Bank CEO Materialism: Risk Controls, Culture and Tail Risk

Robert M. Bushman
Kenan-Flagler Business School, University of North Carolina-Chapel Hill
bushman@unc.edu

Robert H. Davidson
McCombs School of Business, University of Texas at Austin
rhd703@gmail.com

Aiyesha Dey
Carlson School of Management, University of Minnesota
deya@umn.edu

Abbie Smith
The University of Chicago Booth School of Business
abbie.smith@chicagobooth.edu

May 1, 2017

Abstract

Focusing on a key CEO characteristic, materialism, we investigate how the prevalence of materialistic CEOs in the banking sector has evolved over time, and how risk management policies, the behavior of non-CEO executives and bank tail risk vary with CEO materialism. We document that the proportion of banks run by materialistic CEOs increased significantly from 1994 to 2004, coinciding with major bank deregulation. Using an index reflecting the strength of risk management functions (RMI), we find that RMI is significantly lower for banks with materialistic CEOs, and that RMI significantly decreases after a materialistic CEO succeeds a non-materialistic one and increases after a non-materialistic CEO replaces a materialistic CEO. Consistent with CEOs influencing corporate culture, we find that non-CEO executives in banks with materialistic CEOs more aggressively exploited inside trading opportunities around government intervention during the financial crisis. Finally, we find that banks with materialistic CEOs have significantly more downside tail risk relative to banks with non-materialistic CEOs; the difference between groups increased significantly during the recent crisis.

Keywords: Executive materialism; corporate culture; bank risk.
JEL Classification Codes: G01; G02; G18; G21; G32; G38.

We thank John Core, Hamid Mehran, Thomas Ruchti, James Vickery, Chris Williams, Donny Zhao and seminar participants at the International Atlantic Economic Society Annual Meeting, Economics of Culture: Balancing Norms against Rules Conference at the Federal Reserve Bank of New York, University of California at Irvine, Boston College, Georgetown University, University of Graz, University of Illinois, INSEAD, University of Miami, University of Minnesota, Temple University and the U.S. Securities and Exchange Commission for helpful comments. Special thanks to Andrew Ellul and Vijay Yerramilli for sharing their RMI data with us.

1. Introduction

Imprudent risk-taking and ethical lapses associated with the recent global financial crisis damaged public trust in the financial system and resulted in cumulative fines for global banks exceeding $300 billion (McLannahan, 2015). A range of explanations for the pre-crisis behavior of banks has been explored including financial deregulation, failure of risk management functions, and flawed corporate cultures.[1] But many open questions remain. Through what specific channels does bank deregulation operate to shape the behaviors and tail risk of banks? Why do some banks choose weaker risk management functions than others? What factors drive differences in corporate culture across banks?

To shed light on these questions, we build on research that investigates the proposition that CEOs are heterogeneous and exert substantial influence over corporate decisions and outcomes (e.g., Hambrick and Mason, 1984; Bertrand and Schoar, 2003; Bertrand, 2009). We focus on one specific CEO characteristic, materialism, as measured by a CEO's relative ownership of luxury goods. The psychology literature defines materialism as a way of life where an individual displays an attachment to worldly possessions and material needs and desires. As noted by Richins and Rudmin (1994), materialism, perhaps more than any other attribute, describes an individual's real and desired relationship with economic goods. It is tied to the satisfaction an individual derives from the acquisition and possession of goods and is related to the manner by which one pursues economic objectives.

The extant CEO heterogeneity literature focuses primarily on the implications of CEO style at the individual firm level. A distinguishing feature of our paper is that we consider CEO characteristics at the banking sector level by investigating whether the prevalence of materialistic CEOs leading banks increases significantly around major bank deregulation. We also explore individual bank level consequences by considering two key channels through which materialistic CEOs can influence a bank's behavior and outcomes: the choice of risk management architecture and corporate culture. Finally, allowing that CEO materialism can exert influence through risk control choices, corporate culture and other unobservable channels, we directly examine relations between CEO materialism and both an individual bank's tail risk and the sensitivity of a bank's tail risk to aggregate tail shocks.

[1] For example, see Stiglitz (2010) on financial deregulation; Ellul and Yerramilli (2013) and Kashyap et al., (2008) on failure of risk management functions; and Dudley (2014), Financial Stability Board (2014) and Group of Thirty (2015) on the role of flawed corporate cultures within banking organizations.

CEO materialism is particularly pertinent to the banking sector. First, banks must balance the demands of being value-maximizing entities against serving the public interest.[2] High leverage combined with deposit insurance, government guarantees, and bank opacity creates motives and opportunities for decisions that may be optimal for shareholders with limited liability, but not for the economy as a whole if systemic risk is increased. Relevant here is evidence that materialistic people are less sensitive to behaviors that might negatively affect others. For example, Kilbourne and Pickett (2008) find that materialism is associated with reduced concern about the environment, while Davidson et al. (2017) provide evidence consistent with materialistic CEOs pursuing profits at the expense of the environment and other elements of corporate social responsibility. This raises the possibility that materialistic bank CEOs embody values that predispose them to pursue profits while subordinating concerns for negative externalities imposed on other banks and the overall economy.

Second, the financial crisis exposed numerous occurrences of misbehavior, ethical lapses and compliance failures at banks (e.g., Dudley, 2014). In this regard, there is evidence that materialistic individuals are more likely to bend ethical rules to gain possessions (Cohn et al., 2014; Muncy and Eastman, 1998; Richins and Rudmin, 1992).

Third, flawed corporate cultures have been posited as a significant contributor to the financial crisis (Dudley (2014); Financial Stability Board (2014); Group of Thirty (2015)). If materialistic CEOs influence a bank's organizational values and norms of behavior then employees may exhibit heightened propensity for opportunistic behavior (Cohn et al., 2014; Davidson et al., 2015). While a strong control environment can counter such behavior, Davidson et al. (2015) examine non-financial firms and find that materialistic CEOs lead firms in which non-CEO insiders have relatively high probabilities of perpetrating fraud, and where the probability of erroneous financial reporting is relatively higher. Building on these results, we consider the possibility that materialistic bank CEOs oversee relatively lax risk control environments in which incentivized employees can exploit loose oversight to assume tail risks that enhance short run performance at the cost of downside tail risk exposure, and to engage in opportunistic insider trading activities. While such behavior may be in the interests of a bank's

[2] On this point see for example Anginer et al. (2014), Beltratti and Stulz, (2012), Mehran and Mollineaux (2012), Mehran et al., (2011).

shareholders (e.g., Stulz, 2016), associated negative externalities are nevertheless of significant concern to prudential regulators charged with overseeing the banking system.

Considering the alleged role of deregulation in fomenting the financial crisis (e.g., Stiglitz, 2010), our first analysis explores connections between bank deregulation and the hiring of materialistic bank CEOs. This inquiry into the post-deregulation entry of materialistic individuals into bank CEO positions extends Philippon and Reshef (2012) who provide evidence that financial deregulation spurs the flow of human capital into the finance sector. The 1990s saw significant deregulation of the U.S. financial sector, including branch banking deregulation in 1994 via the Interstate Banking and Branching Efficiency Act, and the Gramm-Leach-Bliley Act in 1999.[3] These regulatory changes significantly increased bank competition (e.g., Rice and Strahan, 2010) and expanded banks' growth and risk-taking opportunities (e.g., DeYoung et al., 2013). Given an absence of formal theory linking CEO materialism to deregulation, intensity of competition or growth opportunities, we implement an exploratory analysis examining whether this deregulation coincides with a secular trend in the prevalence of materialistic bank CEOs running U.S. banks.

We document that between 1994 and 2004 the proportion of U.S. banks run by materialistic CEOs increased significantly in absolute terms and relative to non-financial firms. Across all industries in the U.S., banking had the *lowest* proportion of materialistic CEOs in 1994 at 47% (comparable to Utilities). However, by 2004 the banking sector had the *highest* proportion of any industry at 67%. Further, this upward trend appears to be unique to CEO materialism, as we find no significant trends in other CEO characteristics examined in the literature including overconfidence (Malmendier and Tate, 2005; 2008), narcissism (Ham et al., 2014), military service (Benmelech and Frydman, 2015), a record of legal infractions (Davidson et al., 2015), or whether CEOs started their careers in recessions (Schoar and Zuo, 2017). Given this evidence of an influx of materialistic CEOs in the banking sector post-1994, we explore two primary channels through which such individuals may influence bank risk outcomes: risk management choices and influence on bank culture.

Risk management is intrinsic to the business model of banks in a way that it is not for non-financial firms (Stulz, 2016; DeAngelo and Stulz, 2015). A prominent explanation for why

[3] The Gramm-Leach-Bliley Act allowed banks to more fully compete in insurance underwriting, securities brokerage, and investment banking.

banks exposed themselves to excessive risks prior to the crisis is the failure of risk management functions (Ellul and Yerramilli, 2013; Kashyap, et al., 2008). Risk management functions involve the identification, measurement, monitoring, and controlling of risks to ensure that risk-taking activities are in line with a bank's strategic objectives and risk appetite. We hypothesize that banks with materialistic CEOs will adopt relatively lax risk oversight environments. Our analyses build on Ellul and Yerramilli (2013) who construct a risk management index (RMI) reflecting the organizational design of risk management functions, where RMI increases in the strength and independence of banks' risk management functions. Ellul and Yerramilli show that RMI varies significantly across banks and that U.S. banks with higher RMI have lower tail risk and performed relatively better in the financial crisis. We find that RMI is significantly lower for banks with materialistic CEOs. RMI also significantly increases after non-materialistic CEOs replace materialistic CEOs and decreases after materialistic CEOs succeed non-materialistic ones.

Corporate culture is often conceptualized as a "system of shared values that define what is important, and norms that define appropriate attitudes and behaviors for organizational members" (O'Reilly and Chatman, 1996). If CEO materialism influences bank culture, we expect this to manifest in the behavior of non-CEO executives. While it is generally difficult to directly observe non-CEO executives' behavior, insider trading transactions are required to be publicly disclosed. Complementing Jagolinzer et al. (2016), we examine whether non-CEO bank executives are more opportunistic and aggressive in exploiting insider trading opportunities in banks run by materialistic CEOs. We find that non-CEO executives in banks with materialistic CEOs have a higher propensity to exploit inside trading opportunities around government interventions during the financial crisis relative to executives at banks with non-materialistic CEOs.

CEO materialism can influence overall bank risk through risk management choices, corporate culture or other unobservable channels. In our final analyses, we investigate relations between CEO materialism and both downside tail risk and the sensitivity of a bank's tail risk to aggregate tail shocks. We find that banks with materialistic CEOs have significantly more downside tail risk and tail risk co-movement with aggregate tail risk shocks relative to non-materialistic CEOs. It is also the case that materialism mitigates the effect of RMI on tail risk, suggesting that the influence of CEO materialism on tail risk operates through RMI as well as

other channels. Further, the difference in tail risk between groups increased significantly during the recent crisis. Such higher tail risk may reflect an optimal risk-taking strategy from the perspective of shareholders or may reflect the consequences of a governance breakdown where employees exploit weak risk oversight for personal gain (Stulz, 2016). We conjecture that in either case, CEO materialism will be associated with greater *upside tail reward* as compensation for the downside tail risk assumed. Indeed, we find that while materialistic CEOs are associated with higher downside tail risk, they are also associated with higher tail reward.

We acknowledge that our results are not causal effects of randomly assigning materialistic CEOs to banks. Aspects of managerial style associated with materialism may be observable to a board before selecting a new CEO. Therefore, banks with strategic objectives demanding a management style associated with materialistic CEOs might opt for a materialistic CEO (Fee et al., 2013). As a result, policy differences observed between banks with materialistic and non-materialistic CEOs can reflect both true causal effects and unobserved differences in bank characteristics.[4] However, we find no trends in RMI prior to CEO turnovers involving a switch in CEO types, implying that the changes in RMI we document occur following a switch in type. This suggests that CEO materialism is a key ingredient in shaping the strength of banks' risk management functions, regardless of whether it results from CEOs imprinting their style on a bank or from an endogenously matched CEO style implementing a board directed change in strategic direction.[5] Further, we provide robust evidence that our results on the relation of materialism to risk management and tail risk are not likely a consequence of materialistic CEOs being less risk averse due to higher wealth levels or because of differences in incentive compensation contracts between materialistic and non-materialistic CEOs.

Our exploration of CEO materialism in the context of banking makes several contributions. First, our focus on bank CEO materialism extends a large and growing literature examining the extent to which CEOs are heterogeneous and imprint their styles on the firms they lead. In addition, we make a novel contribution by transcending individual firm concerns and documenting that the prevalence of materialistic CEOs in the banking sector significantly

[4] Consider the large increase in materialistic CEOs around bank deregulation discussed earlier. It could be the case that expanded risk-taking opportunities drew a disproportionate influx of materialistic executives into the pool of available CEO candidates making selection of materialistic CEOs by banks statistically more likely. Alternatively, boards may have adopted new strategies favoring a particular CEO type, leading them to screen candidates based on observable style aspects associated with materialism.

[5] See Schoar and Zuo (2017) for a related argument in the context of managerial style associated with CEOs who begin their careers during a recession.

increased around bank deregulation. This provides new evidence on the powerful role that financial deregulation can play in shifting the allocation of CEO human capital in the banking sector. This complements Philippon and Reshef (2012) who document a link between financial deregulation and human capital flows, finding that deregulation is associated with skill intensity, job complexity and high wages for finance employees.

Second, we extend the banking literature by providing evidence consistent with CEO materialism influencing risk management policies, corporate culture and risk-taking in banking. The potential for banks to pursue profits while subordinating concerns for negative externalities is an important concern to bank regulators (Kashyap et al., 2008). While some policymakers place blame for the financial crisis and the attendant loss of trust in the banking sector on a failure of leadership at banks (e.g., Dudley, 2014), there is little research exploring the role played by the personal characteristics of leaders in shaping the policies and performance of banks. As such, our results are likely to be of interest to regulators and policy makers.

Third, our results contribute to the literature on the persistence of risk cultures in banks. Fahlenbrach et al. (2012) find that a bank's stock return performance during the 1998 Russian debt crisis is related to its return performance and failure probability during the recent financial crisis. Cheng et al. (2015) find that residual compensation, measured as total compensation adjusted for size and industry, is positively related to a bank's riskiness, and that residual compensation is highly persistent over time. Our result that RMI decreases (increases) after a CEO changes from non-materialistic to materialistic (materialistic to non-materialistic), suggests that the persistence of a given bank's risk choices is at least partially a function of persistence in bank CEO type.

Overall, our analyses raise the possibility that deregulation contributed to the crisis by increasing the concentration of materialistic bank CEOs which, by weakening risk management and corporate culture, increased the preponderance of aggressive risk-taking and opportunistic behavior in the bank sector.

The rest of the paper is organized as follows. Section 2 expands on the conceptual framework underlying our hypotheses about relations between CEO materialism and risk culture. Section 3 describes the sample, provides descriptive statistics and discusses our analysis of trends in CEO materialism over time. Section 4 presents our empirical analyses on relations between materialism and corporate culture, as evident in bank risk management functions and

the insider trading activities of non-CEO senior executives. Section 5 presents our results on the association between materialistic CEOs and bank risk, and section 6 concludes.

2. Conceptual Framework and Prior Research

Hambrick and Mason's (1984) "Upper Echelons Theory" argues that a manager's experiences, values and cognitive styles affect their choices and consequent corporate decisions. Consistent with this theory, Bertrand and Schoar (2003) document significant manager fixed effects with respect to corporate investment behavior, financing policy, organizational strategy and performance. Fee et al. (2013) highlight the challenges involved in distinguishing idiosyncratic style effects from endogenous matching of CEOs with firms. While Bertrand and Schoar (2003) and Fee et al. (2013) primarily rely on manager fixed effects to isolate managerial style, an evolving line of research investigates relations between specific manager characteristics and firms' policy choices. These characteristics include overconfidence (e.g., Roll, 1986; Malmendier and Tate, 2005, 2008; Schrand and Zechman, 2012), narcissism (e.g., Ham et al., 2014; Aktas et al., 2015), military service (Benmelech and Frydman, 2015), CEOs who start their careers in recessions (Schoar and Zuo, 2016), and a record of legal infractions (Davidson et al., 2015).[6] We extend this research by focusing on the banking sector and investigating shifts in the prevalence of materialistic bank CEOs around bank deregulation, as well as how the organizational structure of risk management functions, corporate culture and bank tail risk vary with CEO materialism.

A stream of psychology literature posits that materialism comprises a set of values and goals focused on wealth, possessions, image and status. These aims are a fundamental aspect of the human value/goal system, and can stand in relative conflict with aims concerning the well-being of others, as well as one's own personal and spiritual growth (Kasser, 2016). The materialism construct manifests in what people care about, what is important to them and what ends they pursue in life (e.g., Fournier and Richins, 1991). Materialistic individuals place the acquisition of material goods at the center of their lives, and for such individuals a lifestyle with a high level of material consumption serves as a primary goal (Fournier and Richins, 1991; Richins and Dawson, 1992; Daun, 1983). Materialism has been described as a way of life characterized by a "devotion to material needs and desires" (Richins and Rudmin, 1994), "the

[6] See also Graham et al. (2013), Cronqvist et al. (2012) and Kaplan et al. (2012).

importance one attaches to worldly possessions" (Belk, 1985), and "the worship of things" (Bredemeier and Toby, 1960). It is the single-minded pursuit of happiness through acquisition or possession rather than through other means that distinguishes materialism (Richins and Rudmin, 1994).

Measuring deep aspects of a person's value system presents a challenge to researchers. Much of the empirical materialism literature in psychology utilizes surveys and laboratory experiments which employ psychometric principles to develop instruments that are administered to research subjects (Kasser, 2016; Richins and Dawson, 1992). As an illustration, Deckop (2015) use an instrument consisting of 14 items where subjects provide their level of agreement with each item. Examples of items in this instrument are: It is important to own expensive homes, cars and clothes; The things people own say a lot about how well they are doing in life; I like to own things that impress people; Having luxurious things is an important part of life; I purchase things because I know they will impress others; The most important concern for a firm is making a profit, even if it means bending or breaking the rules.

Our large sample, archival research is not amenable to administering a psychometric instrument. Instead, we adopt a revealed preference approach based on the premise that fundamental aspects of a CEO's value system are revealed by their observable off-the-job behavior. We follow a growing literature that provides evidence linking executives' off-the-job behavior to corporate behavior (e.g., Cronqvist et al., 2012; Liu and Yermack, 2012). As discussed further in section 3, our materialism proxy interprets executives' personal ownership of luxury goods, including expensive cars, boats, and real estate, as a manifestation of relatively high materialism. While our measure reflects revealed behavior directly related to key elements of some existing instruments (e.g., Deckop, 2015), we cannot psychometrically assess the construct validity of our materialism measure as would a psychologist in a laboratory setting. However, as discussed earlier, Davidson et al. (2015 and 2017) provide robust evidence that this materialism measure is associated with behaviors in non-financial firms that are largely consistent with findings in the psychology literature. This revealed behavior measure allows us to extend beyond the laboratory and investigate the effects of materialism in the banking sector around the financial crisis. We acknowledge that it is a maintained hypothesis that our measure of luxury goods ownership captures meaningful variation in CEOs' materialism.

We are unaware of economic theory that formally models the implications of materialism for risk management, insider trading or tail risk. Lacking developed theory, we build on empirical results spanning several literatures to motivate our analyses of CEO materialism in the banking sector. While CEO materialism has important implications for non-financial firms, it has special relevance to the banking sector deriving from the tension created by the dual demands on banks to be value maximizing entities that also serve public interests that transcend the individual bank. When bank employees engage in imprudent risk taking, behave opportunistically or bend ethical rules, it can impose substantial negative externalities on the economy. The importance of CEO materialism for the banking sector itself is underscored by our analysis showing that the prevalence of materialistic bank CEOs increased significantly preceding the financial crisis.

Extant literature associates materialism with insensitivity to behaviors that negatively affect others (Belk, 1988). Sheldon et al. (2000) provide evidence that materialism predicts more competitive behavior, finding that more materialistic participants make more defection choices in a prisoner's dilemma game. Kilbourne and Pickett (2008) focus on individual's beliefs regarding existence of environmental problems such as water shortages, ozone depletion and global warming. They document that materialism has a negative effect on such beliefs, and that these beliefs affect environmentally responsible behaviors. Deckop et al. (2015) find that materialism is associated with negative organizational citizenship behaviors that can impair firm performance. Using CSR scores that capture a firm's investments in community, diversity, employee relations, environment, and product safety, Davidson et al. (2017) find that firms led by materialistic CEOs have lower CSR scores. This is consistent with materialistic CEOs pursuing profits at the expense of the environment and other social values. Davidson et al. (2017) also find that CSR scores are positively associated with profitability in firms with non-materialistic CEOs, but not in firms with materialistic CEOs. This is consistent with materialistic CEOs consuming private benefits associated with a firm's CSR investments.

Materialism is also commonly connected to the notion of culture. There is evidence that the prevalence of materialism varies substantially across cultures (e.g., Ger and Belk, 1996; Eastman et al., 1997). Kasser et al. (2004) refer to the underpinnings of a culture of consumption as a materialistic value orientation, which involves the widespread belief that it is important to pursue the goals of attaining financial success, having nice possessions, and having the right

image. Materialistic individuals are more likely to bend ethical rules to gain possessions (Richins and Rudmin, 1992; Muncy and Eastman, 1998). Sidoti and Devasagayam (2010) find that materialism is positively associated with credit card misuse. Specifically with respect to banks, Cohn et al. (2014) provide experimental evidence suggesting that the prevailing business culture in the banking industry weakens and undermines the honesty norm. They show that when subjects' professional identity as bank employees is rendered salient, a significant proportion of them become dishonest. Further, bank employees with more materialistic values have a greater tendency to act dishonestly. With respect to non-financial firms, Davidson et al. (2015) find that materialistic CEOs, although not more likely to perpetrate fraud themselves, lead firms in which non-CEO insiders have relatively high probabilities of perpetrating fraud. Also, the probability of erroneous financial reporting is higher in firms run by materialistic (vs. non-materialistic) CEOs. Davidson et al. (2015) interpret these results on fraud and reporting errors as indicative of materialistic CEOs overseeing relatively loose control environments. We extend this literature to consider the influence of bank CEO materialism on risk management and bank culture.

Risk management is intrinsic to the business model of banks in a way that it is not for non-financial firms and is of fundamental concern to bank regulators. Banks differ from non-financial firms in that banks create value for shareholders not just through their investments, but also through their liabilities as part of their business model. Banks produce liquid claims and the value of a bank depends on its success at producing such claims. For example, the value of a bank depends on its deposit franchise. A bank's ability to issue claims that are valued because of their liquidity depends on the riskiness of the bank. Thus, risk management is embedded into the production function of banks in a way that is not the case for non-financials (Stulz, 2016; DeAngelo and Stulz, 2015). Banks' risk-taking behavior can also expose the economy to negative externalities. Our analysis of relations between bank CEO materialism and risk management is motivated by the centrality of risk management to banks' value creation together with the documented proclivity of materialistic individuals for opportunistic behavior, a lack of concern for others, and connections between CEO materialism and the laxity of control environments. We hypothesize that banks with materialistic CEOs will adopt relatively lax risk control environments, perhaps to reduce constraints on bank employees and facilitate more aggressive pursuit of profits in the form of tail risks.

It is important to recognize that a choice of lax risk controls may be optimal or non-optimal from the standpoint of shareholders. It can be optimal if it provides appropriate flexibility for employees to assume risk levels consistent with the risk appetite that maximizes shareholder wealth (Stulz, 2016). However, optimal risk exposure from the perspective of shareholders need not be optimal for society. Recent research shows that banks with more shareholder friendly governance performed worse than other banks during the crisis (Beltratti and Stulz 2012; Erkens, et al., 2012), and have greater insolvency risk (Anginer et al., 2014). On the other hand, lax controls can be sub-optimal if this creates opportunities for employees to consume private benefits by assuming tail risks that benefit themselves at the expense of the bank. For example, Ellul and Yerramilli (2013) find that banks with high RMI performed better during the crisis relative to banks with low RMI. Similar to Beltratti and Stulz (2012) and Erkens, et al. (2012), this is consistent with the shareholders of some banks optimally demanding low RMI and simply getting caught by a low probability negative shock. Or low RMI could have been too low from the shareholders standpoint by owing private benefit consumption by bank employees. While it is beyond the scope of this paper to distinguish these two possibilities, a central point of our paper is that regardless of whether risk controls are optimal or not, higher tail risks associated with materialism's tendency towards lax risk management expose the economy to negative externalities.

Flawed corporate cultures have been posited as a significant contributor to the financial crisis (Dudley, 2014; Financial Stability Board, 2014; Group of Thirty, 2015). If materialistic CEOs influence a bank's organizational values and norms of behavior then employees may exhibit heightened propensity for opportunistic behavior. We extend and complement the extant research by examining the relation between insider trading activities of senior executives in banks and future abnormal returns before, during and after the financial crisis. Jagolinzer et al. (2016) document a relation between executives' political connections and the informativeness of their trades. This relation is strongest during the period in which TARP funds were dispersed, and strongest among politically connected insiders at banks that received TARP funds. In contrast to Jagolinzer et al. (2016) who examine the trades of politically connected bank executives relative to non-connected executives, we test whether the insider trades of non-CEO senior executives in firms led by materialistic CEOs were more predictive of future abnormal returns in the period of TARP funds disbursement than trades of executives in banks led by non-

materialistic CEOs. To the extent that materialistic leaders shape banks' culture we expect opportunistic insider trading behavior of non-CEO executives to be more extensive in firms run by materialistic CEOs.

A key role of risk management is to mitigate the risk of large losses, motivating a focus on downside tail risk. If materialistic CEOs weaken risk management structures and shape bank cultures in a way that heightens other executives' exploitation of control deficiencies, then this could result in a significant increase in a bank's tail risk exposure. We use two measures of downside tail risk based on a growing literature that uses firms' realized stock returns to estimate tail risk. We use total stock returns, not residual returns, as the measure is designed to capture all downside tail risk deriving from both systematic and idiosyncratic tail risk factors. While stock return measures may be limited by the fact that such returns only reflect what investors know and not unknown risks hidden by bank opacity, these measures are widely used in the literature (Acharya et al., 2017; Adrian and Brunnermeier, 2016; Kelly and Jiang, 2014). The first measure reflects the stand alone downside tail risk of an individual bank *unconditional* on what is happening in the overall economy or at other banks. However, a single bank's risk measure does not necessarily reflect its connection to overall systemic risk. Our second measure, the marginal expected shortfall, is designed to measure an individual bank's tail risk exposure to system-wide distress, and is analogous to the stress tests performed by individual institutions and regulators. It has been shown to have significant explanatory power for which firms contribute to a potential crisis (Acharya et al., 2017). We posit that banks with materialistic CEOs have significantly more downside tail risk and aggregate tail risk sensitivity relative to banks with non-materialistic CEOs. We further examine whether these differences in risk between groups increased significantly during the recent crisis.

Taking on tail risk may be an optimal strategy that appropriately balances risks and rewards from the perspective of shareholders. Alternatively, even if such a strategy is not optimal, employees in banks run by materialistic CEOs must be benefiting personally from their risky choices. While it is natural to assume that a profit maximizing agent would only accept downside risk if it is offset by upside potential, this need not be the case if an agent can consume private benefits by assuming downside tail risk. For example, consider a bank employee who writes out-of-the-money put options in order to report profits from the premiums collected. There is no upside associated with this investment, but rather a fixed premium and downside tail risk.

In our final set of tests, we examine whether CEO materialism is associated with higher tail returns and marginal expected surplus.

3. Sample, Descriptive Statistics and Analysis of Trends

3.1. Sample, data and variable measurements

We measure materialism using a revealed preference approach that interprets executives' personal ownership of luxury goods, including expensive cars, boats, and real estate, as a manifestation of relatively high materialism. Our data on CEOs' ownership of vehicles, boats, and real estate are obtained from numerous federal, state and county databases accessed by licensed private investigators. We augment our real estate data by hand collection of public information primarily from county tax assessor websites.[7] We follow a rigorous procedure to assure ourselves that we are adequately capturing luxury assets owned by an individual. In brief, we collect real estate data from title/ownership searches as well as by looking up property records from an individual's address history. The latter procedure allows us to include property that may be in the name of a spouse or held by a trust, and allows us to include properties that an individual raised as new construction (for which we estimate property value based on an average of several real estate databases). For individuals who rent instead of own real estate (for instance, executives in Manhattan), we obtain estimates of property values based on the records for the condominium units in the building (the steps we take to attest to the veracity of the real estate values are described in detail in Appendix B). Our vehicle data is based in part on insurance documents which show an individual is insured to drive a vehicle. This allows us to consider vehicles that may be owned in another's name.

We measure an executive's materialism by setting an indicator variable, *MATERIAL*, equal to 1 if the CEO owns luxury assets prior to December 31, 2013, where luxury assets include cars with a purchase price greater than $75,000, boats greater than 25 feet in length, primary residences worth more than twice the average of the median home prices in the Core Based Statistical Area (CBSA) of his firm's corporate headquarters, any additional residences worth more than twice the average home prices in that CBSA, and 0 otherwise.[8] We derived the

[7] Our acquisition and use of asset data conforms to all provisions of the Driver's Privacy Protection Act (DPPA).
[8] We include a CEO's luxury asset purchases regardless of when they occur to define *MATERIAL*. This is based on our assumption that type is stable and revealed with a delay, and our desire to minimize the number of materialistic CEOs classified otherwise. We note that, in general, there is a question of whether materialism is a stable trait

above cutoff for vehicles using the Jenks natural breaks classification method (Jenks, 1967). This method suggests that suggest that $75,000 represents natural breaks in the distribution of values for car prices. In sum, the Jenks method arranges data into groups by reducing variance within groups and maximizing variance between groups. Step detection, though often used for time series data, identifies jumps in the levels of a distribution and yields similar inferences to the Jenks method.

Nevertheless, in order to verify whether the statistical and economic significance of our results on materialism are sensitive to these measurement choices, we verify that our results are robust to using an alternative measure, where the indicator *MATERIAL* takes a value of 1 if the CEO owns cars with a purchase price in excess of $110,000, boats greater than 40 feet in length, a primary residence worth 5 times the average of the median home price in the CBSA of his firm's corporate headquarters or additional residences worth 5 times the median value of homes in that property's CBSA, and 0 otherwise. We also obtain similar results when we use a continuous measure of materialism, defined as the sum of the dollar values of an executive's car(s), (estimated value of) boat(s) and primary residence in excess of twice the average of the median home prices in the CBSA of the corporate headquarters, and the value of any additional residences as of December 31, 2013.[9] We further verify the robustness of our results to several other measures to capture CEO materialism; we discuss these alternate measures in detail in Appendix B.

---

within person or whether it can vary over time (and whether this variance is symmetric). Broadly, this can be thought of as a "nature versus nurture" argument. We look into this by considering the subset of individuals whose classification as "materialistic" during their tenure at the firm changes. For example, an individual who was CEO from 2000-2009 and who acquired a luxury asset in 2004 would be classified as non-materialistic through 2003 and materialistic beginning in 2004 if measured in real time. When estimating models using these individuals and including a person fixed effect we find no significant difference in results pre and post 'revelation' of materialism. It appears their behavior is the same before and after buying the asset. This doesn't imply that the individual was 'born that way' or that materialism must be a stable trait through life. But, it does appear that once an individual is of an age to become CEO of a large publicly traded company that our proxy of materialism is a stable trait from that point on in our setting and is more accurately measured with a static binary variable.

[9] We choose to report our results using the binary measure for the following reasons. First, a binary measure is needed in our model of CEO transitions. Second, analyses requiring the summation of coefficients are more meaningful and offer a clearer interpretation with a binary measure. Third, boat prices were not provided to us and need to be estimated which calls into question the accuracy of that component. And finally, summing the dollar values of different assets on a one-to-one basis is not likely an accurate measure of the degree of materialism (for instance, someone with a $300,000 car and $700,000 home may not represent the same level of materialism as someone with a $50,000 car and a $950,000 home). However, our results are robust to using the continuous measure and are available on request.

We obtain consolidated financial information of bank holding companies (BHCs) from the FR Y-9C reports that they file with the Federal Reserve System. We gratefully acknowledge the data on the risk management function at BHCs from Andrew Ellul and Vijay Yeramilli. Ellul and Yeramilli (2013) use information from 10-K statements, proxy statements and annual reports of BHCs to construct a novel risk management index (*RMI*) which measures the organizational strength and independence of the risk management function at each BHC for each year. RMI embeds two distinct aspects of a bank's risk priorities. First, RMI reflects a set of variables that measure the importance of the Chief Risk Officer, the official exclusively charged with managing enterprise risk across all business segments of the BHC within the organization. Second, RMI reflects a set of variables intended to capture the quality of risk oversight provided by the BHC's board of directors. The index is constructed by taking the first principal component of the following risk management variables: 1) if a Chief Risk Officer (CRO) responsible for enterprise-wide risk management is present within the BHC or not; 2) if the CRO is an executive officer of the BHC or not; 3) if the CRO is among the five highest paid executives at the BHC or not; 4) the ratio of the CRO's total compensation, excluding stock and option awards, to the CEO's total compensation; 5) if at least one of the independent directors serving on the board's risk committee has banking or finance experience; and 6) if the BHC's board risk committee met more frequently during the year compared to the average board risk committee across all BHCs (see Ellul and Yeramilli (2013) for details on the construction of RMI).

We obtain data on stock prices from the CRSP database, which we use to compute our two measures of downside risk, i.e., tail risk (*TAIL RISK*) and marginal expected shortfall (*MES*), as well as measures of annual returns and volatility of returns. The tail risk reflects the stand alone risk of individual banks, and is estimated as the average return on a bank's stock over the 5% worst return days for the bank's stock in a given year (we consider the negative of this measure so higher values indicate higher tail risk). The marginal expected shortfall (Acharya et al., 2017) is designed to measure how exposed a firm is to aggregate tail shocks and is computed as the average return for an individual bank over the days that fall in the bottom 5% of the S&P500 returns for the year (as before, we consider the negative of this measure). Finally, financial accounting data is employed to compute various firm characteristics and CEO compensation data to compute executive wealth, the sensitivity of CEO compensation to stock

prices (i.e., delta) and the sensitivity of CEO compensation to stock return volatility (i.e., vega) are obtained from the Bank Regulatory, Compustat and ExecuComp databases.

Due to the high cost of background checks on asset ownership we purchase data only for CEOs at financial institutions with market capitalization of greater than $1 billion whose tenures extend beyond 1992.[10] Table 1 describes our final sample, which comprises 284 firms in the financial services sector and 445 CEOs in total over the period 1992–2013. This includes 89 firms for which we have data for at least two CEOs, which allows us to analyze changes in risk management policy following a CEO change. Table 1 also summarizes the distribution of luxury assets. Of the 445 CEOs in the sample, approximately 60% are materialistic.

3.2. Descriptive Statistics

We present summary statistics of the key financial, risk and compensation variables for the banks used in our analyses in Table 2, panel A (columns (1) through (3)). See Appendix A for detailed descriptions of all variables. To better understand the differences in characteristics between firms led by materialistic CEOs vs. non-materialistic CEOs, we compare the means of these variables in columns (4) and (5). Some key observations are as follows.

On average, firms led by materialistic CEOs have significantly higher non-interest income, higher commercial and industrial loans, higher deposits and more mortgage backed securities as a proportion of total assets as compared to those in banks led by non-materialistic CEOs. This demonstrates the importance of controlling for a bank's business model in our analyses. Interestingly, we do not find that these two groups of firms differ in terms of size, thus reducing the likelihood that differences in size are related to differences in risk-taking activities and hence differences in risk-management. More interestingly, the average RMI of firms with materialistic CEOs is significantly lower than that of firms led by non-materialistic CEOs. In fact, the RMI for firms led by materialistic CEOs is lower by 0.140, which is almost half the sample standard deviation for RMI. This is consistent with our main hypothesis regarding the relation between CEO materialism and risk management functions in BHCs.

Next, consider the two measures of downside risk. We observe that banks with materialistic CEOs have significantly higher tail risk and higher marginal expected shortfall. The average of 0.051 (0.032) on tail risk (marginal expected shortfall) for firms led by materialistic CEOs indicates that the mean return on the average BHC stock on the 5% worst return days for

[10] We also exclude Interim CEOs who held the title of CEO for less than 1 fiscal year.

the BHC's stock (for the S&P500) during the year is -5.1% (-3.2%). The corresponding tail risk for banks led by non-materialistic CEOs is -4.7% (-2.9%).[11] Interestingly, while the tail risk and marginal expected shortfall is significantly higher for firms led by materialistic CEOs, so are the tail reward and marginal expected surplus for these firms (vs. firms led by non-materialistic CEOs). Specifically, a firm led by a materialistic CEO has on average 6.1% (3.5%) returns over the 5% best return days for the bank (S&P500); whereas a firm led by a non-materialistic CEO has on average 5.7% (3.2%) returns over the 5% best return days for the bank (S&P500), and these differences are statistically significant.

One potential concern is that our materialism measure simply captures a wealth effect where wealthier executives are more likely to be classified as materialistic because they have the means to acquire luxury assets. Among other things, greater wealth may make executives less risk-averse, and so we want to rule out the possibility that our materialism measure just reflects CEOs with low risk aversion pursuing more aggressive risk-taking strategies. To address this concern, we estimate a measure of an executive's wealth representing the sum of both non-firm wealth and the value of firm-specific wealth. Our estimate of non-firm wealth is calculated using the methodology developed by Dittmann and Maug (2007).[12] Firm-specific wealth is computed using data from ExecuComp and is calculated as the sum of the value of the CEO's portfolio of option and stock holdings, pensions and deferred compensation. Table 2, panel A shows that the average total wealth (non-firm wealth) of materialistic CEOs, $74.49 ($18.6) million, is significantly lower than that of non-materialistic CEOs at $164.07 ($27.9) million. The univariate correlation between total wealth (non-firm wealth) and CEO materialism is -0.113 (-0.071). Thus, our materialism measure does not appear to capture a wealth effect where wealthier executives are more likely to be classified as materialistic.

We also observe a significantly lower average delta for materialistic CEOs as compared to non-materialistic CEOs, where CEOs total wealth is correlated at 0.93 with their delta (0.998 (0.457) between delta and firm-specific (non-firm) wealth). Additionally, we find that the average vega is significantly lower for materialistic CEOs. We do not have a theory of how CEO compensation should vary with materialism and have no prior expectations in this regard. As

[11] As we document later in the paper, the differences in tail risk and MES between banks run by materialistic versus non-materialistic CEOs increases significantly during the financial crisis.

[12] We retrieved estimates of non-firm wealth using the Dittmann and Maug methodology from Ingolf Dittmann's website at http://people.few.eur.nl/dittmann/data.htm .

shown in Table 2, panel A, banks run by materialistic differ in many respects from those run by non-materialistic CEOs. Indicative of real differences in business models, the two bank types differ in loan portfolio composition, extent of non-interest income, holding of mortgage backed securities, deposit base, and tail risks and rewards. Such deep differences in business models would likely drive intricate differences in incentive contract design across the two bank types. To address the possibility that our results are a consequence of differences in incentive compensation contracts between materialistic and non-materialistic CEOs we control for a CEO's delta and vega in all of our empirical analyses. All results are also robust to controlling for total wealth, or to including both firm-specific and non-firm wealth as separate variables simultaneously.

To summarize, the above univariate differences show that RMI is significantly lower and tail risk, MES and tail reward are significantly higher for banks run by materialistic CEOs relative to banks run by non-materialistic CEOs. We test this association more formally in a multivariate setting in section 4.

3.3 Deregulation in the Banking Sector and Trends in CEO types

Our sample period covers two significant deregulation events in the financial sector: branch banking deregulation in 1994 via the Interstate Banking and Branching Efficiency Act, and the Gramm-Leach-Bliley Act in 1999. The Interstate Banking and Branching Efficiency Act intensified competition by lowering barriers to entry into a state by branches of out-of-state banks (Rice and Strahan, 2010). The Gramm-Leach-Bliley Act allowed commercial banks to more fully compete in insurance underwriting, securities brokerage, and investment banking (DeYoung et al., 2013). We explore the possibility that this deregulation, by intensifying competition and expanding opportunities for risk-taking and growth, served to shift the types of individuals in bank leadership. This analysis is in the spirit of Philippon and Reshef (2012), who provide evidence that financial deregulation spurs the flow of human capital into the finance sector.

We begin by plotting the trend in materialistic CEOs over time to examine whether shifts in the regulatory environment correspond with a higher proportion of materialistic executives accepting CEO positions in the banking industry. Figure 1 graphically presents the trend in CEO materialism in the banking industry relative to non-financial firms. We find a rise in the prevalence of materialistic CEOs in the banking industry beginning after 1994, with the trend

peaking in 2004. The influx of materialistic CEOs appears to be specific to the banking sector and not an economy-wide phenomenon as we observe no similar trend for non-financial firms. An analysis of bank CEO turnovers during this period does not indicate unusual changes in the total number of turnovers during these years (see Table 2, panel B). Thus, while the turnover rate remained relatively stable over time, banks that had turnovers were much more likely to hire a materialistic CEO. Across all industries in the U.S., banking had the lowest proportion of materialistic CEOs in 1994 at 47% (comparable to Utilities). However, by 2004 the banking sector had the highest proportion of any industry at 67%. Non-banks, on the other hand remained relatively stable (ranging between 52-57%) over the entire sample period, with the average actually decreasing slightly after 1999.

While Figure 1 portrays a dramatic shift in the composition of materialistic CEOs coincident with bank deregulation, we establish this trend statistically by testing the differences in the average percentages of materialistic CEOs in financial and non-financial service firms from the period before the passage of the Gramm-Leach-Bliley Act (1992-1999) to the period after the passage of this Act (2000-2014). Table 3 presents these differences. In the 1990-1999 timeframe, 49% of CEOs were materialistic on average in financial services firms whereas 59% of CEOs were materialistic on average in non-financial services firms. This difference is statistically significant (at the .01 level). Both groups saw significant shifts in these proportions in the 2000-2014 period. The average percentage of materialistic CEOs increased to 65% for financial services firms (this increase is significant at the .01 level), while the average percentage of materialistic CEOs in non-financial firms declined marginally to 56% (significant at the .10 level). The difference between the financial and non-financial firms continues to be significant (at the .01 level) in the 2000-2014 period, where now the percentage of materialistic CEOs is higher for financial services. These results confirm our graphical analysis above.

Table 3 also reports results from examining differences in the average percentage of materialistic CEOs in three subsamples across the two periods: large financial services companies (firms bigger than the sample median), small financial services firms (firms smaller than the sample median), and bank holding companies only. We find that the average percentage of materialistic CEOs increased significantly (between 15-17%) in all three subsamples from the period before Gramm-Leach-Bliley to the period after passage of the Act (all differences are

significant at the .01 level). Thus, increases in materialistic CEOs occurred homogeneously across the financial sector.

Is the significant trend we document in bank CEO characteristics limited to materialism alone, or did the prevalence of other bank CEO characteristics simultaneously change around bank deregulation? In Figure 2 we plot trends in a range of CEO characteristics that have received attention recently in the literature – namely overconfidence (Malmendier and Tate, 2005; 2008), narcissism (Ham et al., 2014), whether a CEO had prior military service (Benmelech and Frydman, 2015), whether a CEO started his career in a recession (Schoar and Zuo, 2017) or whether he had a record of legal infractions (Davidson et al., 2015).[13] As is evident from Figure 2, we do not observe any significant trends in any of these CEO characteristics - only CEO materialism trends with deregulation. We further verify that our measure of materialism is capturing a construct which is distinct from these other CEO traits. We estimate a regression with materialism as the dependent variable and the above characteristics as independent variables. We find no statistically significant associations between materialism and these traits (results available on request). Not surprisingly then, our regression results are robust to including controls for all the above CEO characteristics.

Finally, in Table 4, we use data from BoardEx to examine whether there was a simultaneous shift in CEOs with different professional backgrounds after deregulation (after 1999). We consider the prior professional backgrounds of CEOs whose tenures began during 1990-1999 (refer to them as pre-deregulation CEOs) and compare them to the backgrounds of CEOs whose tenures started during 2000-2009 (post-deregulation CEOs). We document that, on average, post-deregulation CEOs were significantly less likely to have prior commercial banking experience, significantly more likely to have investment banking experience, were significantly less likely to be inside hires, and were significantly more likely to have Chief Financial Officer experience (significant at the .05 level or better). We examine these differences in professional backgrounds across our sample of materialistic and non-materialistic CEOs, and find that as

[13] We measure these traits based on the prior literature cited above. A CEO is considered overconfident is he is a net acquirer of shares. We modify the measure as net purchases after the 4th year of tenure over the next four years in order to obtain sufficient observations. We measure narcissism by the area covered by a CEO's signature scaled by the number of letters in his name. Military is measured based on whether a CEO has military experience, and the variable recession is measured based on whether a CEO entered the labor market during a recession. A CEO is a considered to be a recordholder if he has any legal infractions, where legal infractions include driving under the influence, other drug-related charges, domestic violence, reckless behavior, disturbing the peace, and traffic violations (including speeding tickets).

compared to non-materialistic CEOs, materialistic CEOs are less likely to have commercial banking experience, more likely to have investment banking experience and less likely to be inside hires (significant at the .10 level or better). Given that there were significant shifts in the professional experiences of the CEOs hired in the post-deregulation period, we verify the robustness of all our regressions by including controls for the professional backgrounds as well as inside/outside hires (results available on request).

The above analyses present compelling evidence of a secular shift in the composition of the type of CEOs in this industry post-deregulation. This dramatic shift in bank CEO materialism motivates the importance of examining the hypothesis that CEO materialism is related to weaker risk controls, more opportunistic cultures and more aggressive tail risk-taking. We examine this in a multivariate setting in the next section.

4. CEO Materialism and Bank Behavior

4.1. CEO Materialism and Risk Management Functions

We begin our formal analysis by examining whether the risk management function in BHCs (as proxied by RMI) varies with CEO type. We estimate the following model with year fixed effects:

$$RMI_{i,t} = \beta 0 + \beta 1\ MATERIAL_{i,t-1} + \beta 2\ CONTROLS_{i,t-1} + Year\ FE + \varepsilon_{i,t} \qquad (1)$$

where $RMI_{i,t}$ is the risk management index for BHC i in year t, and *MATERIAL* is a dummy variable that equals 1 if the CEO of the BHC is materialistic (as defined earlier). We follow Ellul and Yeramilli (2013) in including important financial characteristics that may affect RMI.

First, banks can differ significantly with respect to business models (Altunbas, et al., 2011) and product-line mixes (Bolt and Humphrey, 2015). To address this we include textured controls for asset composition with commercial and industrial loans, consumer loans, mortgage loans, trading assets and mortgage backed securities (all scaled by total assets); loan quality with loans past due for 90 days or more and non-accrual loans; financing structure with total deposits and tier 1 capital (scaled by total assets), and maturity mismatch (ratio of deposits and short term borrowings less cash to total liabilities); and, as an additional product mix control, we include the ratio of non-interest income to the sum of interest and non-interest income. Non-interest income has been shown in the literature to have a significant association with bank risk, and is important

to include (e.g., Stiroh 2004; 2006; Brunnermeier, et al., 2012; Demurgic-Kunt and Huizinga, 2010; De Jonghe, 2010).

We further control for the size of the BHC (measured as the natural log of total assets) and size squared following Ellul and Yeramilli (2013); and for the ratio of market capitalization to book value of equity, past stock returns, the volatility of past returns and beta. The latter two variables are included to distinguish tail risk from return volatility and beta. Holding the mean constant, if distributions are perfectly symmetrical, then larger return volatility is basically equivalent to more tail risk. Recent research in finance (e.g., Kelly and Jiang, 2014) establishes the existence of firm specific tail risk that is distinct from volatility, and which varies across firms and over time. Finally, as discussed earlier, we want to differentiate the effects of CEO materialism from effects deriving from differences in incentive compensation. To address this, we control for CEO compensation characteristics by including the CEO delta and CEO vega in the model (results are robust to including a measure of CEO total wealth). We repeat the above analysis by including firm fixed effects in the model and present results both with and without firm effects.

Table 5 presents the results. For all models, the coefficient on *MATERIAL* is negative and statistically significant (at the .05 level or better), providing evidence of a significant negative association between CEO materialism and the strength of the risk management function at BHCs. Taking an average of the coefficients across the various models (without firm fixed effects), we find that having a materialistic CEO lowers RMI by 0.142, which corresponds to 43% of the sample standard deviation of RMI (which is 0.33). Thus, having a materialistic CEO (vs. a non-materialistic one) is associated with RMI being lower by almost half the sample standard deviation, which is similar to our findings in the univariate analysis.

Among the control variables, the results are somewhat varied across models for some variables, but consistent for others. Some key observations are as follows. We find a significant negative association between RMI and volatility in three (out of four) models, indicating that higher quality risk management is associated with less volatile returns. Size is positive and significant in one model, suggesting that larger BHCs have higher RMI. However, it is negative and significant (although marginally) in one model. We find some evidence of a concave relation between size and RMI as in Ellul and Yeramilli. CEO vega is positive and significantly

associated with RMI in one model. This is intuitive and suggests that BHCs in which CEO wealth is more sensitive to volatility in returns have higher RMI.

4.1.1 Predecessor-Successor Analysis

To provide more rigorous evidence on how RMI varies by CEO type we estimate equation (2) to examine RMI before and after a change in CEO distinguished by predecessor and successor type:

$$RMI_{i,t} = \beta 0 + \beta 1\ NEW\ CEO\ MATERIAL_i + \beta 2\ SUCCESSOR_{i,t} + \beta 3\ CHANGE\ CEO\ TYPE_i + \beta 4\ NEW\ CEO\ MATERIAL_i * SUCCESSOR_{i,t} + \beta 5\ NEW\ CEO\ MATERIAL_i * CHANGE\ CEO\ TYPE_i + \beta 6\ SUCCESSOR_{i,t} * CHANGE\ CEO\ TYPE_i + \beta 7\ NEW\ CEO\ MATERIAL_i * SUCCESSOR_{i,t} * CHANGE\ CEO\ TYPE_i + \beta 8\ CONTROLS + YEAR\ FE + \varepsilon_{i,t}\ , \quad (2)$$

where *NEW CEO MATERIAL* is a dummy variable that equals 1 if the new CEO is materialistic and 0 otherwise, *SUCCESSOR* is a dummy variable that equals 1 if RMI is measured after the new CEO is in office and 0 otherwise, and *CHANGE CEO TYPE* is a dummy variable that equals 1 if there is a change in CEO type from the predecessor to the successor and 0 otherwise. We exclude the transition year, during which both the predecessor and successor are present, from the analysis because it is likely that the RMI score is a function of both CEOs decisions. We estimate equation (2) both with and without control variables. We include the same control variables in equation (2) as we did in equation (1) and do not discuss those in this section for the sake of brevity. Including the control variables again results in decreased sample size, and therefore we report results both with and without these variables. The results are similar for both models.

Table 6 reports the results of estimating equation (2) as well as an analysis of the change in RMI based on the transitions in CEO type. We find that RMI increases significantly (at the .01 level) following the replacement of a materialistic CEO by a non-materialistic CEO. This is consistent with non-materialistic CEOs investing in strengthening the risk management function in their banks once they assume office. Analogously, RMI decreases significantly (though only at the .10 level) when a non-materialistic CEO is replaced by a materialistic CEO. The lower significance level is intuitive as it is plausibly more difficult (and perhaps takes a longer time) to

weaken an existing strong risk-management function in a bank. The corresponding changes in RMI associated with other transitions (non-materialistic –> non-materialistic and materialistic -> materialistic) are not significant. A test of the differences in RMI due to the various transitions reveals that transitions from materialistic to non-materialistic CEOs, and those from non-materialistic to materialistic CEOs, significantly dominate the changes in RMI due to all other transitions.

While the above results are consistent with materialistic bank CEOs imprinting their style on the bank by directly influencing policies and culture, we acknowledge that these results are not causal effects of randomly assigning materialistic CEOs to banks. Boards actively seeking to change strategic direction with respect to banks' operating and risk management strategies may hire materialistic CEOs as best suited to implement this new direction.[14] In additional analysis, we find that the probability of a change in CEO type is significantly higher following forced CEO turnovers than for voluntary or routine turnovers. Forced turnovers lead to a change in CEO type 53% of the time while routine turnovers lead to a change in type 33% of the time. This difference is significant at the 1% level. While this evidence is not definitive, it suggests that at least in some cases boards take an active role in CEO materialism switches. However, it is important to note that we do not find any significant pre-trends in the years prior to CEO turnovers involving a switch in CEO types.[15] The fact that changes in RMI occur only after a switch in type speaks to the fact that regardless of whether the board endogenously selects a CEO by management style or the CEO imprints their style on the bank, CEO materialism is a key ingredient in shaping the strength and independence of banks' risk management function.

Overall, our results in this section indicate that CEO materialism is an important factor in influencing banks' risk management functions.

4.2 CEO Materialism and Bank Culture

We now examine the effect of CEO type on the behaviors of other executives and employees in the organization. We use insider trading activities of other senior executives as a representation of how corporate culture can infiltrate an organization and manifest itself through the actions of the organizations' employees.

[14] One way to rule out this alternative explanation is to conduct this analysis on a sample of exogenous CEO turnovers (transition due to predecessor death being the strongest example), but our sample of turnovers is too small to implement this test.

[15] This result is unreported for brevity, but available on request.

Davidson et al. (2015) document that materialistic CEOs are associated with a corporate culture that reflects lax control systems, including weakened board monitoring, increased equity-based incentives for executives, and a heightened risk of fraud. Based on this evidence, we examine the extent to which banks led by materialistic (vs. non-materialistic) CEOs reflect a culture with lower controls and less monitoring of the actions of other senior executives, thus allowing them to engage in insider trading based on private information. We complement Jagolinzer et al. (2016) who document that the relation between executives' political connections and the informativeness of their trades is strongest during the period in which TARP funds were dispersed, and strongest among politically connected insiders at banks that received TARP funds.[16] To the extent that materialistic leaders shape their banks' culture we expect the insider trades of non-CEO senior executives in firms led by materialistic CEOs to be more predictive of future abnormal returns in the period of TARP funds disbursement than trades of executives in banks led by non-materialistic CEOs. We test the following model:

$$\begin{aligned} ABNORMAL\ RETURNS_{i,t} &= \beta 0 + \beta 1\ INSIDER\ TRADING_{i,t-1} \\ &+ \beta 2\ PRE\text{-}CRISIS + + \beta 3\ CRISIS + \beta 4\ BAILOUT \\ &+ \beta 5\ INSIDER\ TRADING_{i,t-1} * PRE\text{-}CRISIS \\ &+ \beta 6\ INSIDER\ TRADING_{i,t-1} * CRISIS \\ &+ \beta 7\ INSIDER\ TRADING_{i,t-1} * BAILOUT + \beta 8\ CONTROLS + \varepsilon_{i,t} \end{aligned} \qquad (3)$$

In the above equation the dependent variable *ABNORMAL RETURNS* is the market adjusted return in month *t*. The independent variables include *INSIDER TRADING* which is the ratio of net insider purchases to the sum of total insider purchases and sales; *PRE-CRISIS* is a dummy variable that equals 1 for the pre-crisis years, July 2006 through June 2007; *CRISIS* is a dummy variable that equals 1 for the crisis years, July 2007 through June 2009; and *BAILOUT* is a dummy variable that equals 1 for the bailout years, October 2008 through June 2009. As in Jagolinzer et al., we include firm size (log of total assets), the ratio of market capitalization to book value of shareholder's equity, and the abnormal returns in the past year and month as control variables. We estimate the above regression separately for banks run by non-materialistic

[16] We use all firms in the financial services industry (SIC 6000-6999) for this analysis and we include dummy variables for the various types of financial institutions.

and materialistic CEOs, and expect the interaction between *INSIDER TRADING*BAILOUT* to be significantly more positively associated with abnormal returns for banks run by materialistic CEOs (vs. those for non-materialistic CEOs).

Table 7 presents the results. As predicted, we find the interaction of *INSIDER TRADING*BAILOUT* is positive and significant for banks run by materialistic CEOs; the association is insignificant for banks run by non-materialistic CEOs. The difference between these coefficients is statistically significant (at the .05 level) and the size of the coefficient for the materialistic CEOs is more than double than that corresponding to the non-materialistic CEOs. This is consistent with the conjecture that materialistic CEOs are associated with a corporate culture where other executives are more likely to engage in insider trading based on private information.

We do not find evidence that the trades of executives in banks led by materialistic CEOs are related to future returns during the crisis period; however, the trades of executives in banks run by non-materialistic CEOs during this period are marginally negatively associated with future abnormal turns. The difference in the magnitudes between these coefficients is however, small and not significant. In the pre-crisis period, we find negative and statistically significant coefficients for the interaction *INSIDER TRADING*PRE-CRISIS* for both the banks led by non-materialistic and materialistic CEOs. The difference between these coefficients is not significant.

In sum, these results are consistent with insiders anticipating the effect of the government bailout for their firms, where only the executives in banks led by materialistic CEOs traded on this information. While our results on insider trading activities of senior executives provide one instance of how culture can influence the actions of the employees in a bank, it provides compelling food for thought on how materialistic CEOs can create a corporate culture that can heighten the risk that other executives in the bank will act in ways that are not likely to be in the best interests of shareholders and the economy.

5. CEO Materialism and Bank Risk Outcomes

5.1. CEO Materialism and Downside Risk

In our next set of analyses we examine the association between CEO materialism and the outcomes of banks' risk-management systems and corporate cultures, as manifested in downside tail risk. We consider two measures: 1) the stand alone tail risk of individual banks (*TAIL RISK*);

and 2) the marginal expected shortfall, capturing the extent to which an individual bank's stock returns are low when market returns are low (*MES*). We estimate the following regressions:

$$TAIL\ RISK_{i,t} = \beta 0 + \beta 1\ MATERIAL_i + \beta 2\ CONTROLS + Year\ FE + \varepsilon_{i,t} \quad (4)$$

$$MES_{i,t} = \beta 0 + \beta 1\ MATERIAL_i + \beta 2\ CONTROLS + Year\ FE + \varepsilon_{i,t} \quad (5)$$

where the dependent variables are the two measures of downside risk, *MATERIAL* is a dummy variable that equals 1 if the CEO is materialistic, and the control variables are those used in equation (1).

Table 8 presents the results for *TAIL RISK* (columns (1) and (2)) and for *MES* (columns (3) and (4)). The tests and results for our variables of interest are similar in both cases and for brevity we discuss them together. In columns (1) and (3), we replicate the analyses in Ellul and Yeramilli (2013) and present the results without including the variable *MATERIAL* on the right hand side, but include the lagged *RMI* of the BHC instead. In columns (2) and (4), we include *MATERIAL* and *RMI* as well as the various control variables.

The results in columns (1) and (3) are consistent with those in Ellul and Yeramilli – we also find negative and significant coefficients for *RMI* for both dependent variables (at the .05 level), indicating that BHCs that had stronger risk management controls in place the previous year have lower tail risk and lower marginal expected shortfall in the current year. In unreported tests we also rerun models (4) and (5) by including *MATERIAL* but excluding *RMI*. When we include *MATERIAL* but exclude *RMI*, we obtain positive and significant coefficients for *MATERIAL* for both measures of tail risk (at the .01 level), indicating that the tail risk and marginal expected shortfall are significantly higher for BHCs with materialistic CEOs vs. those for BHCs with non-materialistic CEOs.

Interestingly, in the models when both *MATERIAL* and *RMI* are included, *MATERIAL* is statistically significant (at the .05 level or better), but *RMI* loses significance (columns (2) and (4)). One interpretation of this result is that CEO materialism has a first order effect on a bank's downside risk and one channel through which it impacts downside risk is through the bank's risk-management function. Therefore, when we control for both the CEO type and *RMI*, *RMI* loses significance. This idea does not take away from the result on the relation between *RMI* and downside risk, but adds to it by suggesting that CEO materialism is an essential factor as the

CEO is the key person in influencing the bank's risk-management function. In fact, the results indicate that having a materialistic CEO (vs. a non-materialistic CEO) increases *TAIL RISK* as well as *MES* by approximately 20 basis points (which correspond to 260 basis points over 13 days corresponding to the 5% worst return days for the bank and the S&P500).

Among the control variables, in the *TAIL RISK* model, we obtain some evidence of a positive and significant coefficient for *SIZE SQUARED*, as in Ellul and Yeramilli (2013). As they suggest, this indicates that the largest BHCs perhaps take on excessive tail risks in anticipation of being bailed out in the event of a financial crisis. The coefficient on *SIZE* however, is negative and significant. The coefficients on *RETURN* are negative and significant across all models, suggesting that banks with a higher past stock performance have lower tail risk. BHCs with more volatile returns and higher betas have higher tail risks. Also consistent with Ellul and Yeramilli, we find that banks with more tier 1 capital are riskier and those with more non-performing loans have higher downside risk. There is also some evidence that banks with less trading assets, a lower ratio of deposits and short term borrowings less cash to liabilities and higher proportion of non-interest income have more tail risk. Finally, while Ellul and Yeramilli do not detect any significant relations between CEO compensation characteristics and tail risk, we find some evidence that CEO vega is negative and significantly associated with tail risk, while delta is positive and significantly associated with tail risk.

While the results for the control variables are generally similar for *MES*, there are some differences. In this case we do not find significant coefficients for *SIZE* nor *SIZE SQUARED*. Also, in this case we find that CEO vega is positive and significant, though the coefficient loses significance once all control variables are included. Thus, it seems that vega is associated with higher systemic risk, but with lower tail risk. This is consistent with results in Armstrong and Vashishtha (2012) and DeYoung et al. (2015) who show that managers' vega is associated with managers making investments that increase the systematic risk of the firm.

In sum, the above analyses indicate that banks with materialistic CEOs have significantly more downside tail risk and a higher marginal expected shortfall relative to banks with non-materialistic CEOs.

Next, we investigate deeper into the effects of CEO type on a bank's downside risk by examining how banks with materialistic CEOs fared during the recent financial crisis vs. the

non-crisis period. Specifically, we estimate regressions (4) and (5) separately for both the crisis years (2007-2008) and the non-crisis years (the other years in the sample period).

Table 9 presents the results of the above analyses. The results are similar for both measures of downside risk. We find that the coefficient for *MATERIAL* is positive and significantly associated with both *TAIL RISK* and *MES* for both the crisis and the non-crisis years. This supports the results in the prior section that BHCs led by materialistic CEOs are associated with higher downside tail risk and systemic risk. However, we find that the coefficient is significantly higher for the crisis years vs. the non-crisis years for both *TAIL RISK* and *MES* (at the .05 level or better). Having a materialistic CEO increased the marginal expected shortfall by 60 basis points during the crisis years (vs. 20 basis points in the non-crisis years) and increased tail risk by 80 basis points during the crisis years (vs. 20 basis points in the non-crisis period). Cumulating these numbers over the 5% worst returns days for the stock and for S&P 500, materialistic CEOs were associated with increased marginal expected shortfall and tail risk of 780 and 1,040 basis points respectively. This suggests that the consequences of having materialistic CEO in terms of downside risk for firms are likely to be far more severe during economic downturns.

5.2. CEO Materialism and Upside Potential

The previous section documented that having a materialistic CEO at the helm is associated with significantly higher downside risk for a firm, particularly during crisis periods. In this section we examine whether materialistic bank CEOs are also associated with more upside tail rewards.

We consider two measures of upside potential for a firm symmetric to the downside risk measures: 1) the stand alone tail reward of individual banks (*TAIL REWARD*); and 2) the marginal expected surplus, capturing the extent to which an individual bank's stock returns are high when market returns are high (*MESUR*). We estimate the following regressions:

$$TAIL\ REWARD_{i,t} = \beta 0 + \beta 1\ MATERIAL_i + \beta 2\ CONTROLS + Year\ FE + \varepsilon_{i,t} \quad (6)$$

$$MESUR_{i,t} = \beta 0 + \beta 1\ MATERIAL_i + \beta 2\ CONTROLS + Year\ FE + \varepsilon_{i,t} \quad (7)$$

where the dependent variables are the two measures of upside reward, *MATERIAL* is a dummy variable that equals 1 if the CEO is materialistic, and the control variables are the same as in the models represented in equations (4) and (5).

Table 10 presents the results for *TAIL REWARD* (columns (1) and (2)) and for *MESUR* (columns (3) and (4)). We present tests and results in the same order as we did in the prior section, using only *RMI* and both as right hand side variables (we also use only *MATERIAL* in unreported tests). As before, the results for both are similar and we discuss them together.

Two results stand out. First, across all models *RMI* is not significantly associated with either the tail reward or the marginal expected surplus. Second, across all models, *MATERIAL* is positive and significantly associated with the tail reward as well as the marginal expected surplus for a bank (at the .05 level or better). These results indicate that stronger risk management controls can be associated with lower tail risk and lower marginal expected shortfall (as we find), but they are not related to a bank's upside returns. But, materialistic CEOs (through the decisions/ strategic choices they make) are significantly related to the upside returns earned by a bank (vs. non-materialistic CEOs). Specifically, having a materialistic CEO (vs. a non-materialistic CEO) increases *TAIL REWARD* as well as *MES* by approximately 20-30 basis points (which correspond to 260-390 basis points over 13 days corresponding to the 5% highest return days for the bank and the S&P 500). The results for the controls variables for both models with *TAIL REWARD* and *MESUR* are similar to those in the case of *TAIL RISK* and *MES* respectively, and we do not repeat the discussion here.

In sum, it seems that while materialistic individuals expose a bank to higher downside risk, they also help the bank earn higher upside rewards.

6. Conclusion

This paper investigates how the prevalence of materialistic CEOs in the banking sector has evolved over time, and how risk management policies, the behavior of non-CEO executives and bank tail risk vary with CEO materialism. A novel contribution derives from our examination of trends in CEO materialism around bank deregulation. While there has been some work on the impact of deregulation on the flow of human capital into the financial sector, we are the first to consider the impact of deregulation on the distribution of leadership styles at the banking sector level. We document that the proportion of banks run by materialistic CEOs

increased significantly from 1994 to 2004, coinciding with major bank deregulation. That no such trend exists for non-financial firms highlights that something special occurred in the banking sector that skewed the leadership of banks towards a more materialistic orientation. While policymakers place some blame for the financial crisis and the attendant loss of trust on a failure of bank leadership (e.g., Dudley, 2014), there is little research exploring the role played by the personal characteristics of leaders in shaping the policies and performance of banks. As such, our results on the shifting composition of materialistic CEO style characteristics are likely to be of interest to regulators and policy makers.

After documenting a significant shift in the nature of banking sector CEOs, we examine two key channels through which materialistic CEOs can influence a bank's behavior and outcomes: (1) the choice of a bank's risk management policies, and (2) corporate culture as manifested in the insider trading behavior of non-CEO executives. A prominent explanation for why banks exposed themselves to excessive risks prior to the crisis is the failure of risk management functions. Using an index reflecting the strength of risk management functions (RMI), we find that RMI is significantly lower for banks with materialistic CEOs, and that RMI significantly decreases after a materialistic CEO succeeds a non-materialistic one and increases after a non-materialistic CEO replaces a materialistic CEO. Given the important role that leadership plays in shaping a firm's culture and the behavior of employees operating in the culture, we next investigate the relation between materialism and culture. Recognizing that culture is an abstract construct which is inherently unobservable and difficult to measure, we limit our analysis to examining the extent to which opportunistic behavior of non-CEO executives differs in firms run by materialistic CEOs. Consistent with CEOs influencing corporate culture, we find that non-CEO executives in banks with materialistic CEOs more aggressively exploited inside trading opportunities around government intervention during the financial crisis.

CEO materialism can influence overall bank risk through risk management choices, corporate culture or other unobservable channels. In our final analyses, we investigate relations between CEO materialism and both downside tail risk and the sensitivity of a bank's tail risk to aggregate tail shocks. We find that banks with materialistic CEOs have significantly more downside tail risk and tail risk co-movement with aggregate tail risk shocks relative to non-materialistic CEOs, where the difference in tail risk between groups increased significantly

during the recent crisis. Further, while we find that while materialistic CEOs are associated with higher downside tail risk, they are also associated with higher tail reward.

Overall, our analyses raise the possibility that deregulation contributed to the crisis by increasing the concentration of materialistic bank CEOs which, by weakening risk management and corporate culture, increased the preponderance of aggressive risk-taking and opportunistic behavior in the bank sector. These analyses provide provocative evidence on unintended consequences of financial deregulation in shifting the allocation of CEO human capital in the banking sector. While this may not be a problem for shareholders as they can design optimal governance structures from their perspective that are tailored to a CEO's characteristics, a major sector-wide shift in the prominence of materialistic bank CEOs can present major problems for prudential regulation if it results in widespread adoption of lax risk management structures, opportunistic cultures and increased tail risk taking.

References

Acharya, V., Pederson, L., Philippon, T., and Richardson, M., 2017. Measuring systemic risk. Review of Financial Studies 30 (1), 2-47.

Adrian, T. and Brunnermeier, M., 2016. CoVaR. American Economic Review 106, 7, 1705-1741.

Aktas, N., Bodt, E., Bollaert, H., Roll, R., 2015. CEO narcissism and the takeover process: From private initiation to deal completion. Forthcoming Journal of Finance and Quantitative Analysis.

Altunbas, Y., Manganelli, S., and Marques-Ibanez, D., 2011. Bank risk during the financial crisis: do business models matter? European Central Bank working paper 1394.

Anginer, D., Demirgüç-Kunt, A., Huizinga, H., and Ma K., 2014. Corporate governance and bank insolvency risk: International evidence. European Banking Center Discussion Paper Series no. 2014-010, and Center Discussion Papers, no. 2014-053.

Armstrong, C., and Vashishtha, R., 2011. Executive stock options, differential risk-taking incentives, and firm value. Journal of Financial Economics 104, 70-88.

Belk, R., 1988. Third world consumer culture. Research in Marketing 4, 102–127.

Benmelech, E., and Frydman, C., 2015. Military CEOs. Journal of Financial Economics 117, 43-59.

Beltratti, A., and Stulz, R.M., 2012. The credit crisis around the globe: Why did some banks perform better? Journal of Financial Economics 105, 1–17.

Bertrand, M., and Schoar, A., 2003. Managing with style: The effect of managers on firm policies. The Quarterly Journal of Economics 118, 1169-1198.

Bolt, W., and Humphrey, D., 2015. A frontier measure of US banking competition. European Journal of Operational Research Volume 246, Issue 2, 450–461.

Brunnermeier, M., Dong, G., and Palia, D., 2012. Banks' non-interest income and systemic risk. Princeton University working paper.

Cheng, I., Harrison, H., and Scheinkman, J., 2015. Yesterday's heroes: Compensation and creative risk-taking. The Journal of Finance 70 (2), 839–879.

Cohn, A., Fehr, E. and Maréchal, A., 2014. Business culture and dishonesty in the banking industry. Nature 516, 86–89.

Cronqvist, H., Makhija, A., and Yonker S., 2012. Behavioral consistency in corporate finance: CEO personal and corporate leverage. Journal of Financial Economics 103, 20-40.

Daun, A., 1983. The Materialistic Life-Style: Some Socio-Psychological Aspects. In: L. Uusitalo (Ed.), Consumer Behavior and Environmental Quality. New York, St. Martin Press.

Davidson, R., Dey, A., and Smith, A., 2017. CEO Materialism and Corporate Social Responsibility. Working paper.

Davidson, R., Dey, A., and Smith, A., 2015. Executives' "off-the-job" behavior, corporate culture and financial reporting risk. Journal of Financial Economics 117, 5-28.

DeAngelo, H., and Stulz, R. M., 2015. Liquid-claim production, risk management, and capital structure: Why high leverage is optimal for banks. Journal of Financial Economics 116 (2), 219-36.

Deckop, J. R., Giacalone, R. A., and Jurkiewicz, C. L., 2015. Materialism and workplace behaviors: Does wanting more result in less? Social Indicators Research Volume 121 (3), 787–803.

Demirguc-Kunt, A., and Huizinga, H., 2010. Bank activity and funding strategies: the impact on risk and returns. Journal of Financial Economics 98, 626–650.

De Jonghe, O., 2010. Back to the basics in banking? A micro-analysis of banking system stability. Journal of Financial Intermediation 19(3), 387–417.

Deyong, R., 1996. Some psychological aspects of reduced consumer behavior. Environment and Behavior 28, 358-409.

DeYoung, R. Peng, E. Y. and Meng, Y., 2013. Executive compensation and business policy choices at U.S. commercial banks. Journal of Financial and Quantitative Analysis 48 (1), 165–196.

Dudley, W., 2014. Enhancing Financial Stability by Improving Culture in the Financial Services Industry. Remarks at the Workshop on Reforming Culture and Behavior in the Financial Services Industry, Federal Reserve Bank of New York, New York City.

Eastman, J. K., Fredenberger, B., Campbell, D. and Calvert, S., 1997. The relationship between status consumption and materialism: A cross-cultural comparison of Chinese, Mexican, and American students. Journal of Marketing Theory and Practice 5 (1), 52-66.

Ellul, A. and Yerramilli, V., 2013. Stronger risk controls, lower risk: Evidence from US bank holding companies. The Journal of Finance 68, 1757-1803.

Erkens, David H. and Hung, Mingyi and Matos, Pedro P., 2012. Corporate Governance in the 2007-2008 Financial Crisis: Evidence from Financial Institutions Worldwide. Journal of Corporate Finance, Volume 18, Issue 2: 389–411.

Fahlenbrach, R., Prilmeier, R. and Stulz, R., 2012. This time is the same: Using bank performance in 1998 to explain bank performance during the recent financial crisis. Journal of Finance 67, 2139 - 2185.

Fee, C. E., Hadlock, C. J. and Pierce, J. R., 2013. Managers with and without style: Evidence using exogenous variation. The Review of Financial Studies 26 (3), 567– 600.

Financial Stability Board, 2014. A Framework for Assessing Risk Culture. Financial Stability Board.

Fournier, S., Richins, M., 1991. Popular and theoretical notions of materialism. Journal of Social Behavior and Personality 6(6), 403-414.

Ger, G. and Belk, R.W., 1996. Cross-cultural differences in materialism. Journal of Economic Psychology 17, 55–77.

Graham, J., Harvey, C., and Puri, M., 2013. Managerial attitudes and corporate actions. Journal of Financial Economics Volume 109 (1), 103–121.

Group of Thirty, 2015. Banking Conduct and Culture. The Group of Thirty, 1726 M Street, N.W., Suite 200, Washington, D.C. 20036.

Ham, C., Seybert, N. and Wang, S., 2017. Narcissism is a bad sign: CEO signature size, investment, and performance. Forthcoming Journal of Accounting Research.

Jagolinzer, A. D. and Larcker, D. F., Ormazabal, G. and Taylor, D. J., 2016. Political connections and the informativeness of insider trades. Rock Center for Corporate Governance at Stanford University Working Paper No. 222.

Jenks, G. F., 1967. The data model concept in statistical mapping. International Yearbook of Cartography 7, 186-190.

Kanner, A. and Soule, R., 2004. Globalization, Corporate Culture, and Freedom. Psychology and Consumer Culture: The Struggle for a Good Life in a Materialistic World, Tim Kasser and Anthony D. Kanner, eds. Washington, DC: American Psychological Association, 49-67.

Kaplan, S., Klebanov, M., and Sorensen, M., 2012. Which CEO characteristics and abilities matter? Journal of Finance 67, 973-1007.

Kashyap, A. K., Rajan, R., and Stein, J. C., 2008. Rethinking capital regulation. Proceedings, Federal Reserve Bank of Kansas City, 431-471.

Kasser, T., 2016. Materialistic values and goals. Annual Review of Psychology 67, 489–514.

Kasser, T., Ryan, R. M., Couchman, C. E., and Sheldon, K. M., 2004. Materialistic values: Their causes and consequences. Psychology and Consumer Culture: The Struggle for a Good Life

in a Materialistic World, Tim Kasser and Anthony D. Kanner, eds. Washington, DC: American Psychological Association, 11-28.

Kelly, B. T. and Hao, J., 2014. Tail risk and asset prices. Review of Financial Studies 27 (10), 2841-2871.

Kilbourne, W. and Pickett, G., 2008. How materialism affects environmental beliefs, concern, and environmentally responsible behavior. Journal of Business Research 61, 885 – 893.

Liu, C. and Yermack, D., 2012. Where are the shareholders' mansions? CEOs' home purchases, stock sales,and subsequent company performance. In: Boubaker,S., Nguyen,B.D., Nguyen, D.K.(Eds.), Corporate Governance: Recent Developments and New Trends, Springer-Verlag Heidelberg, 3–28.

Malmendier, U. and Tate, G., 2005. CEO overconfidence and corporate investment. Journal of Finance 60, 2661-2700.

Malmendier, U. and Tate, G., 2008. Who makes acquisitions? CEO overconfidence and the market's reaction. Journal of Financial Economics 89, 20-43.

McLannahan, B., 2015. Banks' Post Crisis Legal Costs Hit $300bn. The Financial Times, June 8, 2015.

Mehran, H. and Mollineaux, L., 2012. Corporate governance of financial institutions. Annual Review of Financial Economics, 4, 215-232.

Mehran, H., Morrison, A., and Shapiro, J., 2011. Corporate Governance and Banks: What Have We Learned from the Financial Crisis? FRB of New York Staff Report No. 502.

Muncy, J. and Eastman, J., 1998. Materialism and consumer ethics: An exploratory study. Journal of Business Ethics 17, 137-145.

O'Reilly, C. and Chatman, J. A., 1996. Culture as Social Control: Corporations, Cults, and Commitment. In Barry M. Staw and L. L. Cummings, eds., Research in Organizational Behavior, 18, Greenwich, CT: JAI Press, Inc.

Richins, M. and Rudmin, F., 1994. Materialism and economic psychology. Journal of Economic Psychology 15, 217-231.

Rice, T., and Strahan, P., 2010. Does credit competition affect small-firm finance? Journal of Finance 65, 861-889.

Schrand, C., and Zechman, S., 2012. Executive overconfidence and the slippery slope to financial misreporting. Journal of Accounting and Economics 53, 311-329.

Schoar, A. and Zuo, L., 2017. Shaped by booms and busts: How the economy impacts CEO careers and management styles. Forthcoming Review of Financial Studies.

Sheldon K. M., Sheldon M. S, and Osbaldiston R., 2000. Prosocial values and group assortation in an N-person prisoner's dilemma. Human Nature 11, 387–404.

Sidoti, S., and Devasagayam, R., 2010. Credit cards and college students: Effect of materialism and risk attitude on misuse. The Marketing Management Journal 20 (2), 64-79.

Stiglitz, J., 2010. Freefall: America, Free Markets, and the Sinking of the World Economy. W. W. Norton & Company, New York, NY.

Stiroh, K., 2004. Diversification in banking: Is noninterest income the answer? Journal of Money, Credit and Banking 36, 853-882.

Stiroh, K., 2006. A portfolio view of banking with interest and noninterest activities. Journal of Money, Credit, and Banking 38, 2131-2161.

Stulz, R. M., 2016. Risk management, governance, culture, and risk taking in banks. Economic Policy Review (August), 43-60.

Table 1
Sample Composition and Summary of CEO Luxury Asset Ownership

	TOTAL NUMBER (N)
FIRMS	
Banks over 1992-2013	284
EXECUTIVES	
Chief Executive Officers (CEOs)	445
Executive Composition:	
Non-materialistic CEOs	176
Materialistic CEOs	269
Luxury Asset Ownership:	
Cars worth more than $75,000	270
Boats longer than 25 feet	247
Homes worth more than twice the average of median home prices of the Core Based Statistical Area	332

Table 1, panel A presents the number of firms included in the sample. In addition the table presents the number of non-materialistic and material CEOs and the composition of asset ownership for the sample CEOs.

Table 2, Panel A
Descriptive Statistics

	ALL FIRMS (N = 284)			NON-MATERIALISTIC CEO FIRMS	MATERIALISTIC CEO FIRMS
	MEAN	MEDIAN	STD. DEV.	MEAN	MEAN
RETURN	0.146	0.116	0.380	0.154	0.138
VOLATILITY	0.085	0.069	0.060	0.085	0.086
BETA	1.000	0.963	0.610	1.021	1.004
WEALTH	117.530	23.380	392.880	164.070	74.494***
NON-FIRM WEALTH	22.892	4.474	65.587	27.923	18.591***
DELTA	1.078	0.216	3.541	1.399	0.654***
VEGA	0.145	0.044	0.273	0.162	0.132**
SIZE	9.992	9.723	1.490	9.966	9.980
TIER 1	10.711	10.235	4.570	10.750	10.68
BAD LOANS	0.010	0.005	0.010	0.009	0.010
NON INT. INCOME	0.277	0.227	0.180	0.263	0.289**
COMM. LOANS	0.198	0.162	0.100	0.187	0.206***
CONS. LOANS	0.127	0.106	0.100	0.125	0.128
MORTG. LOANS	0.245	0.239	0.190	0.246	0.244
DEPOSITS	0.674	0.698	0.150	0.665	0.682**
TRADING ASSETS	0.018	0.001	0.050	0.018	0.018
MBS	0.027	0.000	0.070	0.024	0.029*
RMI	0.649	0.583	0.330	0.723	0.583***
MES	0.031	0.022	0.020	0.029	0.032**
TAIL RISK	0.049	0.040	0.030	0.047	0.051***
MESUR	0.034	0.024	0.031	0.032	0.035**
TAIL REWARD	0.059	0.045	0.043	0.057	0.061***
MTB	1.872	1.709	1.040	1.841	1.898
MATURITY MISMATCH	0.871	0.864	0.160	0.868	0.874
INSIDER TRADING	-0.350	-0.950	0.860	-0.366	-0.337

*****Significant at the 1% level; **5% level; * 10% level.**

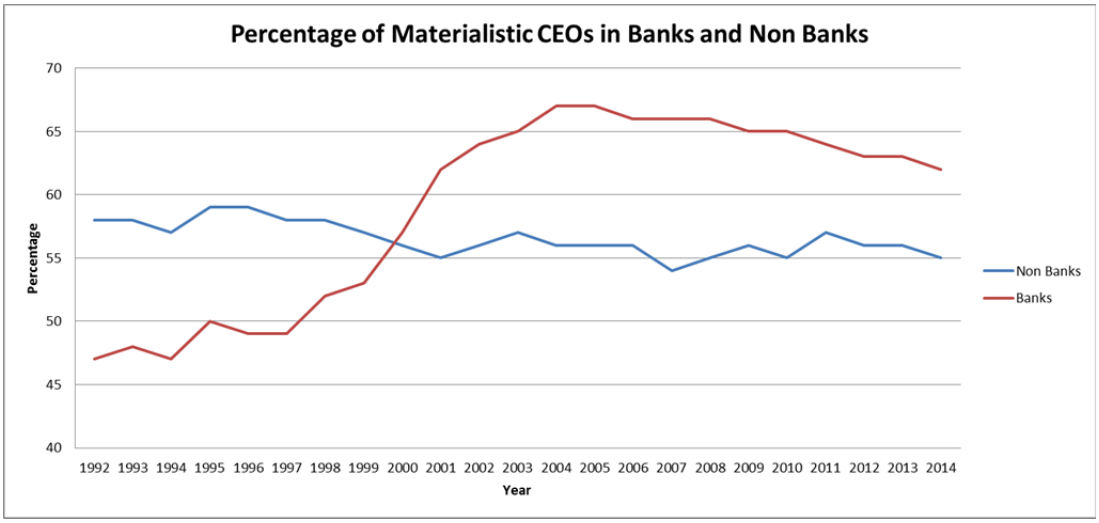
Table 2, Panel A presents the summary statistics of key variables used in the analyses. We also compare the mean values of these variables across firms run by non-materialistic and materialistic CEOs. The significances of t-tests of differences in means for non-materialistic and material CEO firms are presented next to the corresponding variables for the firms run by material CEOs. *RETURN* is the returns over the past 12 months for a bank; *VOLATILITY* is the standard deviation of the past 12 month returns for a bank; *BETA* is the systematic risk of a bank calculated using CAPM using the prior 36 months of returns; *WEALTH* is the sum of the value of the CEO's option and stock holdings, pensions, deferred compensation and an estimate of non-firm wealth calculated using the methodology developed by Dittmann and Maug (2007); *NON-FIRM WEALTH* is an estimate of a CEO's wealth outside of the firm calculated using the methodology developed by Dittmann and Maug (2007); *DELTA* is the dollar change in a CEO's wealth for a 1% change in stock price; *VEGA* is the dollar change in a CEO's wealth for a 0.01 change in the standard deviation of returns; *SIZE* is the natural logarithm of the book value of the total assets of the company; *TIER 1* is the ratio of a bank's tier-1 capital to the book value of total assets; *BAD LOANS* is the ratio of the sum of loans past due 90 days or more and non-accrual loans to total assets; *NON INT INCOME* is the ratio of non-interest income to the sum of interest income and non-interest income; *COMM LOANS* is the ratio of commercial and industrial loans to total assets; *CONS LOANS* is the ratio of consumer loans to total assets; *MORTG LOANS* is the ratio of mortgage loans to total assets; *DEPOSITS* is the ratio of total deposits to total assets; *TRADING ASSETS* is the ratio of total trading assets to total assets; *MBS* is the ratio of all mortgage backed securities to total assets; *RMI* is the risk management index for BHCs as computed by Ellul and Yeramilli (2013); *MES (MESUR)* is the marginal expected shortfall (surplus) measured as the average return for a bank during the 5% worst (best) return days for the banking industry in a year; *TAIL RISK (REWARD)* is the average return for a bank during the 5% worst (best) return days for the bank in a year; *MTB* is the ratio of market capitalization to the book value of shareholders equity; *MATURITY MISMATCH* is the ratio of deposits and short term borrowings less cash to total liabilities; *INSIDER TRADING* is the ratio of net insider purchases to the sum of total insider purchases and sales.

Table 2, Panel B
Summary of CEO Turnovers

YEAR	*CEOS*	*TURNOVER*
1992	101	12
1993	112	12
1994	120	15
1995	129	16
1996	136	12
1997	139	16
1998	137	27
1999	153	11
2000	152	22
2001	154	16
2002	149	16
2003	149	18
2004	153	19
2005	154	13
2006	150	16
2007	147	21
2008	140	19
2009	132	30
2010	137	19
2011	137	14
2012	139	21
2013	144	19

Table 2 Panel B presents the number of CEO turnovers over the sample period.

Figure 1
Trends in CEO Type in Banks vs. Non-banks



Legend Figure 1: This figure shows the trend in the composition of CEO type (materialistic vs. non-materialistic CEOs) in banks versus non-banks. A CEO is defined as *MATERIAL* if the CEO owns luxury assets, where luxury assets include boats >25 feet, cars worth more than $75,000, a primary residence worth more than twice the average of median home prices in zip codes within the Core Based Statistical Area (CBSA) of his corporate headquarters, or additional homes worth more than twice the average home price in the corresponding CBSA. If a CEO does not own any of these luxury assets, he is defined as being *NON-MATERIALISTIC*.

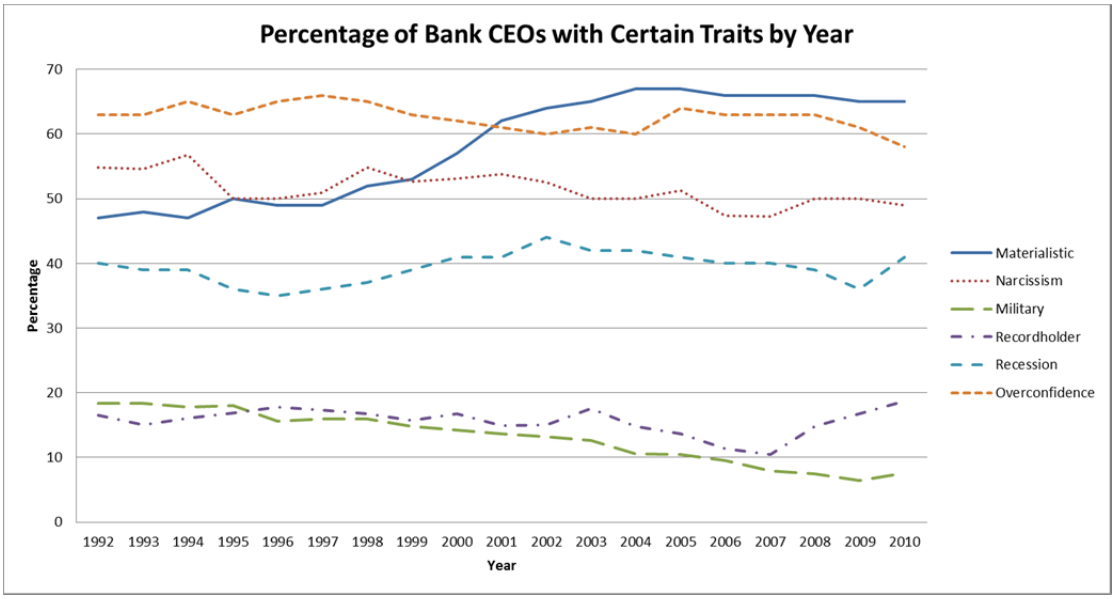
Table 3
Test of Differences between Trends in Materialistic CEOs

	1992 - 1999	2000 – 2014	Difference
Non-Financial Services Firms	59%	56%	-3% *
Financial Services Firms	49%	65%	16% ***
Difference	-10% ***	9% ***	
Large Financial Services Firms	47%	64%	17% ***
Small Financial Services Firms	51%	66%	15% ***
Bank Holding Companies Only	47%	64%	17% ***

*****Significant at the 1% level; **5% level; * 10% level.**

Table 3 presents the results of differences in means of the proportion of materialistic CEOs in financial v. non-financial firms across the two periods 1992-1999 and 2000-2014. In addition, this table presents the differences in the proportion of materialistic CEOs across these two sub-periods for three subsamples: large financial services firms, small financial services firms, and a sample of bank holding companies only.

Figure 2
Trends in Bank CEO Characteristics Over Time



Legend Figure 2: This figure shows trends over time in the prevalence of bank CEOs with certain characteristics. We consider the following traits. A CEO is defined as *materialistic* if he owns luxury assets, where luxury assets include boats >25 feet, cars worth more than $75,000, a primary residence worth more than twice the average of median home prices in the Core Based Statistical Area (CBSA), or additional homes worth more than twice the average home price in the corresponding CBSA. We measure *narcissism* by the area covered by a CEO's signatures scaled by the number of letters in his name and compute the percentage of CEOs in a given year above the median narcissism score for all CEOs in our sample. *Military* is measured based on whether a CEO has military experience. A CEO is a considered to be a *recordholder* if he has any legal infractions, where legal infractions include driving under the influence, other drug-related charges, domestic violence, reckless behavior, disturbing the peace, and traffic violations (including speeding tickets). The variable *recession* is measured based on whether a CEO enters the labor market during a recession. A CEO is considered *overconfident* if he is a net acquirer of shares. We modify the measure as net purchases after the 4th year of tenure over the next four years in order to obtain sufficient observations.

Table 4
Summary of CEOs' Prior Professional Experience

	CEO Tenure Start Dates		
	Between 1990 and 1999	**Between 2000 and 2009**	**Difference**
Prior Commercial Banking Experience	80%	58%	-22% ***
Prior Investment Banking Experience	10%	18%	8% **
Inside Hire	73%	64%	-9% **
Prior Chief Operating Officer Experience	43%	39%	-4%
Prior Chief Financial Officer Experience	7%	22%	15% ***
	CEO Luxury Asset Ownership		
	Materialistic	**Non-materialistic**	**Difference**
Prior Commercial Banking Experience	60%	68%	8% **
Prior Investment Banking Experience	18%	12%	-6% *
Inside Hire	64%	71%	7% **
Prior Chief Operating Officer Experience	42%	40%	-2%
Prior Chief Financial Officer Experience	14%	17%	3%

*****Significant at the 1% level; **5% level; * 10% level.**

Table 4 presents the prior professional experience of CEOs with tenures starting in the years prior to the passage of the Gramm-Leach-Bliley Act (1990-1999) and with tenures starting in the years after the passage of this Act (2000-2009). This table also presents the prior professional experience of materialistic vs. non-materialistic CEOs in our sample.

Table 5
Risk Management Index

$RMIi,t = \beta 0 + \beta 1\ MATERIALi,t\text{-}1 + CONTROLSi,t\text{-}1 + YEAR\ FE + \varepsilon i,t$

	COEF. (T)	COEF. (T)	COEF. (T)	COEF. (T)
INTERCEPT	0.794***	0.803	-1.029	1.421**
	(17.21)	(31.00)	(-1.45)	(3.20)
MATERIAL	-0.133***	-0.036**	-0.151***	-0.059**
	(-2.80)	(-2.18)	(-3.85)	(-3.02)
RETURNS	-0.057*	0.003	-0.012	0.001
	(-1.87)	(0.31)	(-0.29)	(0.04)
VOLATILITY	-1.892***	-0.151	-0.851**	-0.378**
	(-6.26)	(-1.22)	(-2.81)	(-2.28)
BETA	0.093**	0.009	-0.008	0.016
	(2.48)	(0.80)	(-0.29)	(1.29)
DELTA	0.002	-0.001	-0.007*	0.002
	(0.94)	(-0.60)	(-1.82)	(0.87)
VEGA	0.144	0.019	0.139**	-0.010
	(1.36)	(0.82)	(2.45)	(-0.35)
SIZE			0.293**	-0.137*
			(2.46)	(-1.67)
SIZE SQUARED			-0.012**	0.007
			(-2.20)	(1.50)
TIER 1			-0.017*	-0.001
			(-1.93)	(-0.39)
BAD LOANS			-0.438	-0.163
			(-0.94)	(-0.84)
COMM LOANS			-0.049	-0.034
			(-0.21)	(-0.24)
CONS LOANS			0.512***	0.162
			(2.89)	(0.81)
MORTG LOANS			0.191	0.168
			(1.06)	(1.61)
DEPOSITS			-0.635*	-0.295
			(-1.84)	(-1.50)
MATURITY MISMATCH			0.621***	0.145
			(2.69)	(1.06)
MTB			-0.011	-0.005
			(-0.64)	(-0.61)
NON-INT INCOME			0.442***	-0.024
			(2.72)	(-0.26)

Table 5 (Contd.)
Risk Management Index

	COEF. (T)	COEF. (T)	COEF. (T)	COEF. (T)
TRADING ASSETS			0.711**	0.228
			(2.10)	(0.37)
MBS			-0.702	-0.343**
			(-1.51)	(-2.27)
NO. OF OBSERVATIONS	1,084	1,084	827	827
NO. OF BANKS	158	158	134	134
NO.OF CEOS	253	253	206	206
ADJUSTED R-SQUARED	0.13	0.93	0.42	0.93
YEAR FE	Yes	Yes	Yes	Yes
FIRM FE	No	Yes	No	Yes

*****Significant at the 1% level; **5% level; * 10% level. Standard errors are clustered by CEO.**

Table 5 presents the results of the relation between CEO materialism and the risk management in banks (results both with and without firm fixed effects are presented). *RMI* is the risk management index for BHCs as computed by Ellul and Yeramilli (2012); *MATERIAL* is a dummy variable that equals 1 if the CEO owns luxury assets and 0 otherwise. Luxury assets include cars costing more than $75,000, boats greater than 25 feet in length, primary residences worth more than twice the average of the median home prices in the Core Based Statistical Area (CBSA) of the corporate headquarters, and additional residences worth twice the average home prices in that CBSA; *RETURNS* is the returns over the past 12 months for a bank; *VOLATILITY* is the standard deviation of the past 12 month returns for a bank; *BETA* is the systematic risk of a bank calculated using CAPM using the prior 36 months of returns; *DELTA* is the dollar change in a CEO's wealth for a 1% change in stock price; *VEGA* is the dollar change in a CEO's wealth for a 0.01 change in the standard deviation of returns; *SIZE* (*SIZE SQUARED*) is the natural logarithm of the (square of the) book value of the total assets of the company; *TIER 1* is the ratio of a bank's tier-1 capital to the book value of total assets; *BAD LOANS* is the ratio of the sum of loans past due 90 days or more and non-accrual loans to total assets; *COMM LOANS* is the ratio of commercial and industrial loans to total assets; *CONS LOANS* is the ratio of consumer loans to total assets; *MORTG LOANS* is the ratio of mortgage loans to total assets; *DEPOSITS* is the ratio of total deposits to total assets; *MATURITY MISMATCH* is the ratio of deposits and short term borrowings less cash to total liabilities; *MTB* is the ratio of market capitalization to the book value of shareholders equity; *NON INT INCOME* is the ratio of non-interest income to the sum of interest income and non-interest income; *TRADING ASSETS* is the ratio of total trading assets to total assets; *MBS* is the ratio of all mortgage backed securities to total assets.

Table 6
Predecessor Successor Analysis

$RMI_{i,t} = \beta 0 + \beta 1\ NEW\ CEO\ MATERIAL_i + \beta 2\ SUCCESSOR_{i,t} + \beta 3\ CHANGE\ CEO\ TYPE_i + \beta 4\ NEW\ CEO\ MATERIAL_i * SUCCESSOR_{i,t} + \beta 5\ NEW\ CEO\ MATERIAL_i * CHANGE\ CEO\ TYPE_i + \beta 6\ SUCCESSOR_{i,t} * CHANGE\ CEO\ TYPE_i + \beta 7\ NEW\ CEO\ MATERIAL_i * SUCCESSOR_{i,t} * CHANGE\ CEO\ TYPE_i + CONTROLS_{it-1} + YEAR\ FE + \varepsilon_{i,t}$

	WITHOUT CONTROLS	**WITH CONTROLS**
	COEF. (T)	COEF. (T)
INTERCEPT	0.565***	-0.902
	(9.80)	(-1.50)
NEW CEO MATERIAL	-0.041	-0.033
	(-1.42)	(-1.25)
SUCCESSOR	0.036	0.041
	(1.11)	(1.44)
CHANGE CEO TYPE	-0.049	-0.027
	(-0.56)	(-0.87)
NEW CEO MATERIAL × SUCCESSOR	-0.021	-0.019
	(-0.27)	(-0.49)
NEW CEO MATERIAL × CHANGE CEO TYPE	0.210	0.107
	(1.79)	(1.62)
SUCCESSOR × CHANGE CEO TYPE	0.179**	0.214**
	(2.32)	(2.43)
NEW CEO MATERIAL × SUCCESSOR × CHANGE CEO TYPE	-0.289***	-0.326***
	(-2.71)	(-2.58)
Analysis of Changes		
Material CEO to Material CEO	0.015	0.022
	(0.31)	(0.42)
Non-materialistic CEO to Material CEO	-0.095*	-0.090*
	(-1.90)	(-1.84)
Non-materialistic CEO to Non-materialistic CEO	0.036	0.041
	(0.66)	(0.70)
Material CEO to Non-materialistic CEO	0.215***	0.228***
	(3.51)	(2.74)
Test of Differences	*P- value*	*P-value*
Material – Non-materialistic > Material – Material	0.01	0.01
Material – Non-materialistic > Non-materialistic – Non-materialistic	0.01	0.02
Material – Non-materialistic > Non-materialistic – Material	0.01	0.01
Non-materialistic – Material < Material – Material	0.09	0.09
Non-materialistic – Material < Non-materialistic – Non-materialistic	0.07	0.06
Non-materialistic – Material < Material – Non-materialistic	0.01	0.01
NO. OF OBSERVATIONS	845	631
NO. OF BANKS	89	70
NO. OF CEOS	184	142
ADJUSTED R-SQUARED	0.06	0.45
YEAR FE	Yes	Yes

Table 6 (Cont.)

*****Significant at the 1% level; **5% level; * 10% level. Standard errors are clustered by CEO.**
Table 6 presents results of a model that examines the relation between RMI and changes in CEO type due to turnover. A CEO is classified as material if he owns luxury assets (and vice versa), where luxury assets include cars worth more than $75,000, boats >25 feet, primary residences worth more than twice the average of the median home prices in the Core Based Statistical Area (CBSA) of the corporate headquarters, and additional residences worth twice the average home prices in that CBSA. *NEW CEO MATERIAL* is a dummy variable that equals 1 if the new CEO hired is material, and 0 otherwise; *SUCCESSOR* is a dummy variable that equal 1 if RMI is measured during the successor CEO's tenure, and 0 otherwise; *CHANGE CEO TYPE* is a dummy variable that equals 1 if there was a change in CEO type from the predecessor to the successor, and 0 otherwise. The controls variables (not reported for brevity) include the variables used in the prior RMI analyses, namely (see Appendix for definitions): returns, volatility, beta, delta, vega, size, size squared, tier 1, bad loans, commercial loans, consumer loans, mortgage loans, deposits, maturity mismatch; market-to-book, non-interest income, trading assets, and mortgage backed securities. The table also presents an analysis of the significance of changes in RMI corresponding to changes in CEO types and a test of these differences.

Table 7
CEO Materialism and Insider Trading

ABNORMAL RETURNSi,t = β0 + β1 *INSIDER TRADINGi,t-1* + *CRISIS YEAR DUMMIES* + *INTERACTIONS* + *CONTROLSi,t-1* + *εi,t*

	NON-MATERIALISTIC CEO	**MATERIALISTIC CEO**
	COEF. (T)	COEF. (T)
INTERCEPT	0.008 (1.18)	0.003 (0.36)
INSIDER TRADING	0.003** (2.09)	0.004*** (2.69)
PRE-CRISIS	-0.025*** (-8.84)	-0.021*** (-6.70)
CRISIS	-0.005 (-0.93)	0.006 (0.80)
BAILOUT	-0.046*** (-3.94)	-0.032*** (-3.16)
*INSIDER TRADING * PRE-CRISIS*	-0.009*** (-3.05)	-0.007*** (-2.58)
*INSIDER TRADING * CRISIS*	-0.008* (-1.82)	-0.005 (-0.90)
*INSIDER TRADING * BAILOUT*	0.012 (1.40)	0.028*** (2.91)
SIZE	-0.001 (-1.63)	-0.003** (-2.28)
MTB	-0.001 (-0.27)	0.001 (0.50)
PAST MONTH RETURNS	0.001 (0.39)	0.001 (1.38)
PAST YEAR RETURNS	0.001 (1.35)	0.001 (1.19)
NO. OF OBSERVATIONS	3,104	3,648
NO. OF BANKS	75	116
NO. OF CEOS	81	127
ADJUSTED R-SQUARED	0.02	0.02
YEAR FE	Yes	Yes
*Test of Differences: INSIDER TRADING * BAILOUT*	*P-Value*	
Materialistic – Non-materialistic	0.04	

*****Significant at the 1% level; **5% level; * 10% level. Standard errors are clustered by CEO.**

Table 7 presents the results of the relation between materialism of the CEO and insider trading by other senior executives of the firm. *ABNORMAL RETURNS* equals α for net purchases made by executives, where α is obtained from estimating transaction-day specific regressions of daily returns on common factors over the 180-days following each transaction: (Ri – Rf) = α + β1 (Rmkt – Rf) + β2 SMB + β3 HML + β4 UMD + e. Ri is the daily return to firm i's equity, Rf is the daily risk-free interest rate, Rmkt is the CRSP value-weighted market return, and SMB, HML, and UMD are the size, book-to-market, and momentum factors; *INSIDER TRADING* is the ratio of net insider purchases to the sum of total insider purchases and sales; *PRE-CRISIS* is a dummy variable that equals 1 for the pre-crisis years, July 2006 through June 2007; *CRISIS* is a dummy variable that equals 1 for the crisis years, July 2007 through June 2009; *BAILOUT* is a dummy variable that equals 1 for the bailout years, October 2008 through June 2009; *SIZE* is the natural logarithm of the book value of the total assets of the company; *MTB* is the ratio of market capitalization to the book value of shareholders equity; *PAST MONTH* (*YEAR*) *RETURNS* is the abnormal returns in month t-1 (for the period t-2 through t-12) organized into quintiles.

Table 8
Firm Tail Risk and Marginal Expected Surplus

$$TAIL\ RISK_{i,t} / MES_{i,t} = \beta 0 + \beta 1\ MATERIAL_{i,t-1} + CONTROLS_{i,t-1} + YEAR\ FE + \varepsilon_{i,t}$$

	TAIL RISK		**MES**	
	COEF. (T)	COEF. (T)	COEF. (T)	COEF. (T)
	(1)	(2)	(3)	(4)
INTERCEPT	0.023***	0.107***	0.019***	-0.040
	(13.57)	(4.19)	(11.37)	(-1.56)
MATERIAL		0.001***		0.002**
		(2.37)		(2.49)
RETURNS	-0.014***	-0.016***	-0.006***	-0.005
	(-7.64)	(-10.12)	(-2.84)	(-1.31)
VOLATILITY	0.271***	0.218***	0.091***	0.060***
	(11.75)	(9.85)	(4.73)	(2.65)
BETA	0.006***	0.003	0.006***	0.003*
	(6.07)	(2.23)	(5.77)	(1.91)
DELTA	0.000	0.001***	-0.000	0.001***
	(0.01)	(2.72)	(-0.14)	(3.87)
VEGA	-0.002	-0.005**	0.008***	0.003
	(-1.08)	(-2.37)	(3.06)	(0.53)
RMI	-0.002**	0.001	-0.002**	-0.002
	(-2.37)	(0.16)	(-2.25)	(-1.07)
SIZE		-0.016***		0.008
		(-3.55)		(1.86)
SIZE SQUARED		0.001***		-0.001
		(3.63)		(-0.86)
TIER 1		0.001**		0.001
		(2.07)		(1.42)
BAD LOANS		0.320***		0.250***
		(8.72)		(7.72)
COMM LOANS		0.001		0.001
		(0.12)		(0.29)
CONS LOANS		-0.007		-0.009*
		(-1.36)		(-1.91)
MORTG LOANS		-0.005		-0.008*
		(-1.24)		(-1.95)
DEPOSITS		0.015*		0.027***
		(1.92)		(2.91)
MATURITY MISMATCH		-0.015***		-0.021***
		(-2.60)		(-3.75)
MTB		0.001		0.002***
		(1.46)		(3.01)
NON-INT INCOME		0.010**		-0.016***
		(2.25)		(-3.06)

Table 8 (Contd.)
Firm Tail Risk and Marginal Expected Surplus

	TAIL RISK		MES	
	COEF. (T)	COEF. (T)	COEF. (T)	COEF. (T)
	(1)	(2)	(3)	(4)
TRADING ASSETS		-0.016**		-0.017*
		(-2.31)		(-1.93)
MBS		-0.004		-0.031
		(-0.14)		(-1.09)
NO. OF OBSERVATIONS	1,084	827	1,084	827
NO. OF BANKS	158	134	158	134
NO. OF CEOS	253	206	253	206
ADJUSTED R-SQUARED	0.86	0.93	0.93	0.87
YEAR FE	Yes	Yes	Yes	Yes

*****Significant at the 1% level; **5% level; * 10% level. Standard errors are clustered by CEO.**

Table 8 presents the results of the relation between CEO materialism and the tail risk as well as marginal expected surplus of the firm. *TAIL RISK* is the average return for a bank during the 5% worst return days for the bank in a year; *MES* is the marginal expected shortfall measured as the average return for a bank during the 5% worst return days for the banking industry in a year; *MATERIAL* is a dummy variable that equals 1 if the CEO owns luxury assets and 0 otherwise. Luxury assets include cars costing more than $75,000, boats greater than 25 feet in length, primary residences worth more than twice the average of the median home prices in the Core Based Statistical Area (CBSA) of the corporate headquarters, and additional residences worth twice the average home prices in that CBSA; *RETURNS* is the returns over the past 12 months for a bank; *VOLATILITY* is the standard deviation of the past 12 month returns for a bank; *BETA* is the systematic risk of a bank calculated using CAPM using the prior 36 months of returns; *DELTA* is the dollar change in a CEO's wealth for a 1% change in stock price; *VEGA* is the dollar change in a CEO's wealth for a 0.01 change in the standard deviation of returns; *SIZE* (*SIZE SQUARED*) is the natural logarithm of the (square of the) book value of the total assets of the company; *TIER 1* is the ratio of a bank's tier-1 capital to the book value of total assets; *BAD LOANS* is the ratio of the sum of loans past due 90 days or more and non-accrual loans to total assets; *COMM LOANS* is the ratio of commercial and industrial loans to total assets; *CONS LOANS* is the ratio of consumer loans to total assets; *MORTG LOANS* is the ratio of mortgage loans to total assets; *DEPOSITS* is the ratio of total deposits to total assets; *MATURITY MISMATCH* is the ratio of deposits and short term borrowings less cash to total liabilities; *MTB* is the ratio of market capitalization to the book value of shareholders equity; *NON-INT INCOME* is the ratio of non-interest income to the sum of interest income and non-interest income; *TRADING ASSETS* is the ratio of total trading assets to total assets; *MBS* is the ratio of all mortgage backed securities to total assets.

Table 9
Marginal Expected Shortfall and Firm Tail Risk: Crisis Years

$$TAIL\ RISK_{i,t} / MES_{i,t} = \beta 0 + \beta 1\ MATERIAL_{i,t-1} + CONTROLS_{i,t-1} + YEAR\ FE + \varepsilon_{i,t}$$

	TAIL RISK		MES	
	NON CRISIS YEARS	**CRISIS YEARS**	**NON CRISIS YEARS**	**CRISIS YEARS**
	COEF. (T)	COEF. (T)	COEF. (T)	COEF. (T)
INTERCEPT	0.017***	0.063***	0.016***	0.040***
	(13.85)	(11.91)	(17.26)	(14.30)
MATERIAL	0.002**	0.008**	0.002**	0.006**
	(2.36)	(2.36)	(2.50)	(2.31)
RETURNS	-0.008***	-0.054***	-0.001	-0.016***
	(-6.48)	(-6.48)	(-0.92)	(-3.49)
VOLATILITY	0.277***	0.128**	0.034**	0.068***
	(16.62)	(2.52)	(2.53)	(2.92)
BETA	0.004***	0.022***	0.007***	-0.003
	(6.59)	(4.54)	(9.27)	(-0.71)
DELTA	0.001	-0.001***	0.000	-0.001***
	(0.78)	(-5.89)	(0.78)	(-3.77)
VEGA	-0.002	0.014**	0.005***	0.018***
	(-1.44)	(2.20)	(3.21)	(4.30)
NO. OF OBSERVATIONS	1,364	173	1,364	173
NO. OF BANKS	154	87	154	87
NO. OF CEOS	248	101	248	101
ADJUSTED R-SQUARED	0.81	0.75	0.78	0.67
YEAR FE	Yes	Yes	Yes	Yes
Test of Differences	*P-Value*		*P-Value*	
Crisis Years – Non-crisis years	0.04		0.05	

*****Significant at the 1% level; **5% level; * 10% level. Standard errors are clustered by CEO.**
Table 9 presents the results of the relation between CEO materialism and the tail risk and marginal expected shortfall of the firm both during crisis years (2007-2008) and non-crisis years (remaining years). *TAIL RISK* is the average return for a bank during the 5% worst return days for the bank in a year; *MES* is the marginal expected shortfall measured as the average return for a bank during the 5% worst return days for the banking industry in a year; *MATERIAL* is a dummy variable that equals 1 if the CEO owns luxury assets and 0 otherwise. Luxury assets include cars costing more than $75,000, boats greater than 25 feet in length, primary residences worth more than twice the average of the median home prices in the Core Based Statistical Area (CBSA) of the corporate headquarters, and additional residences worth twice the average home prices in that CBSA; *RETURNS* is the returns over the past 12 months for a bank; *VOLATILITY* is the standard deviation of the past 12 month returns for a bank; *BETA* is the systematic risk of a bank calculated using CAPM using the prior 36 months of returns; *DELTA* is the dollar change in a CEO's wealth for a 1% change in stock price; *VEGA* is the dollar change in a CEO's wealth for a 0.01 change in the standard deviation of returns.

Table 10
Firm Tail Reward and Marginal Expected Surplus

TAIL REWARDi,t / MESURi,t = β0 + β1 *MATERIALi,t-1 + CONTROLSi,t-1 + YEAR FE + εi,t*

	TAIL REWARD		**MESUR**	
	COEF. (T)	COEF. (T)	COEF. (T)	COEF. (T)
	(1)	(2)	(3)	(4)
INTERCEPT	0.022***	0.141***	0.021***	-0.033
	(9.15)	(4.02)	(11.71)	(-1.09)
MATERIAL		0.002**		0.003**
		(2.34)		(2.23)
RETURNS	-0.006***	-0.005**	-0.005**	-0.007*
	(-2.87)	(-2.11)	(-2.30)	(-1.79)
VOLATILITY	0.378***	0.271***	0.107***	0.102***
	(11.01)	(8.25)	(5.06)	(3.65)
BETA	0.008***	0.002	0.007***	0.005**
	(4.78)	(1.46)	(5.37)	(2.45)
DELTA	0.000	-0.000	0.001	0.003
	(-0.01)	(-0.18)	(0.30)	(1.43)
VEGA	-0.002	-0.004*	0.008**	0.002
	(-1.17)	(-1.85)	(2.51)	(0.28)
RMI	-0.002	0.001	0.002	-0.002
	(-0.95)	(0.47)	(1.34)	(-0.98)
SIZE		-0.022***		0.004
		(-3.79)		(1.38)
SIZE SQUARED		0.001***		0.000
		(3.74)		(0.27)
TIER 1		0.001**		0.001
		(2.01)		(1.38)
BAD LOANS		0.510***		0.241***
		(8.94)		(5.27)
COMM LOANS		0.000		0.000
		(0.03)		(-0.05)
CONS LOANS		0.005		-0.008
		(0.63)		(-1.19)
MORTG LOANS		-0.005		0.000
		(-1.07)		(-0.06)
DEPOSITS		-0.005		0.030***
		(-0.41)		(2.93)
MATURITY MISMATCH		-0.002		-0.017**
		(-0.33)		(-2.31)
MTB		0.001		0.003***
		(1.57)		(3.60)
NON-INT INCOME		0.013***		-0.009
		(2.76)		(-1.61)

Table 10 (Contd.)
Firm Tail Reward and Marginal Expected Surplus

	TAIL REWARD		MESUR	
	COEF. (T)	COEF. (T)	COEF. (T)	COEF. (T)
	(1)	(2)	(3)	(4)
TRADING ASSETS		-0.017*		-0.015
		(-1.65)		(-1.53)
MBS		0.035		-0.013
		(0.65)		(-0.26)
NO. OF OBSERVATIONS	1,084	827	1,084	827
NO. OF BANKS	158	134	158	134
NO. OF CEOS	253	206	253	206
ADJUSTED R-SQUARED	0.87	0.93	0.77	0.83
YEAR FE	Yes	Yes	Yes	Yes

*****Significant at the 1% level; **5% level; * 10% level. Standard errors are clustered by CEO.**

Table 10 presents the results of the relation between CEO materialism and the tail reward as well as the marginal expected surplus of the firm. *TAIL REWARD* is the average return for a bank during the 5% best return days for the bank in a year; *MESUR* is the marginal expected surplus measured as the average return for a bank during the 5% best return days for the banking industry in a year; *MATERIAL* is a dummy variable that equals 1 if the CEO owns luxury assets and 0 otherwise. Luxury assets include cars costing more than $75,000, boats greater than 25 feet in length, primary residences worth more than twice the average of the median home prices in the Core Based Statistical Area (CBSA) of the corporate headquarters, and additional residences worth twice the average home prices in that CBSA; *RETURNS* is the returns over the past 12 months for a bank; *VOLATILITY* is the standard deviation of the past 12 month returns for a bank; *BETA* is the systematic risk of a bank calculated using CAPM using the prior 36 months of returns; *DELTA* is the dollar change in a CEO's wealth for a 1% change in stock price; *VEGA* is the dollar change in a CEO's wealth for a 0.01 change in the standard deviation of returns; *SIZE* (*SIZE SQUARED*) is the natural logarithm of the (square of the) book value of the total assets of the company; *TIER 1* is the ratio of a bank's tier-1 capital to the book value of total assets; *BAD LOANS* is the ratio of the sum of loans past due 90 days or more and non-accrual loans to total assets; *COMM LOANS* is the ratio of commercial and industrial loans to total assets; *CONS LOANS* is the ratio of consumer loans to total assets; *MORTG LOANS* is the ratio of mortgage loans to total assets; *DEPOSITS* is the ratio of total deposits to total assets; *MATURITY MISMATCH* is the ratio of deposits and short term borrowings less cash to total liabilities; *MTB* is the ratio of market capitalization to the book value of shareholders equity; *NON-INT INCOME* is the ratio of non-interest income to the sum of interest income and non-interest income; *TRADING ASSETS* is the ratio of total trading assets to total assets; *MBS* is the ratio of all mortgage backed securities to total assets.

Appendix A
Definition of Variables and Data Sources

Variable	Measurement	Data Source
Risk Management Index. (*RMI*)	The risk management index for BHCs as computed by Ellul and Yeramilli (2013). It is computed as the first principal component of five risk management variables, namely, CRO Executive, CRO-Top5, CRO Centrality, Risk Committee Experience, and Active Risk Committee.	Ellul and Yeramilli (2013)
Marginal Expected Shortfall (Surplus). (*MES; MESUR)*	The average return for a bank during the 5% worst (best) return days for the banking industry in a year.	CRSP
Tail Risk (Reward). (*TAIL RISK; TAIL REWARD*)	The average return for a bank during the 5% worst (best) return days for the bank in a year.	CRSP
Returns. (*RETURNS*)	The returns over the past 12 months for a bank.	CRSP
Past returns. (*PAST MONTH RETURNS; PAST YEAR RETURNS*)	The abnormal returns in month t-1 organized into quintiles; the abnormal returns for the period t-2 through t-12 organized into quintiles.	CRSP
Volatility. (*VOLATILITY*)	The standard deviation of the past 12 month returns for a bank.	CRSP
Beta. (*BETA*)	The systematic risk of a bank calculated using CAPM using the prior 36 months of returns.	CRSP
The delta for a CEO. (*DELTA*)	The dollar change (in millions of dollars) in a CEO's wealth for a 1% change in stock price.	ExecuComp
The vega for a CEO. (*VEGA*)	The dollar change (in millions of dollars) in a CEO's wealth for a 0.01 change in the standard deviation of returns.	ExecuComp
Firm size. (*SIZE; SIZE SQUARED)*	The natural logarithm of the book value of the total assets of the company; the natural logarithm of the square of the book value of the total assets of the company.	Compustat/ Call Reports
Tier-1 capital of a bank. (*TIER-1*)	The ratio of a bank's tier-1 capital to the book value of total assets.	Compustat/ Call Reports
Bad loans. (*BAD LOANS)*	The ratio of the sum of loans past due 90 days or more and non-accrual loans to total assets.	Compustat/ Call Reports
Commercial loans. (*COMM LOANS*)	The ratio of commercial and industrial loans to total assets.	Compustat/ Call Reports
Consumer loans. (*CONS LOANS*)	The ratio of consumer loans to total assets.	Compustat/ Call Reports
Mortgage loans. (*MORTG LOANS*)	The ratio of mortgage loans to total assets.	Compustat/ Call Reports
Deposits. (*DEPOSITS*)	The ratio of total deposits to total assets.	Compustat/ Call Reports
Maturity mismatch. (*MATURITY MISMATCH*)	The ratio of deposits and short term borrowings less cash to total liabilities.	Compustat/ Call Reports
Market to book. (*MTB*)	The ratio of market capitalization to the book value of shareholders equity.	Compustat/ CRSP
Non-interest income. (*NON-INT INCOME*)	The ratio of non-interest income to the sum of interest income and non-interest income.	Compustat/ Call Reports
Trading assets. (*TRADING ASSETS*)	The ratio of total trading assets to total assets.	Compustat/ Call Reports
Mortgage backed securities. (*MBS*)	The ratio of all mortgage backed securities to total assets.	Compustat/ Call Reports

Definition of Variables and Data Sources (Contd.)

Variable	Measurement	Data Source
Net insider trades. (*INSIDER TRADING*)	The ratio of net insider purchases to the sum of total insider purchases and sales.	Thomson Reuters
Pre-crisis period. (*PRE-CRISIS*)	A dummy variable that equals 1 for the pre-crisis years, July 2006 through June 2007.	
Crisis period. (*CRISIS*)	A dummy variable that equals 1 for the crisis years, July 2007 through June 2009.	
Bailout period. (*BAILOUT*)	A dummy variable that equals 1 for the bailout years, October 2008 through June 2009.	
CEO wealth. (*WEALTH*)	The wealth of a CEO is calculated as the sum of estimates of firm based wealth and non-firm based wealth. Firm based wealth is measured as the sum of the value of the CEO's portfolio of option and stock holdings, pensions and deferred compensation. Non-firm based wealth is estimated based on the methodology developed by Dittmann and Maug (2007). Expressed in millions of dollars.	ExecuComp; Ingolf Dittmann's website (http://people.few.eur.nl/dittmann/data.htm)
Luxury asset ownership. (*MATERIAL*)	A dummy variable that equals 1 if the CEO owns luxury assets and 0 otherwise. Luxury assets include cars costing more than $75,000, boats greater than 25 feet in length, primary residences worth more than twice the average of the median home prices in the Core Based Statistical Area (CBSA) of the corporate headquarters, and additional residences worth twice the average home prices in that CBSA.	Find Out the Truth.com (FOTT)
Change in CEO type to materialistic. (*NEW CEO MATERIAL*)	A dummy variable that equals 1 if the new CEO hired after the turnover of the predecessor CEO is material, and 0 otherwise.	Find Out The Truth.com (FOTT)
Observation under the regime of the successor CEO. (*SUCCESSOR*)	A dummy variable that equals 1 if an observation is during the time period when the new CEO was in office, and 0 otherwise.	Find Out The Truth.com (FOTT)
Change in CEO type. (*CHANGE CEO TYPE*)	A dummy variable that equals 1 if there was a change in type from the predecessor CEO to the new CEO, and 0 otherwise	Find Out The Truth.com (FOTT)

Appendix B

I] Discussion of the Real Estate Data

We define an executive as materialistic if they own a primary residence worth more than two times the average of median home prices in zip codes in the corresponding Core Based Statistical Area (CBSA) of their firm's headquarters or if they own a secondary residence worth more than 2 times the average of median home price in zip codes in that property's CBSA. Thus our measure of materialism depends heavily on the real estate values we can obtain for each executive. In the following pages we discuss the steps we have taken to assure ourselves of the veracity of the values of properties owned by an individual.

FOTT provides us with an address history for each executive, not just a summary of property title records or real estate transactions records. This means we have data on new construction, rentals, and properties held in the name of another entity. Our data also provides us with the years when the individual was associated with the property, so we can properly assign transactions through time to the correct individual.

We measure value using an average of estimated property values from Eppraisal.com, Zillow.com, Trulia.com, and Realtor.com or as of 12/31/2015. For robustness, we also measure value from a combination of sales prices or estimated values (in cases of rentals, new construction, or missing sales records) in the year the executive moved into the property.

We demonstrate using the Manhattan CBSA.

Manhattan Residential Zip Codes	
Central Harlem	10026, 10027, 10030, 10037, 10039
Chelsea and Clinton	10001, 10011, 10018, 10019, 10036
East Harlem	10029, 10035
Gramercy Park and Murray Hill	10010, 10016, 10017, 10022
Greenwich Village and Soho	10012, 10013, 10014
Lower Manhattan	10004, 10005, 10006, 10007, 10038, 10280
Lower East Side	10002, 10003, 10009
Upper East Side	10021, 10028, 10044, 10065, 10075, 10128
Upper West Side	10023, 10024, 10025
Inwood and Washington Heights	10031, 10032, 10033, 10034, 10040

Below we provide current median sales prices for each zip code as provided by Trulia.com. Median values provided by Zillow.com, Realtor.com, or Zipcodes.com (historical data is provided by Zipcodes.com and must be purchased) yields similar values.

Zip Code	Median Sales Price
10001	$1,575,000.00
10002	$1,525,000.00
10003	$1,540,000.00
10004	$1,200,000.00
10005	$1,785,000.00
10006	$740,000.00
10007	$2,800,000.00
10009	$1,284,375.00
10010	$1,250,000.00
10011	$1,812,500.00
10012	$1,600,000.00
10013	$3,150,000.00
10014	$2,031,000.00
10016	$925,000.00
10017	$850,000.00
10018	$1,200,000.00
10019	$1,462,500.00
10021	$1,730,000.00
10022	$866,500.00
10023	$1,773,469.00
10024	$1,792,120.00
10025	$1,300,000.00
10026	$890,000.00
10027	$837,500.00
10028	$1,735,000.00
10029	$477,000.00
10030	$540,000.00
10031	$651,068.00
10032	$454,000.00
10033	$415,000.00
10034	$470,000.00
10035	$750,000.00
10036	$1,050,000.00
10037	$477,867.00
10038	$1,043,706.00
10039	$797,800.00
10040	$689,000.00
10044	$540,000.00
10065	$1,325,000.00
10075	$998,000.00
10128	$1,159,000.00
10280	$765,000.00
Mean	$1,196,604.88

Based on this data, an executing working in Manhattan would need to own/rent a home with an estimated value just under $2,400,000 to be considered materialistic under our main measure of real estate. In robustness analysis we increase the threshold to 5 times the average of median home prices in the relevant CBSA. Under this criterion, an executive must own/rent a home with an estimated value just under $6,000,000.

New construction, rentals, and properties held in the name of another entity provide potential issues with identification and estimation. Below, we discuss these properties.

New Construction

Many executives choose to construct new homes. Our address history provides us with the address of the home but property records on purchase price will generally only have data on the price paid for the land. Internet resources provide us with information to determine if a home is in fact new construction, and provide an estimate of the property's value which we can use to compute our measure of materialism.

To illustrate our process to determine new construction and estimate the value, consider the following property: 1835 73rd Avenue Ne, Medina, WA 98039. This home belongs to Bill Gates and given that the home has its own Wikipedia page, it does not seem like an invasion of privacy to discuss it. To learn whether the home was new construction and get an estimated value for the property we can use the real estate aggregator Zillow.com. Below is the Zillow link to the Gates' property:

http://www.zillow.com/homes/1835-73rd-Ave-NE,-Medina,-WA-98039_rb/?fromHomePage=true&shouldFireSellPageImplicitClaimGA=false

Zillow notes that the original purchase was for $2,050,000 in 1988. But, given that construction of the property itself did not begin until 1994, we have evidence that the purchase in 1988 was for land alone. We can verify whether the original purchase was for an existing home or for vacant land from information provided by the King County Department of Assessments. Below is the link to the Gates' property:

http://info.kingcounty.gov/Assessor/eRealProperty/Dashboard.aspx?ParcelNbr=9208900079

The department of assessment indicates that construction took place in 1994 and the tax roll history indicates the years taxable and appraised improvements to the land were first assessed to the property. Therefore, we know the purchase was for vacant land and the home subsequently built on the land.

Zillow also provides a current estimate of the value of the home at $161,352,038. While this property might be particularly hard to value, most homes have several relevant comparison properties to aid in the process. Moreover, homes of such value that it is difficult to find relevant comparisons are almost certainly going to cost more than 2 times the average price of homes in the relevant core based statistical area, so even though the dollar estimate is noisy, this will not lead to classification issues regarding our main measure of materialism.

At this point, we have verified that the home itself was new construction, and have an estimated value to use to compute our measure of materialism. Similar information can be gleaned for all properties in our sample in that we can compare the year a home was constructed to the year land was purchased via Internet sources and from the county tax assessor. Because the data provided to us by FOTT is an address history, and not a home purchase history, it is highly unlikely that homes acquired through new construction are missing from our sample or have incorrect estimates for their value. Our data also provides us with the years an individual is associated with a particular address so we can determine if the individual was associated with the home when it was constructed, or purchased the home years later (and in such cases we can use the purchase price as an estimate in that year).

Given that values for new construction are always estimates, we have two options when computing our value of materialism. We can take the estimated value of all homes as of 2015 and scale by the CBSA of the area in 2015, or we can take an estimated value in the year of acquisition (or the purchase price when available) by solving for the estimated value in the year of acquisition using the following equation:

$$\frac{E_{t-acquisition}}{A_{t-acquisition}} = \frac{E_{2015}}{A_{2015}}$$

Where E equals the estimated value and A equals the assessed value. While the ratio of estimated to assessed value is not constant over time (and the variability can vary geographically), it is hard to think of a theoretical argument for how its variance could be related bank RMI scores or tail risk, which it would need to be in order for classifications based on the error to drive our results. Our estimates of CEO materialism are correlated at over 99% whether using 2015 estimated values or a combination of actual purchase prices and estimated values from the year of acquisition.

Rental Apartments

Many executives in our sample choose to rent. This is particularly common in Manhattan where an executive may rent an apartment close to the office. It is not clear if a property an executive lives in and rents should be treated identically to one which was purchased, but we are able to collect information on properties an individual rents and verify the accuracy of such information as follows.

Our address history provides information on where an executive lives even if the property is a rental. From this information we can gain estimates of property values the same way we do for all properties. One concern could be the ability to differentiate between different units in a given building. Our address history also provides apartment numbers/designations so we are able to differentiate a penthouse condominium from another living space and accurately look up the estimated value of the correct space.

For an example of information that can be collected on condominiums (which an executive may own or rent) consider the residential condominium building located at 3 Commonwealth Avenue, Boston MA, 02116. The following link provides data from the assessor's office for the city of Boston for this building.

http://www.cityofboston.gov/assessing/search/?parcel=0502825000

The building has a master parcel number 0502825000, but each unit has its own parcel number distinguished by changing the last digit of the master parcel. Each individual unit has separate information including assessed taxable values, so these units are not identical. Our address history provides apartment or unit numbers so if we were interested in this property we could gather information for the appropriate unit in the building. The following link provides Zillow information for Apartment 3 at 3 Commonwealth Avenue:

http://www.zillow.com/homedetails/3-Commonwealth-Ave-APT-3-Boston-MA-02116/59166810_zpid/

Zillow provides a current estimated value for this specific unit, and past sales prices and assessed values, which can be verified through the assessor's office indicating that the correct unit is presented.

Real Estate held in Another Entity's Name

In some cases an executive is living in a property for which legal title belongs to another entity. This could be a spouse, but is often commonly related to family trusts. This can occur to administer the estate of a deceased relative, or be an ongoing event for personal financial reasons. Additionally, individuals occasionally transfer property held in a controlled trust for nominal sums of money ($1.00 in many cases). Of course this does not represent a true sales price or market value of the property. As noted before, our address history provides evidence that an executive was living at a home even if it is owned by another individual or trust. The address history also provides the dates the individual was associated with the property, so we can locate sales transactions if they exist and we can estimate property values at the time of transfer in addition to current estimated values. In these cases, transfer of title often does not coincide with the years an individual was present in the home. For example, an individual might occupy a home in 2000 while it is held in trust and then might purchase the home for a market or nominal fee in 2004. We can use estimated values for the year 2000, the year 2004, or the year 2015 and scale by the appropriate cost of real estate in the property's core based statistical area for that year. As discussed above, estimates of materialism using current or past property estimates are correlated at over 99%.

II] Measures of Materialism

Our primary measure of materialism is an indicator variable, *MATERIAL*, equal to 1 if the CEO owns luxury assets prior to December 31, 2013, where luxury assets include cars with a purchase price greater than $75,000, boats greater than 25 feet in length, primary residences worth more than twice the average of the median home prices in the Core Based Statistical Area (CBSA) of the corporate headquarters, and additional residences worth twice the average home prices in that CBSA, and 0 otherwise.

To verify that we are adequately capturing the materialistic tendencies in an individual, we construct and verify the robustness of our results to several alternate measures of materialism. We discuss these alternate measures (some are already mentioned in the main body of the paper) in the following pages.

We recalculate a binary measure of materialism using different cut-off values – vehicles with a list price of $110,000 or greater, boats 40 feet and longer, and homes worth at least 5 times the average of median home prices in the zip codes of their firm's CBSA. While the cutoff figures are significantly different, the measure is highly correlated with the original measure. Under these requirements, all non-materialistic CEOs under the original measure are still non-materialistic under this measure, and all materialistic CEOs under this measure are materialistic under the original measure. The only individuals who are classified differently are those who were originally classified as materialistic specifically because of assets within the higher and lower range of the two methods. As such, the measures are highly correlated and yield nearly identical results.

Next, we develop an ordinal measure of materialism by counting the number of materialistic assets an individual owns all individuals who are non-materialistic using a binary measure have 0 lavish assets so this measure really just creates variation in the group defined as materialistic. We can calculate this measure in real time, or by choosing the peak level and applying that as a static measure. This measure has some appeal in that one aspect of materialism is this desire to keep acquiring more goods over time and the measure captures that. However, it is not clear that it is appropriate to treat an individual who has purchased two $100,000 cars as more materialistic than an individual who has purchased one $250,000 car. Results using an ordinal measure are highly correlated with results using a binary measure. Given that both measures classify non-materialistic CEOs in the same manner, the only way this measure would create different results is if the associations between materialism and our dependent variables were distributed like an inverted U where "moderately" materialistic CEOs drove the results and highly materialistic CEOs behaved as non-materialistic CEOs.

Given that our real estate data is more complete than data for vehicles or boats, we recalculate materialism only using real estate data. Under this measure, every individual classified as non-materialistic is still classified as such, and all individuals who owned a materialistic home are classified as materialistic. Individuals classified as materialistic based solely on vehicle or boat ownership are now classified as non-materialistic. The measure is highly correlated with our original measure and our empirical results are similar, though in some cases they are stronger when we use vehicle and boat data, suggesting that it is informative and that such individuals should be considered materialistic under our methodology. We also create three groups – non-materialistic, materialistic without real estate, and materialistic with real estate – and compare results for these groups to one another. We find that the two materialistic groups are statistically similar to one another and significantly different from the non-materialistic group.

We calculate a continuous measure of materialism based on the dollar value (or estimated value) of an individual's assets. We can calculate this measure in real time or as a static measure using the peak value of assets. Because we do not have boat prices available to us, they are estimated from a model that considers length, manufacturer, model, and year. While these inputs are all strong determinants of price, the unique nature of boats and the ability to customize means that individual observations could be poorly estimated. A continuous measure potentially offers advantages in that a $20 million dollar home might be indicative of a higher level of materialism than a $10 million dollar home (assume in the same geographic location). However, this is not a given. Particularly as it pertains to our hypotheses, it is possible that after a certain level of materialism increases are not predictive. Moreover, in our binary measure we have no reason to believe our classification is influenced by an individual's wealth as every CEO in our sample can easily afford a $75,000 vehicle, a boat greater than 25 feet long, or a home worth twice the

average of median home prices in their firm's CBSA. However, a CEO's wealth can influence a continuous measure. The richest CEOs in our sample can afford assets worth more than the entire net worth of the least rich CEOs in our sample. This potentially leads to mismeasurement. To address this we can scale the value of assets by an individual's wealth but now the measure has numerator and denominator affects that can vary independently. Assume a CEO with a net worth of $100 million (primarily from stock in his firm) owns assets worth $10 million. If in the next year his firm's stock price increases by 20% and his net worth increases by $20 million that individual has to spend another $2 million on vehicles, boats, or homes or else his measured value of materialism will decrease even though there is no reason to believe the individual has become less materialistic simply because his net worth increased. Further, it is likely not reasonable to compare spending rates for ultra-rich individuals. As wealth increases an individual generally spends a smaller proportion of wealth on real estate, vehicles, or boats. While in theory there is no limit to the value of these assets an individual can purchase, in practice there likely is. Consider an individual worth $50 million dollars. Such an individual might purchase a home worth $10 million dollars, a yacht for $4 million, and own $1 million in vehicles. This individual has spent 30% of their net worth on these assets. Now consider an individual worth $500 million. It is highly doubtful that this individual would need to spend $150 million on real estate, vehicles, and boats to be considered as materialistic as the first individual. There is a practical limit on how much one spends on these things. Finally, it is not clear that the marginal dollar spent on a vehicle is equivalent to the marginal dollar spent on a home nor is an appropriate weighting factor obvious. While a continuous measure has intuitive appeal, it also has many limitations and weaknesses. That said, it still exhibits a strong correlation with our binary measure (the CEOs with more valuable assets are going to be classified as materialistic using a binary measure) and our results are similar. Results using a continuous measure are sensitive to outliers in terms of wealth or asset values and winsorizing the data produces more stable and consistent results.

To conclude, our choice of the primary measure of materialism using the binary model was motivated by the high correlation of this measure with all of the above alternative measures, the ease of its interpretation, the ability to estimate certain models using this measure, and last but not the least, the simplicity of the measure.