S. Market valuation and merger waves. The journal of finance 2004;59;2685-2718.

Rhodes–Kropf, M, Robinson, DT, Viswanathan, S. Valuation waves and merger activity: The empirical evidence. Journal of financial economics 2005;77;561-603.

Rind, B, Kipnis, D. Changes in self-perceptions as a result of successfully persuading others. Journal of social issues 1999;55;141-156.

Ritter, JR, Welch, I. A review of IPO activity, pricing, and allocations. The journal of finance 2002;57;1795-1828.

Roll, R. The hubris hypothesis of corporate takeovers. Journal of business 1986;197-216.

Rosen, RJ. Merger momentum and investor sentiment: The stock market reaction to merger announcements. The Journal of Business 2006;79;987-1017.

Rosenbaum, PR, Rubin, DB. Constructing a control group using multivariate matched sampling methods that incorporate the propensity score. The American Statistician 1985;39;33-38.

Rowley, TJ. Moving beyond dyadic ties: A network theory of stakeholder influences. Academy of management Review 1997;22;887-910.

Russell, B, Power: A new social analysis. Psychology Press; 2004.

Sanday, PR, A woman scorned: Acquaintance rape on trial. Univ of California Press; 1997.

Savor, PG, Lu, Q. Do stock mergers create value for acquirers? The journal of finance 2009;64;1061-1097.

Schiantarelli, F 1995. Financial constraints and investment: a critical review of methodological issues and international evidence, Conference Series-Federal Reserve Bank of Boston. Federal Reserve Bank of Boston; 1995.

Schlingemann, FP. Financing decisions and bidder gains. Journal of Corporate finance 2004;10;683-701.

Schonlau, R, Singh, PV. Board networks and merger performance. 2009.

Seasholes, M, Wu, G. Profiting from predictability: Smart traders, daily price limits, and investor attention. University of California, Berkeley, working paper 2004.

Serfling, MA. CEO age and the riskiness of corporate policies. Journal of Corporate finance 2014;25;251-273.

Servaes, H. Tobin's Q and the Gains from Takeovers. The journal of finance 1991;46;409-419.

Sharpe, WF. Capital asset prices: A theory of market equilibrium under conditions of risk. The journal of finance 1964;19;425-442.

Shefrin, H, Statman, M. The disposition to sell winners too early and ride losers too long: Theory and evidence. The journal of finance 1985;40;777-790.

Shiller, RJ. From efficient markets theory to behavioral finance. Journal of economic perspectives 2003;17;83-104.

Shleifer, A, Vishny, RW. Stock market driven acquisitions. Journal of financial economics 2003;70;295-311.

Shue, K. Executive networks and firm policies: Evidence from the random assignment of MBA peers. The Review of Financial Studies 2013;26;1401-1442.

Sidanius, J. The psychology of group conflict and the dynamics of oppression: A social dominance perspective. 1993.

Smith, RL, Kim, J-H. The combined effects of free cash flow and financial slack on bidder and target stock returns. Journal of business 1994;281-310.

Statman, M. Behaviorial finance: Past battles and future engagements. Financial Analysts Journal 1999;55;18-27.

Stock, JH, Yogo, M 2002. Testing for weak instruments in linear IV regression. National Bureau of Economic Research; 2002.

Stulz, R. Managerial control of voting rights: Financing policies and the market for corporate control. Journal of financial economics 1988;20;25-54.

Sudarsanam, S, Holl, P, Salami, A. Shareholder wealth gains in mergers: effect of synergy and ownership structure. Journal of Business Finance & Accounting 1996;23;673-698.

Sudarsanam, S, Mahate, AA. Glamour acquirers, method of payment and post-acquisition performance: the UK evidence. Journal of Business Finance & Accounting 2003;30;299-342.

Sulloway, FJ, Born to rebel: Birth order, family dynamics, and creative lives. Pantheon Books; 1996.

Sutton, SK, Davidson, RJ. Prefrontal brain asymmetry: A biological substrate of the behavioral approach and inhibition systems. Psychological science 1997;8;204-210.

Toffanin, M 2005. Examining the implications of financing choice for cash acquisitions. Concordia University; 2005.

Tong, Z. Firm diversification and the value of corporate cash holdings. Journal of Corporate finance 2011;17;741-758.

Travlos, NG. Corporate takeover bids, methods of payment, and bidding firms' stock returns. The journal of finance 1987;42;943-963.

Tsoukalas, JD, Tsoukas, S, Guariglia, A. To what extent are savings–cash flow sensitivities informative to test for capital market imperfections? Review of Finance 2017;21;1251-1285.

Ward, C, Yin, C, Zeng, Y. Institutional investor monitoring motivation and the marginal value of cash. Journal of Corporate finance 2018;48;49-75.

Weber, M, The theory of social and economic organization. Simon and Schuster; 1947.

Weißofner, F, Wessels, U. Overnight Returns: An International Sentiment Measure. Journal of Behavioral Finance 2020;21;205-217.

Whited, TM. Debt, liquidity constraints, and corporate investment: Evidence from panel data. The journal of finance 1992;47;1425-1460.

Whitney, I, Smith, PK. A survey of the nature and extent of bullying in junior/middle and secondary schools. Educational research 1993;35;3-25.

Woolcock, M. Social capital and economic development: Toward a theoretical synthesis and policy framework. Theory and society 1998;27;151-208.

Wurgler, J, Zhuravskaya, E. Does arbitrage flatten demand curves for stocks? The Journal of Business 2002;75;583-608.

Yook, KC. Larger return to cash acquisitions: signaling effect or leverage effect? The Journal of Business 2003;76;477-498.

Zeng, S, Wang, L. CEO gender and corporate cash holdings. Are female CEOs more conservative? Asia-Pacific Journal of Accounting & Economics 2015;22;449-474.

Zhang, XF. Information uncertainty and stock returns. The journal of finance 2006;61;105-137.