Executives' Legal Records, Lavish Lifestyles and Insider Trading Activities

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Abstract

We examine how and why insider trading varies across senior executives and their firms. We posit that relatively materialistic (or unfrugal) executives, as evidenced by the ownership of luxury goods, and executives with relatively low respect for rules and self-control, as evidenced by a legal record, have a high propensity to exploit inside trading opportunities relative to other executives at their firms. Consistent with this hypothesis, we document that the profitability and strategic timing of trades are higher for unfrugal and recordholder senior executives than for other senior executives of the same firms. The profitability and strategic timing of unfrugal executives' purchases increase significantly with opportunities to trade on inside information, as measured by proxies for information asymmetry and a weak corporate control environment, and, as expected, these effects are significantly larger for unfrugal (i.e. high propensity) executives than for frugal (i.e. low propensity) executives. The analogous results for recordholders are less pronounced, as might be expected if recordholders have low self-control and/or a low respect for rules and norms, mitigating the deterrent effect of corporate controls. Finally, as predicted, the profitability of non-CEOs' purchases is higher in firms run by unfrugal (vs. frugal) CEOs. The effect of CEO type on the profitability of trades by other senior executives is corroborated on a sample of firms whose CEO died in office by the incremental profits detected upon the unplanned transition from a frugal to unfrugal CEO relative to the behavior of trading profits upon other unplanned CEO transitions.

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1. Introduction

The academic literature provides evidence of insiders possessing nonpublic information about their firms' prospects and of the associated superior insider trading performance (e.g., Jaffe [1974], Seyhun [1986], Rozeff and Zaman [1998], Lakonishok and Lee [2001], among others). However, little research exists on the personal characteristics of executives associated with inside trading, or on how these personal attributes temper the relation between inside trading and firms' information and control environments.[1]

We examine how and why the profitability and strategic timing of insiders' trades varies across individual senior executives and their firms.[2] In principle, the profitability and strategic timing of executives' trades will depend on both 1) the *opportunity* to exploit inside information (i.e. the extent to which an executive possesses value relevant inside information (hereafter "information environment"), and the extent to which corporate control systems do not restrict trading on such information (hereafter "control environment")),[3] and 2) an executive's *propensity* to exploit inside information, given the opportunity.

We examine how the propensity to exploit inside information varies by executive "type", controlling for firm fixed effects to hold constant inside trading opportunities (i.e. the information and control environment). We primarily focus on two measures of an executive's propensity to exploit inside information, including 1) the risk-adjusted stock returns over the 180 days following the executive's trades (i.e. profitability of trades) and 2) the relation between the three day stock price reaction to quarterly earnings news and the executive's decision to engage in a net purchase, net sale, or neither during the preceding ninety days (i.e. strategic timing of trades). We measure an executive's type based on two aspects of his behavior outside the

[1] We use the terms "corporate insiders" or "insiders" to refer to those officers in a firm who are required to file trading reports under Section 16(a) of the Securities and Exchange Act of 1934 (often referred to as "Section 16 insiders"). Although Section 10(b) of the Securities and Exchange Act of 1934 and rule 10b-5 outlaws trades based on *material*, nonpublic information, we use the term "inside information" to refer to private information about a corporation that is available to insiders, whether or not that information is considered legally "material" under the securities laws. Hence, the insider trading analyzed here is not necessarily illegal.

[2] We use the term "strategic timing" to refer to the influence of private information about firm performance on an executive's decision to engage in a purchase, sale, or no transaction of his firm's shares.

[3] In principle, the opportunity to exploit inside information through the purchase of shares depends on the availability of funds to buy shares, and the ability to exploit inside information through the sale of shares depends on share ownership. We measure the profitability of executives' trades using the risk-adjusted returns following the actual purchases and sales by senior executives, regardless of transaction size, suggesting that the ability to buy or sell shares is not likely a major concern for our measures of inside trading profits.

workplace, including 1) whether the executive has a record of legal infractions ("recordholder") vs. a clean record ("nonrecordholder"), and 2) whether the executive owns luxury goods (unfrugal) or not (frugal). We interpret legal infractions, including driving under the influence of alcohol, other drug-related charges, domestic violence, reckless behavior, disturbing the peace, and speeding tickets, as a symptom of a relatively high disregard for laws and lack of self-control, and posit that recordholders have a higher propensity than nonrecordholders to exploit inside information. We interpret the ownership of luxury goods, including expensive cars, homes, or yachts, as a symptom of relatively low "frugality" or high materialism (Lastovicka et al. [1999]).[4] The psychology literature defines materialism as a way of life characterized by a "devotion to material needs and desires" (Richins and Rudmin [1994]), "the importance one attaches to worldly possessions" (Belk [1985]), and "the worship of things" (Bredemeier and Toby [1960]). We expect materialistic executives to have a relatively high propensity to exploit inside information for financial gain.

As predicted, we find that the profitability and strategic timing of trades by recordholders and unfrugal executives are significantly higher than for other senior executives at the same firms. Further, the profitability of share purchases increases significantly with the intensity of materialism as measured by the speed with which an executive acquires luxury goods after appointment as a senior executive. We interpret these results as support for the hypothesis that recordholders and unfrugal executives have a relatively high personal propensity to trade on inside information.

We also examine how the profitability and strategic timing of executives' trades vary with proxies for their firms' information and control environments as a function of executive type. We predict that the profitability and strategic timing of trades of unfrugal (vs. frugal) and recordholder (vs. nonrecordholder) executives have a relatively strong positive relation to weak corporate information and control environments given the relatively high propensity of unfrugal and recordholder executives to take advantage of inside trading opportunities.

As predicted, the profitability of purchases and the strategic timing of net purchases vs. net sales by unfrugal senior executives are significantly positively related to all of our proxies for information asymmetry

[4] In the remainder of the paper we use the terms "unfrugal" and "materialistic" interchangeably.

(Fog index (Li [2008]) and the information asymmetry component of the stock's bid-ask spread) and weak controls (low monitoring incentives of outside directors (as measured by the existence of social connections between outside directors and the CEO and low shareholdings of outside directors), and poor overall governance score), and these effects are significantly stronger than for frugal (i.e. low propensity) executives. These results support the joint hypothesis that our proxies for weak information and control environments capture meaningful differences in opportunities to trade on inside information, and that materialistic executives have a relatively high propensity to exploit inside information, given the opportunity. The analogous results for the information and control environment are more mixed and significantly less pronounced for the analysis of recordholders (vs. nonrecordholders).

Finally, we explore how the profitability of inside purchases by non-CEO senior executives varies by CEO type. Motivated by psychology and managerial accounting literatures, Davidson et al. [2013] predict and find that unfrugal CEOs are less likely than frugal CEOs to run a "tight ship" characterized by relatively intense monitoring by outside directors, strong internal control systems, and few restatements caused by reporting errors or fraud perpetrated by other insiders. In light of this evidence we expect that information asymmetry and weak controls are significantly higher in firms run by unfrugal (vs. frugal) CEOs, suggesting an increase in the opportunities to trade on inside information under the tenure of unfrugal CEOs.[5] Therefore, we predict that the ensuing corporate culture in firms run by unfrugal (vs. frugal) CEOs is more conducive to profitable insider trading by other senior executives. Given that Davidson et al. [2013] find little evidence of a weak culture during the tenure of recordholder CEOs, we do not have strong priors about the effect of such CEOs on the profitability of other executives' trades. However, we examine these relations for completeness.

Consistent with our conjecture, we find that the profitability of purchases by non-CEO senior executives is relatively high in firms run by unfrugal CEOs. In contrast, we do not find that the profitability of purchases

[5] In fact, in a follow-up paper we test the effect of a CEO's psychological type on various aspects of the information and control environments in his or her firm. Our preliminary evidence indicates that the information environment becomes more opaque and the control environment becomes weaker during the tenure of unfrugal CEOs in an absolute sense and relative to such changes during the tenure of frugal CEOs.

by non-CEO senior executives differs in firms run by recordholder vs. non-recordholder CEOs. To provide further evidence on these relations and to improve identification, we additionally examine the profitability of purchases by non-CEO senior executives before vs. after CEO deaths, distinguished by CEO predecessor and successor type. We find that the profitability of purchases by non-CEO senior executives increases significantly after a frugal CEO is replaced by an unfrugal CEO in absolute terms and relative to other unplanned transitions, consistent with the hypothesized effect of low CEO frugality on the profitability of trades by a firm's other senior executives**.**

The interpretation of our results is subject to several caveats. First, our analysis does not address directly the issue of *illegal* insider trading. We use data on insider trading from publicly available reports filed with the SEC as required by Section 16(a) of the Securities and Exchange Act of 1934. As Bainbridge [2000] notes, it not clear that executives will report their violations of Rule 10b5-1 which prohibits insider trading based on material, nonpublic information, suggesting that our analysis may not capture the most egregious cases of insider trading. Even if executives do report all trades, as we assume, we cannot isolate the trades based on *material* non-public information. Moreover, our analysis does not capture insider trading accomplished by executives disclosing inside information to others to trade on their behalf. Second, as described below, our sample is not entirely randomly selected due to the high cost of the background checks we use for data on legal records and asset ownership. This limits inferences about the generalizability of our results to the general population of public U.S. companies. Third, the endogenous sorting of executives to firms may compromise the interpretation of our results. And fourth, inclusion of purchases of luxury goods after the measurement of the profitability of insiders' trades (as well as before) runs the risk of reverse causality as an explanation for a positive relation between the ownership of luxury goods and the profitability of insiders' trades. We conduct a variety of analyses that mitigate, but do not eliminate, these concerns.

Our paper makes several contributions, subject to the caveats above. First, we provide evidence that senior executives' propensity to exploit inside trading opportunities varies in an intuitive way with their "psychological type", identified on the basis of luxury good ownership and legal records. Second, we document that the profitability and strategic timing of trades by unfrugal senior executives, and to a lesser

extent, recordholders, increases significantly with proxies for relatively weak information and control environments both in an absolute sense and relative to other (i.e. low propensity) executives. In contrast, we fail to detect a significant positive relation between insider trading and any of our proxies for a weak information or control environment when executives are assumed to be homogeneous, suggesting the importance of incorporating executive type and a possible explanation for mixed results in the prior literature on the effects of information and control environments. Third, we provide evidence of how CEO type is related to the profitability of trades by other senior executives. Overall, our results supplement evidence in Davidson et al. [2013] that our measures of "off-the-job" behavior capture meaningful differences in managerial style that may be useful in other contexts.

The remainder of this paper is organized as follows. Section 2 presents a brief review of the relevant literature and develops our hypotheses. Section 3 describes the sample and data and provides some descriptive statistics. Sections 4 through 6 present our empirical analyses for our first, second, and third hypotheses, respectively, and Section 7 provides a summary and conclusions.

2. Hypotheses Development

A large body of research suggests that insiders trade on superior information, and that senior officers and directors who are involved in the firm's operations trade on more valuable information than those outside the firm (e.g., Lin and Howe [1990], Aboody and Lev [2000], Ke et al. [2003], Piotroski and Roulstone [2005], Huddart et al. [2007], Ravina and Sapienza [2010]). In general, this literature documents that while purchase transactions earn significant abnormal returns, sale transactions do not (e.g., Lakonishok and Lee [2001], Ravina and Sapienza [2010], Jagolinzer et al. [2011]). One explanation for this asymmetry in trading profits is litigation risk (e.g., Cheng and Lo [2006]). Insider sales followed by significant price declines can attract lawsuits as investors who suffer losses due to such declines can allege that managers traded on material private information. Lawsuits are less likely following insider purchases because price increases following purchases only result in opportunity costs for investors.

Early insider trading studies focus on return prediction from insider trades (Lorie and Niederhoffer [1968], Jaffe [1974]). Seyhun [1986, 1988] examines whether investors can profit from insider trades, and find that mimicking aggregate insider trading is not profitable after incorporating transactions costs. Seyhun [1992] provides both cross-sectional and time-series evidence of the predictive ability of insider trading after incorporating changing business conditions. Rozeff and Zaman [1998] document that insiders buy shares when their firm is a value firm and sell shares when their firm is a growth firm, suggesting that insiders are trading against deviations from fundamental value.

Several studies examine insider trading around major corporate events, such as corporate news announcements, dividend initiations, bankruptcy filings, earnings restatements and takeover announcements (Elliot et al. [1984], John and Lang [1991], Sivakumar and Waymire [1994], Seyhun and Bradley [1997], Agrawal and Nasser [2012]). The conclusions from these studies are somewhat mixed. While insiders tend to trade profitably prior to some events (such as stock repurchases, earnings announcements, and bankruptcy filings), they appear to refrain from active insider trading prior to merger announcements.[6]

Several studies examine the relation between insider trading and firms' information environments (Aboody and Lev [2000], Beneish and Vargus [2002], Frankel and Li [2004], Aboody et al. [2005], Piotroski and Roulstone [2005], Huddart and Ke [2007]). While some measures of information asymmetry (such as R&D and abnormal returns over past earnings announcements) are related to the profitability of trades, other measures (such as bid-ask spread, institutional ownership, analyst following and book to market) are not significantly related. Related studies document that insiders strategically choose their disclosure policies and time their trades to maximize their trading profits (Cheng and Lo [2006], Noe [1999]).

Finally, two recent studies examine the relation between insider trading profitability and firms' control environments. Jagolinzer et al. [2011] document that the general counsel can effectively mitigate informed

[6]Agrawal and Nasser [2012] distinguish "active" inside trading (actual purchases or sales based on favorable and unfavorable inside information, respectively) vs. "passive" insider trading (withholding purchases or sales based on unfavorable or favorable inside information, respectively). They do not detect active insider trading in target firms prior to the takeover announcement. Instead, they find that insiders of targets of takeovers *reduce* their purchases of shares prior to takeover announcements. However, these insiders reduce their sales of shares to a greater degree than they reduce their purchases, thereby engaging in "passive" insider trading.

trade and that the choice of corporate governance affects the extent to which insiders trade on superior information. Ravina and Sapienza [2010] measure governance using G-score and board size, and find that insiders earn higher trading profits at firms with the "weakest" governance.

In general, prior research has treated executives as homogeneous with respect to their propensity to trade on inside information, given the opportunity. One exception is Bhattacharya and Marshall [2012], who document that the top management who were indicted for illegal insider trading between 1989 and 2002 were richer and better paid. They speculate but do not test whether psychological factors contribute to insider trading behavior. Our paper takes the first step (of which we are aware) in this direction.

Our first set of hypotheses concerns the relation between executives' propensity to trade on information and their psychological type. The hypothesized association between legal records and the propensity to trade on inside information is largely based on the criminology and psychology literatures. The criminology literature defines crime as an act of force or fraud undertaken in the pursuit of self-interest, and argues that individuals with greater propensities to commit crimes are likely to have low self-control and are less likely to conform to social norms and laws (Gottfredson and Hirschi [1990]). Jones and Kavanagh [1996] show that individuals lacking conventional morality exhibit significantly more unethical behavioral tendencies than others. Blickle et al. [2006] argue that low self-control and high hedonism are positively related to the likelihood of committing white-collar crime. Further, individuals displaying unethical tendencies, such as past criminal behavior, tend to persist in this type of behavior (Gendreau et al. [1996], Shu et al. [2011]). Fisman and Miguel [2007] find that United Nations diplomats' unpaid parking tickets in New York City are significantly related to the corruption and legal enforcement in their home country, suggesting that even minor legal violations can capture differential behavioral norms. Finally, Davidson et al. [2013] document that prior criminal records are significantly associated with executives' propensity to commit financial reporting fraud. If the presence/absence of a record captures meaningful variation in regard for laws and self-control, we expect that all else equal, executives with a record will have a relatively high propensity to trade on inside information since they are less constrained in circumstances in which their inside information is material.

The hypothesized relation between the ownership of luxury goods and the propensity to trade on inside information is motivated by the consumer psychology literature. This literature identifies frugality as a psychological trait, likely indistinct from non-materialism, characterized by the degree to which a consumer is both restrained in acquiring and resourceful in using goods and services to achieve long term goals (DeYoung [1996], Lastovicka et al. [1999]). In a similar vein, the psychology literature describes that 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 also been argued to be questionable from an ethical perspective, as more materialistic individuals are more likely to be willing to bend ethical rules to gain possessions (Richins and Rudmin [1992], Muncy and Eastman [1998]). We interpret executives' ownership of luxury goods as a manifestation of relatively low frugality, i.e., high materialism.[7] If the ownership of luxury goods captures meaningful variation in the materialism of senior executives, we expect the temptation to trade on inside information for financial gain to be relatively strong among executives who own luxury goods, ceteris paribus.

Our second set of hypotheses concerns the relation between insider trading and firms' information and control environments. We predict that the inside trading profits and the strategic timing of insider trades of "high-propensity executives" (i.e. unfrugal and recordholder executives) increase with the opacity of the information environment (due to the existence of more inside information), and with the weakness of the corporate control systems (due to less severe constraints on inside trading). And we expect the relation between the profitability and strategic timing of inside trades and the information and control environment to be significantly stronger for high (vs. low) propensity executives.

We measure the opacity of the information environment by the FOG index (developed by Li [2008]) and the information asymmetry component of the bid-ask spread of a firm's stock, and predict a positive relation with the profitability of trades and the timing of trades by unfrugal and recordholder executives. Further, we

[7]Liu and Yermack [2007] interpret the purchase of large homes as a signal of CEO entrenchment, and find that such purchases are associated with a deterioration in future corporate performance.

predict a positive interaction between these opacity measures and our indicators for unfrugal (vs. frugal) and recordholder (vs. nonrecordholder) executives. Prior research on the relation between insider trading profits and proxies for the information environment reports mixed evidence (Lin and Howe [1990], Huddart and Ke [2007]). However, these studies pool across executives failing to take into account the role of an executive's propensity to trade on inside information.

We use three proxies for a relatively weak control environment: low stockholdings of independent directors as a percentage of shares outstanding, the existence of social connections between outside directors and the CEO, and an overall score reflecting the low quality of governance in the firm. The first two measures are motivated by recent papers in which the existence of social connections between outside directors and the CEO and low shareholdings by outside directors are interpreted as relatively weak board monitoring (Hwang and Kim [2009], Bhagat and Bolton [2008], Bhagat et al. [1999], Davidson et al. [2013]). We predict that the profitability and strategic timing of insiders' trades increase with weaker board monitoring and lower overall governance quality in the firm. As before, we expect these effects to be larger for unfrugal and recordholder executives.

Finally, we predict that the information and control environments are more conducive to profitable insider trading by other non-CEO senior executives in firms run by unfrugal (vs. frugal) CEOs. This third hypothesis is motivated by the results in Davidson et al. [2013] that unfrugal CEOs are less likely than frugal CEOs to run a "tight ship" (as characterized by relatively intense monitoring by outside directors, strong internal control systems, and few financial reporting failures or fraud perpetrated by other insiders). We test analogous hypotheses for recordholder vs. nonrecordholder CEOs, but do not have strong priors given the lack of theoretical links and any consistent evidence in Davidson et al. [2013] that the control environment is weak during the tenure of recordholder CEOs.

3. Sample, Data, and Descriptive Statistics

Our initial list of potential sample firms includes firms on CRSP and Compustat with at least one insider trading transaction by a CEO or any other senior executive during 1988- 2011 on the Thomson Financial

insider trading database. We assign executive designations based on Thomson Reuters' Role Codes. Specifically, "senior executives" are non-CEOs who are any C-level executive (chief financial/ investment/ operations/ technology officer), president, executive vice president or senior vice president. Data requirements for each transaction include: share price, number of shares transacted, and the type of trade (purchase or sale). Consistent with prior research, our analyses only include non-compensation related equity purchases and as well as sales of common stock under a Section 16 officer's direct control.[8]

We randomly select 421 firms from the initial list for inclusion in the final sample. We also include all 337 firms from the initial list used in our related studies due to the high cost of the background checks for data on legal records and asset ownership, including 99 firms that were subsequently involved in fraud (and 101 non-fraud firms that had been matched to the fraud firms), 89 firms wherein a material reporting error occurred during the CEO's tenure, and 48 firms that eventually filed for bankruptcy. Finally, we include 36 firms from the initial list that experienced CEO turnover due to the death of the predecessor CEO[9].

Our final sample, described in Table 1, includes 794 firms for which we purchase background checks to determine the legal record and asset ownership of the CEO (959 CEOs in total), and of 419 non-CEO senior executives randomly selected from those who had at least one purchase or sale transaction. We use inside transaction data for the 959 CEOs of the 794 sample firms, and for all 2,868 non-CEO senior executives of the 794 sample firms.[10]

Given that much of our sample is not randomly selected, we compare the industry distribution and some key firm characteristics of our final sample with the Compustat population (untabulated for the sake of brevity). We find that the industry distribution of our sample is similar to the Compustat population based on the Fama and French ten-industry classification scheme. We also compare our sample to the Compustat population with regards to size (as measured by either the market capitalization of firms or the average total

[8] Transactions of derivative securities (not common shares) are excluded. This definition (which is consistent with prior research) includes sales of stock acquired from the exercise of stock options, but does not include the acquisition of shares from option exercises.

[9] We include indicators for fraud, error and bankruptcy in all relevant analyses to allow for different behavior in these three subsamples of firms.

[10] We use transaction data for *all* non-CEO senior officers of sample firms (regardless of whether we know their type) in the analyses that do not require executive type below the CEO level.

assets), sales, and market-to-book ratio. Our sample firms tend to be larger than Compustat firms, which is not surprising given that we require ExecuComp data for our sample. And our sample firms tend to have lower market-to-book ratios than the Compustat population.

Our data on executives' legal infractions and ownership of real estate, boats, and luxury vehicles are obtained from numerous federal, state and county databases accessed by licensed private investigators. We augment our real estate data by hand collection from public real estate information on the Internet.[11] The legal infractions include criminal convictions, specifically, traffic violations, driving under influence and other drug and alcohol related charges, reckless endangerment and domestic violence charges. We set an indicator variable, *RECORD*, equal to 1 if the executive has any such convictions in his personal record as of December 31, 2010 and 0 otherwise.[12] We repeat all our analyses by only considering serious criminal convictions (which comprises all violations listed above except the traffic violations) and also by only considering minor criminal convictions (which comprises traffic violations only) and our results for both cases are similar to those reported in the paper. *UNFRUGAL* is an indicator variable equal to 1 if the executive has owned any luxury assets prior to December 31, 2010, including a primary residence worth more than twice the average of the median home prices in the zip codes within fifteen miles of the corporate headquarters, any additional residences or vacation homes worth more than twice the average home prices in that metropolitan area (as defined by the Core Based Statistical Area (CBSA)), boats greater than 25 feet in length, and cars with a purchase price greater than $75,000, and 0 otherwise.[13] We obtain similar results in all of our analyses when we use a continuous measure for *UNFRUGAL*, defined as the sum of the value of an executive's car(s), boat(s) and primary residence in excess of twice the average of the median home prices in

[11] Our acquisition and use of asset data conforms to all provisions of the Driver's Privacy Protection Act (DPPA).
[12] The Appendix presents all variable definitions and data sources.
[13] We include an executive's legal infractions and luxury asset purchases regardless of when they occurred to define *RECORD* and *UNFRUGAL* for that executive. This is based on our assumption that executive type is stable and revealed with a delay, and our desire to minimize the number of recordholders and unfrugal executives classified otherwise.

the zip codes within fifteen miles of the corporate headquarters, and the value of any additional residences or vacation homes as of December 31, 2010.[14]

Following Jagolinzer et al. [2011], we estimate the profitability of a net purchase (net sale) by a given executive *i* on day *t* (*TRADING_PROFIT i,t)* using the α (-α) of the four factor Fama-French [1993] and Carhart [1997] model estimated over the 180 days following the transaction:

$$(Ri - Rf) = \alpha + \beta 1\ (Rmkt - Rf) + \beta 2\ SMB + \beta 3\ HML + \beta 4\ UMD + e \qquad (1)$$

where *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, *SMB*, *HML*, and *UMD* are the size, book-to-market, and momentum factors (Fama and French [1993], Carhart [1997]), and α (-α) is *TRADING_PROFITi,t*, the average daily risk-adjusted return to a net purchase (sale) during the 180 days following the transaction.[15]

To measure the strategic timing of trades by individual executives, we estimate the following model for each CEO using all quarters of his or her tenure as CEO:

$$ANN\_CRETq = \beta 0 + \beta 1\ TRADE\_BEHAVq + \varepsilon q \qquad (2)$$

where *ANN_CRETq* is his firm's 3-day market-adjusted buy and hold return centered on the earnings announcement date for quarter q, and *TRADE_BEHAVq* equals 1 (-1) if the executive is a net purchaser (net seller) of shares during the 90 days prior to the earnings announcement for quarter q, and equals 0 if the executive is neither a net purchaser nor a net seller during that ninety-day period. We interpret the coefficient β1 as the degree to which a CEO strategically decides when to purchase, sell, or not trade, based on the earnings news for that quarter (*STRAT_TIMING*). [16]

[14] We choose to report our results using the binary measure for the following reasons. First, the interpretations of our coefficients, particularly the interaction terms and the summations of coefficients, are easier when using the binary measure. Second, the prices of boats need to be estimated which adds some noise to the measure. And third, the estimation of a continuous measure is noisier for senior executives due to the lack of accurate tenure information for all senior executives in our sample. However, all results using the continuous measure are available on request.

[15] As pointed out by Jagolinzer et al. [2011], this approach has at least two advantages. First, estimating average daily abnormal returns avoids the biases inherent in statistical tests of long-run buy-and-hold returns, and second, computing trade-day specific risk-adjusted returns relative to the Fama-French model controls for differences in risk across transactions (i.e. transaction-day specific factor loadings) and provides a trade-specific measure of profitability. Results are robust to estimating equation (1) including one and two lags of all factors to correct for infrequent trading and to measuring trading profits using six-month market-adjusted buy-and-hold returns.

[16] We also measure how often an executive trades (*FREQUENCY)* as described in the Appendix.

We obtain data for measures of the information and control environments from several sources. We use the Fog index developed by Li [2008] (*FOG*) and the adverse selection component of the bid-ask spread estimated using data from the Trade and Quote (TAQ) database (*BAS*) as measures of the opacity of the information environment.

To capture a relatively weak corporate control environment, we use low shareholdings of independent directors from the RiskMetrics database, supplemented with hand-collected data from annual proxy statements (*LOW_DIR_SHARES*), and the existence of social connections between the CEO and outside directors (*SOCIAL*) as measures of relatively weak board monitoring. We obtain social connections between the CEO and independent directors from BoardEx of Management Diagnostics Limited, a private research company specialized in social network data on company officials of US and European public and private companies. The data contain relational links between directors and other officials for companies. Links in the dataset are constructed by cross-referencing employment history, educational background and professional qualifications. To examine the social connections of independent directors with their CEOs, we consider whether an independent director overlapped with the CEO in the past for two or more years in at least one of the following: university, military service, and employer. We also consider the director to be socially connected to the CEO if he or she is a member of one or more clubs (e.g. country clubs), serves in one or more charities, or is a member of other similar organizations with the CEO. As a third measure of a weak control environment, we use an overall measure of the quality of corporate governance (*GOVSCORE*) from Governance Metrics International (GMI). GMI uses various accounting (including regulatory reporting violations, financial statement and earnings data) and governance information to develop an overall governance score for firms from 1 to 5, where higher scores indicate weaker governance.[17]

Finally we calculate a firm-based measure of an executive's wealth using data from ExecuComp and Thomson Reuters that considers: historical cash compensation, the value of current option and restricted

[17] Although we refer to *GOVSCORE* throughout as a measure of the control environment, it also reflects a firm's information environment to the extent that it captures relatively low quality financial reporting.

stock holdings, the value generated from historical option exercises, deferred compensation and the value of long-term incentive plans, and profits from open market transactions.

Table 2, Panel A describes record and asset information for sample CEOs and non-CEO senior executives. Table 2, Panel B presents summary statistics for the insider trading, information and control environment variables for sample firms. Mean and median trading profits from purchases by CEOs, and non-CEO senior executives are significantly greater than zero. While our analysis includes over 3,000 purchases, at the individual-year level, purchases occur infrequently. For example, CEOs engage in open market purchases approximately once every two years. The mean frequency of CEOs' sales is more than five times higher than the frequency of their purchases. This is not surprising because sales include the disposition of stock acquired through option grants. Collectively, non-CEO senior executives engage in purchases and sales slightly less often than do CEOs. When CEOs make purchases, the average trade size is more than twice as large as that for a non-CEO senior executive.

4. Empirical Results: Propensity to Trade on Inside Information and Executive Type

4.1. Profitability of Trades and Executive Type

We examine whether executives' trading profits vary with his or her type (recordholder or unfrugal), controlling for fixed firm effects, to test our first hypothesis. This analysis is based on 229 CEOs and 419 randomly selected non-CEO senior executives. This intra-firm analysis holds constant time-invariant firm-level factors in an attempt to control for the opportunity to trade on inside information (i.e. the firm's information and control environment). We estimate the following model with firm fixed effects:

$$TRADING\_PROFIT_{i,t} = \beta 0 + \beta 1\ EXEC\ TYPE_i + \beta 2\ CEO_i + \beta 3\ EXEC\ TYPE_i * CEO_i + \varepsilon_{i,t} \qquad (3)$$

where $TRADING\_PROFIT_{i,t}$ is the average daily risk-adjusted return to a net purchase (sale) by executive *i* during the 180 days following the transaction on day *t* (i.e., α (-α) from equation (1)), *EXEC TYPEi* is either *RECORD* or *UNFRUGAL* for executive *i*, and *CEOi* is an indicator variables set equal to 1 if executive *i* is the CEO, and 0 otherwise to allow for CEOs' differential trading profits. In the above model (and, whenever relevant, in all subsequent models) we include indicators for fraud, error and bankruptcy to control for the

possible differential behavior of executives in these three subsamples of firms. However we do not report these indicators for the sake of brevity, particularly given that these coefficients are never statistically significant.

Table 3, Panel A presents the results.[18] The coefficients on both *RECORD* and *UNFRUGAL* are significantly greater than zero (at the .05 and .01 levels respectively) for purchases, but not for sales. The coefficient on *RECORD* in column (1) indicates that non-CEO senior executives with a legal record earn 0.037% higher risk-adjusted returns per day (incremental returns totaling 6.7% over 180 days) following purchases than nonrecordholder peers in the same firm. The coefficient on *UNFRUGAL* in column (3) indicates that unfrugal non-CEO senior executives earn 0.040% higher returns per day (incremental returns totaling 7.2% over 180 days) following purchases than frugal peers in the same firm. These incremental returns are economically significant in absolute terms and relative to the profitability of trades of other executives. For example, the intercepts in columns (1) and (3) of Table 3 indicate that for the base firm, the average daily risk-adjusted return following purchases by non-CEOs who are not recordholders is .023% and non-CEOs who are frugal is .028%. Hence, the returns following purchases by executives who are recordholders or unfrugal are almost twice as high as their recordholder and unfrugal peers.

We find similar results for CEOs. The summation of coefficients for *EXEC TYPE* and *EXEC_TYPE * CEO* suggests that unfrugal and recordholder CEOs earn significantly higher profits from purchases than frugal and nonrecordholder CEOs (at the .05 level). Specifically, recordholder CEOs earn 0.047% higher risk-adjusted returns per day (incremental returns totaling 8.5% over 180 days) following purchases than nonrecordholder CEOs in the same firm. Unfrugal CEOs earn 0.052% higher returns per day (incremental returns totaling 9.4% over 180 days) following purchases than frugal peers in the same firm. Overall, we interpret our results as support for the prediction that recordholders and unfrugal executives have a higher propensity to exploit inside information when they purchase shares than other executives.

[18] In all models with trading profits as the dependent variables, t statistics are computed using standard errors clustered by firm and transaction date to correct for cross sectional and time series dependence. Results are robust to clustering by firm only and by transaction date only.

A concern with our interpretation of the relation between the profitability of share purchases and asset ownership is the potential for reverse causality; i.e. highly profitable share purchases increase the acquisition of luxury goods. The concern is aggravated by our approach to identifying unfrugal executives based on their acquisition of luxury goods, regardless of when they acquire the goods. As described above, our approach is designed to allow the maximum time for unfrugal executives to reveal their true type, assuming type is stable.[19,20]

To examine the issue of reverse causality, we estimate the following model for our subsample of unfrugal executives:

$$TRADING\_PROFIT_{i,t} = \beta 0 + \beta 1\ TIME\_TO\_UNFRUGAL_i + \beta 2\ CEO_i + \beta 3\ TIME\_TO\_UNFRUGAL_i * CEO_i + \varepsilon_{i,t} \quad (4)$$

Where *TIME_TO_UNFRUGAL* is the number of years executive *i* is a senior executive before his initial acquisition of luxury goods (i.e., the length of time it takes an unfrugal executive to reveal his "type"), and *CEO* is an indicator variable that equals 1 if executive *i* is the CEO.[21] If, as we argue, the acquisition of luxury goods captures the materialism (low frugality) of executives (rather than high wealth from prior inside trading profits), the speed of acquiring luxury goods after being appointed a senior executive arguably captures the *intensity* of materialism. If trading profits are higher for executives who acquire luxury goods sooner (vs. later) after their appointment as a senior executive ($\beta 1 < 0$), we will interpret that as support for the materialism interpretation, not reverse causality. The sooner a senior executive acquires luxury goods, the more materialistic he is likely to be, and the more heavily our estimate of the profitability of his trades relies on transactions *after* the asset purchase (i.e. not reverse causality).

[19] As a verification of this assumption we compare the trading profits from trades by unfrugal and recordholder executives before and after they purchase luxury assets and break the law (i.e., before and after they reveal their type). We find no difference in the trading profits, supporting our assumption that an individual's type is invariant regardless of whether he/she has had an opportunity to reveal it.

[20] This is less of an issue for recordholder executives because there is no reason for trading profits to induce future legal infractions.

[21] We measure *TIME_TO_UNFRUGAL* relative to the year an executive first became a senior executive because we assume that the high compensation of senior executives enables the acquisition of luxury goods.

We run model (4) for the subset of firms with multiple unfrugal executives and include firm fixed effects. We also run the model for all firms with any unfrugal executives, which results in a larger sample. However, in this latter case we have some firms with only one executive and thus, we cannot include firm fixed effects. Table 3, Panel B presents the results. We find a negative and significant coefficient for *TIME_TO_UNFRUGAL* ($\beta 1 < 0$ at the .05 level) with and without firm fixed effects, supporting our materialism interpretation, not reverse causality.

To further explore reverse causality, we rerun all analyses with the addition of a control variable for each executive's wealth, and find that our (untabulated) results are unchanged.[22] Further, the correlation between *UNFRUGAL* and executive wealth is insignificantly different from zero, reducing concerns that an executive's wealth affects our results.

4.1.1 Real Time Classification of Executives

Throughout we consider luxury asset purchases and legal infractions regardless of when they occurred to classify executives as frugal/unfrugal and recordholders/nonrecordholders. To provide practical insight on the real time use of data on legal records and asset ownership in predicting future trading profitability, we reclassify executives (this section only) based solely on *prior* asset purchases and legal records, varying the minimum *prior* tenure as an executive required for inclusion in the sample from one to ten years. The longer the prior tenure requirement, the more time each executive has to reveal his true type, but the fewer the executives included. Note that we only include CEOs in this analysis as we do not have tenure details for all senior executives in our sample (given that we consider up to ten years of tenure, this sample is likely to be dominated by CEOs, particularly in the latter years of tenure). We re-estimate model (3) for each of the ten cutoffs including inside trades only *after* the cutoff:

$$TRADING\_PROFIT_{i,t} = \beta 0 + \beta 1\ CEO\ \ TYPE_{i,t} + \varepsilon_{i,t}$$

[22] We measure the wealth of an executive as the sum of the value of unexercised exercisable options + the value of unexercised unexercisable options + the value of restricted stock holdings + the value of long-term incentive plan (pension) + the profit from option exercises + the profit from open market trading activity of common stock + cash based compensation multiplied by the number of years the executives has worked as a senior executive.

The results in Table 3, Panel C indicate that unfrugal CEOs and recordholders earn significantly higher profits on purchases than other CEOs when we require at least three and six years of prior tenure for inclusion in the sample, respectively,[23] providing insight into the real time usefulness of data on legal records and asset ownership to assess the future profitability of insider trading activities. Further, the results indicate that the significance of executive type increases monotonically with the tenure required for inclusion in the sample for both *RECORD* and *UNFRUGAL* (in spite of the reduction in sample size), consistent with our underlying assumption that executive type is revealed with a delay (i.e. measured more accurately later).

4.2. Strategic Timing of Trades and Executive Type

To test whether strategic timing of trades varies with executive type, we estimate the following model (firm fixed effects included):

$$ANN\_CRET_{i,q} = \beta 0 + \beta 1\ EXEC\_TYPE_i + \beta 2\ TRADE\_BEHAV_{i,q} + \beta 3\ EXEC\_TYPE_i * TRADE\_BEHAV_{i,q} + \varepsilon_{i,q} \quad (5)$$

where *ANN_CRETi,q* is the 3-day market adjusted return centered on the earnings announcement for executive *i*'s firm in quarter *q*, *TRADE_BEHAVi,q* is equal to 1 (-1) if executive *i* is a net purchaser (net seller) of shares during the 90 days preceding his firm's earnings announcement in quarter *q*, and 0 otherwise. As before, *EXEC_TYPEi* is either *FRUGALi* or *RECORDi*. The coefficient on *EXEC_TYPE * TRADE_BEHAV* estimates how strategic timing of insider trades varies within firms by executive type (i.e. frugal vs. unfrugal, or recordholder vs. nonrecordholder). We estimate equation (5) separately for CEOs and non-CEO senior executives in order to compare whether the strategic timing of trades varies across CEOs and other senior executives.

Table 4 reports the results. The significant positive interactions on *TRADE_BEHAV *RECORD* (columns (1) and (3)) and on *TRADE_BEHAV * UNFRUGAL* (column (2) and (4)) ($\beta 3 > 0$, .05 level for all cases)

[23] The median number of years it takes for an unfrugal (recordholder) CEO to reveal his type after appointment as a senior executive is 8 years (10 years) (see Table 3, Panel C).

suggest that, as predicted, the strategic timing of trades is more pronounced for recordholders (vs. nonrecordholders) and unfrugal (vs. frugal) CEOs as well as non-CEO senior executives of the same firms. The t statistics reported near the bottom of Table 4 suggest that recordholder and unfrugal executives strategically time their trades in an absolute sense (the sum of the coefficients on *TRADE_BEHAV* and *EXEC_TYPE * TRADE_BEHAV* is positive and significant for both unfrugal and recordholder CEOs and unfrugal and recordholder non-CEO senior executives at the .05 level). These strategic timing results provide additional evidence that executives who are recordholders and executives who are unfrugal have a relatively high propensity to trade on inside information, given the opportunity. Finally, the F statistics near the bottom of Table 4 also indicate that the strategic timing by recordholder and unfrugal CEOs is not significantly different from that by recordholder and unfrugal non-CEOs of the same firm.

For completeness, we examine whether the frequency with which executives make share purchases varies with their type. To analyze the frequency of insider purchases we estimate the following Tobit model:

$$FREQUENCY_{i,t} = \beta 0 + \beta 1\ EXEC\_TYPE_i + \beta 2\ CEO_i + \beta 3\ EXEC\_TYPE_i * CEO_i + \varepsilon_{i,t} \quad (6)$$

where *FREQUENCY* is the number of times an insider made an open market purchase during the year and *CEO* is an indicator variable that equals 1 if executive i is the CEO. We find (untabulated) marginal evidence that unfrugal executives purchase shares more frequently (coefficient on *UNFRUGAL* is significant at the .10 level). We find no evidence that recordholder executives trade more frequently (possibly due to low power (few executives have records), or that CEOs purchase more frequently than non-CEO senior executives.

4.3 Insider Trading and Corporate Bankruptcy

The interpretation of the results above is subject to the caveat that we cannot isolate the trades that were based on *material* non-public information. As a result, we cannot conclude that these trades were *illegal* or undesirable. In this section, we attempt to tease out whether executive type is associated with insider trading based on material non-public information by focusing on a sample of 102 firms that went bankrupt between 1996 and 2008.

Corporate managers possess significant nonpublic information regarding the future price of their firms' securities and are able to use their information advantage in their trades (e.g., Seyhun [1990], John and Lang [1991], Lee et al [1992]). Therefore, if executives are prone to exploit material private information to avoid significant capital losses, then we would expect such trading to occur prior to events that their executives expected to have a significant negative impact on the firm's future stock prices. Consistent with this notion, Bradley and Seyhun [1997] provide evidence that corporate insiders engage in significant sales of their companies' shares as early as 5 years prior to the bankruptcy filing date, and as a result avoid significant capital losses. They also show that these sales are more intense for top executives and officers and increase over time to reach a peak in the filing announcement month.[24]

If unfrugal CEOs have a higher propensity to trade on material inside information, then we would expect unfrugal CEOs to be more likely than frugal CEOs to sell (or postpone purchasing) their shares before the significant stock-price declines preceding the filing of bankruptcy. To examine this conjecture, we conduct the following tests.[25] First, we compare the net purchases of unfrugal versus frugal CEOs in the 12, 24 and 36 months prior to the date when the firm's shares were delisted due to filing for bankruptcy (the event date).[26] Table 5, Panel A provides the results. We find that in the 12 and 36 months prior to bankruptcy, both unfrugal and frugal CEOs are net sellers of their firm's shares, but unfrugal CEOs are net sellers of a significantly higher number of shares (t-statistics of differences are significant at the .05 level in the 36 months preceding bankruptcy). For 24 months prior to bankruptcy, we find that frugal CEOs are net buyers, but that unfrugal CEOs continue to be net sellers, and this difference is statistically significant (.05 level). These numbers indicate that insider selling starts several years preceding bankruptcy (consistent with the evidence in Bradley and Seyhun [1997]) and is mainly driven by unfrugal CEOs.

[24] Loderer and Sheehan [1989] find evidence contradicting the notion that insiders sell stock prior to filing a bankruptcy petition. However, their methodology and sample selection present some difficulties which potentially prevent them from documenting such insider trading (see Bradley and Seyhun [1997] for a discussion).

[25] Unfortunately we have an insufficient number of recordholder CEOs in the bankruptcy sample to conduct similar analyses for recordholders vs. non-recordholders.

[26] While for several firms the delisting dates coincide with the bankruptcy filing dates, in a lot of cases delisting occurred prior to the bankruptcy filing. We do not have delisting information for 4 firms in our sample. For these firms we use the bankruptcy filing date as the event date.

In addition to comparing the net purchases of frugal versus unfrugal CEOs, we also examine whether executives' own trading behaviors changed in the years leading up to bankruptcy. Specifically, for each CEO type, we compare their net purchases in the 2 years just prior to bankruptcy to their net purchases in the years 3 and 4 before bankruptcy. We find that unfrugal CEOs increased their net sales by 82,571 shares in the 2 years prior to bankruptcy as compared to the previous period. Interestingly, frugal CEOs become net purchasers in the 2 years before bankruptcy as compared with the previous two years, and had higher net purchases of 82,422 shares. The difference between the trading behavior changes of frugal and unfrugal CEOs is significant at the .05 level. This suggests that the increasing rate of insider selling leading up to bankruptcy documented in prior studies is primarily driven by unfrugal CEOs, thus highlighting the importance of considering personal characteristics of executives while studying insider trading behavior.

Next, we estimate the following models for the abnormal profits made from trades by CEOs of the bankrupt firms[27]:

$$TRADING\_PROFIT_{i,t} = \beta 0 + \beta 1\ UNFRUGAL_{i,t} + \varepsilon_{i,t} \qquad (7)$$

In the above model (7) the dependent variable is the abnormal trading profits from open market sales made by CEOs. We run the above analyses for the 12, 24 and 36 months prior to the event date. For comparison purposes, we also run the above model for all sales by the CEOs over their tenures in these firms.

Table 5, Panel B presents the results (columns (1), (2), (3) and (4) present results for the trades within 12 months of bankruptcy, 24 months of bankruptcy, 36 months of bankruptcy and over the entire tenure of the CEO respectively). The coefficients on *UNFRUGAL* in columns (1), (2) and (3) are significantly greater than zero (at the .01, .01 and .05 levels respectively). The coefficient in column (1) indicates that unfrugal CEOs earn 0.008% higher risk-adjusted returns per day (incremental returns totaling 2.92% over 365 days prior to bankruptcy) following sales as compared to frugal CEOs in the same firm. Columns (2) and (3) indicate that unfrugal CEOs executives earn 0.011% (0.006%) higher returns per day, with incremental returns totaling 8.03% (6.57%) over 730 days (1,095 days) as compared to frugal CEOs in the same firm over the same periods. These incremental returns are economically significant in both absolute terms as well as relative to

[27] We only include CEOs in this analysis as we data on other senior executives for the sample of bankrupt firms.

the profitability of the sales of other CEOs. The coefficient on *UNFRUGAL* in column (4) where we examine all sales over a CEO's tenure is not statistically significant, which is consistent with our results in Table 3.[28]

The results above support the prediction that unfrugal executives have a higher propensity (than frugal executives) to exploit material inside information. They are also more likely to strategically time their insider trades in order to avoid significant capital losses. This examination of CEOs' trading activities prior to a major corporate event that has significant negative implications for the firm's stock price strengthens the conjecture that materialistic executives are more likely to have a higher propensity to engage in *illegal* insider trading. Further, following the argument in Bradley and Seyhun [1997], while insider sales may be a means for materialistic managers to mitigate their own losses in the event of financial distress, selling their shares prior to filing reduces their incentives to bargain for stockholders' interests in Chapter 11 proceedings, thus questioning their role as stewards of shareholder resources.

5. Empirical Results: Insider Trading and the Information and Control Environment

In this section we examine whether 1) the profitability of purchases by high propensity executives (i.e. recordholders and unfrugal executives) increases with proxies for the opportunity to trade on inside information, including measures of the opacity of firms' information environments and measures of the weakness of firms' control systems, and whether 2) these effects are significantly stronger for high propensity vs. low propensity (i.e. non-recordholder and frugal) executives. We estimate the following model for CEOs:

$$TRADING\_PROFIT_{i,t} = \beta 0 + \beta 1\ INFORMATION_{i,t} + \beta 2\ CEO\ TYPE\ i + \beta 3\ CEO\ TYPE_i\ *\ INFORMATION_{i,t} + \varepsilon_{i,t} \quad (8a)$$

$$TRADING\_PROFIT_{i,t} = \beta 0 + \beta 1\ CONTROL\ ENV_{i,t} + \beta 2\ CEO\ TYPE\ i + \beta 3\ CEO\ TYPE_i\ *\ CONTROL\ ENV_{i,t} + \varepsilon_{i,t} \quad (8b)$$

[28] In unreported analyses we document significant results for purchases over the tenure of the CEO for the bankruptcy firms, which is consistent with our results in Table 3.

Further, for comparison purposes, we also examine the above relations without incorporating the types of the executives and their interactions. The dependent variable is the trading profits from purchases made by CEO *i* in year *t*. The variable *INFORMATIONi,t* is either *FOG* (Fog index developed by Li [2008]), or *BAS* (adverse selection component of the bid-ask spread as computed in Glosten and Harris [1988]) for firm *i*, year *t*, and *CONTROL ENVi,t* is either the negative value of the stock based compensation of independent directors (*LOW_DIR_SHARES*), social ties between the CEO and independent directors (*SOCIAL*), or the overall governance score (*GOVSCORE*) for firm *i*, year *t*. We interpret high values of *FOG* and *BAS* as a relatively opaque information environment and high values of *LOW_DIR_SHARES*, *SOCIAL* and *GOVSCORE* as a relatively weak control environment. Finally, *CEO TYPE* is either *RECORD* or *UNFRUGAL*, indicating the given CEO's type. We also estimate the above models for non-CEO senior executives separately. The results are qualitatively similar to those obtained for CEOs and therefore are not tabulated for brevity.

Table 6, Panels A and B present results for our proxies for the information environment and control environment, respectively. Beginning with the results for which high (low) propensity CEOs are defined as unfrugal (frugal), the t statistics at the bottom of Table 6 (significance of $\beta 1 + \beta 3$ in models 8a and 8b) indicate that the trading profits from purchases by unfrugal CEOs increase significantly (.05 level or better) with the opacity of the information environment as measured by both *FOG* and *BAS* (Panel A, columns (3) and (6)), and with all three measures of the weakness of the control environment (Panel B, columns (3), (6), and (9)). In contrast, trading profits from purchases by frugal CEOs are not significantly positively related to any of the proxies for the opportunity to trade on inside information ($\beta 1$ of models 8a and 8b). Further, the interaction term $\beta 3$ is significant (.05 level) and in the predicted positive direction for all information and control environment proxies, indicating that the relation between inside trading profits and the opportunity to trade on inside information is significantly stronger for unfrugal (vs. frugal) CEOs. Overall these results support our prediction that inside trading profits from purchases by unfrugal CEOs increase with our proxies for an opaque information environment and a weak control environment, and these effects are significantly stronger than for frugal CEOs. Furthermore, the significant main effects of $\beta 2 > 0$ support the higher

expected profits of unfrugal CEOs, controlling for various aspects of the information and control environment.

Turning to the results for which high (low) propensity CEOs are defined as recordholders (nonrecordholders), the t statistics at the bottom of Table 6 (significance of $\beta 1 + \beta 3$ in models 8a and 8b) indicate that the trading profits from purchases by recordholder CEOs increase significantly with the opacity of the information environment as measured *BAS* (.05 level) (Panel A, column (5)) but not *FOG* (Panel A, column (2)), and with two measures of the weakness of the control environment, *LOW_DIR_SHARES* (.05 level) (Panel B, column (2)) and *GOVSCORE* (.10 level) (Panel B, column (8)), but not *SOCIAL* (Panel B, column (5)). The trading profits of nonrecordholder CEOs are not significantly related to any of the proxies for the opportunity to trade on inside information ($\beta 1$ of models 8a and 8b). The interaction term $\beta 3$ is significant (.05 level) and in the predicted positive direction for *BAS*, (Panel A, column (5), .10 level), *LOW_DIR_SHARES* (Panel B, column (2)), (.05 level), and *GOVSCORE* (Panel B, column (8)), .05 level) indicating that the relation between inside trading profits and the opportunity to trade on inside information as measured by these three proxies is significantly stronger for recordholder (vs. nonrecordholder) CEOs. Finally, the significant positive main effect of *CEO RECORD* in all models ($\beta 2>0$ at .05 level) indicates that trading profits following purchases by CEOs with a record are significantly higher than the trading profits following purchases by nonrecordholders, controlling for various aspects of the information and control environment. Collectively, these results suggest that although recordholders have a relatively high propensity to purchase shares on the basis of superior information, the effects of the information and control environment appear less pronounced than documented for unfrugal CEOs.[29] This is intuitively appealing if *CEO RECORD* captures a lack of self-control and disregard for rules and norms.

Finally, Table 6 presents results for the simplified version of models 8(a) and 8(b), ignoring executive type. The profitability of CEOs' purchases is not significantly related to any of the proxies for the information and control environment, except for *BAS* for CEO purchases (Panel A, column (4) marginally

[29] Untabulated tests comparing the sensitivity of trading profits to our five proxies for the information and control environment for recordholders vs. unfrugal CEOs indicate that the relation is significantly stronger for unfrugal CEOs than for recordholders for *FOG*, *BAS*, and *GOVSCORE*.

significant at the .10 level). This suggests that models that examine the relation between insider trading profits and the information and control environment are likely misspecified if they do not take into account the propensity of the executive to take advantage of trading opportunities, potentially contributing to mixed results in prior studies.

Next, we estimate models 9(a) and 9(b) to test whether the strategic timing of CEOs' trades increases with the weakness of firms' information and control environments, and whether these relations are stronger for unfrugal and recordholder CEOs[30]:

$$STRAT\_TIMING_i = \beta 0 + \beta 1\ INFORMATION_i + \beta 2\ CEO\ TYPE\ i + \beta 3\ INFORMATION_i * CEO\ TYPE_i + \varepsilon_i \quad (9a)$$

$$STRAT\_TIMING_i = \beta 0 + \beta 1\ CONTROL\ ENV_i + \beta 2\ CEO\ TYPE\ i + \beta 3\ CONTROL\ ENV_i * CEO\ TYPE_i + \varepsilon_i \quad (9b)$$

where *STRAT_TIMINGi* is estimated separately for each executive *i* as β1 from model (2) described in section 3:

$$ANN\_CRET_q = \alpha + \beta 1\ TRADE\_BEHAV_q + \varepsilon_q$$

and *TRADE_BEHAVq* is equal to 1 (-1) if the executive was a net purchaser (net seller) during the 90 days preceding the earnings announcement for quarter *q*, and 0 if the executive was not a net purchaser or net seller during the 90-day period. *INFORMATION* and *CONTROL ENV* are averaged over the CEO's tenure because *STRAT_TIMING* is measured at the individual level and not the individual-year level. For comparison purposes, we also estimate the above models without including CEO type and their interactions.

Table 7 presents the results. Analogous to the results in Table 6, in the models excluding CEO type, we do not find significant relations between strategic timing and any of the information or control environment variables.

In our models where we distinguish low vs. high propensity CEOs on the basis of frugality (columns (3) and (6) of Panel A, and columns (3), (6), and (9) of Panel B), the t statistics at the bottom of Table 7

[30] We estimate models (9a) and (9b) for CEOs only due to data constraints.

(significance of $\beta 1 + \beta 3$) indicate that the strategic timing of unfrugal CEOs' trades is positively and significantly related in absolute terms to the opacity of the information environment as measured by both *FOG* and *BAS* (at .10 and .05 levels, respectively), and to the weakness of the control environment as measured by *GOVSCORE* (at .05 level), but not to either proxy for the intensity of board monitoring, (*LOW_DIR_SHARES* and *SOCIAL*). Similarly, the positive relation between the strategic timing of unfrugal CEOs trades and *FOG*, *BAS*, and *GOVSCORE* is significantly stronger than for frugal CEOs (significance of $\beta 3 > 0$), but we do not find such differences with respect to *LOW_DIR_SHARES* and *SOCIAL* . These results indicate that strategic timing of unfrugal CEOs' trades increases significantly in both absolute and relative (to frugal CEOs) terms with the weakness of the information environment, and with *GOVSCORE*, but not with either measure of board monitoring intensity.

The "nonresults" for both measures of board monitoring intensity reported in Table 7, Panel B, is in contrast to the significance of both measures in explaining the profitability of purchases (Table 6, Panel B). A potential explanation is that while the dependent variable in Table 6 (*TRADING_PROFIT*) captures the influence of inside information on the stock price performance following actual share purchases (i.e. active inside trading), the dependent variable in Table 7 (*STRAT_TIMING*) captures the combined effects of inside information on the decision to trade (i.e. "active" inside trading reflected in being a net seller or a net purchaser) and on the decision *not* to trade ("passive" inside trading.) While diligent outside directors arguably can be expected to limit active inside trading by senior executives (consistent with results in Table 6), they cannot be expected to limit decisions not to trade (passive inside trading), potentially explaining the "nonresults" for *SOCIAL* and *LOW_DIR_SHARES* in Table 7.

To shed light on this possibility, we replace the dependent variable in Table 7, Panel B by a modified measure, *STRAT_TIMING**, estimated by excluding quarters for which the executive was neither a net purchaser or seller during the preceding 90-day period. Specifically, we re-estimate a modified version of model (2) for each executive, using *TRADE_BEHAV*q* as the explanatory variable, set equal to 1 if the executive is a net purchaser in the 90 days preceding the earnings announcement, and 0 if the executive is a net seller. In contrast to *STRAT_TIMING*, *STRAT_TIMING** picks up the effects of inside information on

actual trades only. The results (Table 7, Panel C) indicate that active insider trading by unfrugal CEOs, as measured by *STRAT_TIMING**, increases significantly in absolute and relative (to frugal CEOs) terms with both measures of weak board monitoring (*LOW_DIRECTOR_SHARES* (.10 level) and *SOCIAL* (.05 level)), consistent with our potential explanation for the nonresults on these monitoring variables in Panel B. As in Panel B, *GOVSCORE* is significant at the .05 level in absolute and relative terms.

In the analogous models comparing CEOs who are recordholders vs. nonrecordholders (columns (2) and (5) in Panel A and columns (2), (5) and (8) in Panels B and C), we find no evidence that the timing of the trades by recordholder CEOs varies significantly with the information or control environments in either absolute or relative (to nonrecordholders) terms. However, the strategic timing of trades by recordholder CEOs is significantly higher for recordholders than nonrecordholders (coefficient on *CEO TYPE* is significant at the .05 level in all 5 models in both Panels B and C).

6. Empirical Results: CEO Type and the Profitability of Non-CEO Trades

In our final set of tests, we estimate model (10) to test whether the profitability of trades of non-CEO senior executives varies by CEO type:[31]

$$TRADING\_PROFIT_{i,t} = \beta 0 + \beta 1\ CEO\_RECORD_i + \beta 2\ CEO\_UNFRUGAL_i + \varepsilon_{i,t} \qquad (10)$$

where $TRADING\_PROFIT_{i,t}$ is the risk-adjusted average daily stock return over the 180 days following the purchase of executive *i* on day *t* (from model (1). CEO_RECORD_i and $CEO\_UNFRUGAL_i$ are indicator variables set equal to 1 if the CEO of executive *i*'s firm has a legal record or owns luxury goods, respectively (0 otherwise). We predict that trading profits are relatively high in firms run by unfrugal CEOs ($\beta 2 > 0$). Our priors are less strong with respect to the incremental profitability of insider trading in firms run by recordholder CEOs ($\beta 1$).

Table 8, Panel A presents the results. As predicted, the profitability of purchases by non-CEOs is significantly higher in firms run by unfrugal (vs. frugal) CEOs. The slope on *CEO_UNFRUGAL* indicates

[31] As in prior models, we also include three indicator variables to allow for differential insider trading profits in firms that restated financial statements due to fraud, restated financial statements due to a material error, or went bankrupt. None of these three indicators are significant at conventional levels.

that the daily trading profits following purchases by non-CEO senior executives are .027% higher in firms run by unfrugal (vs. frugal) CEOs (t-stat.=2.55). To put this in perspective, the estimated daily trading profits following purchases of non-CEO senior executives in firms run by frugal CEOs with a clean record (and not a fraud, error, or bankrupt firm) as estimated by the intercept is .025%. Hence, the daily trading profits of non-CEO senior executives are more than twice as large in firms run by unfrugal CEOs. In contrast, the trading profits of non-CEOs are not significantly different in firms run by CEOs with vs. without a record.

To provide further evidence on how the profitability of non-CEOs' trades varies by CEO type and to reduce endogeneity concerns, we estimate model (11) to examine the profitability of purchases by non-CEO senior executives before and after a change in CEO due to the death of the predecessor CEO, distinguished by predecessor and successor type:

$$\begin{aligned} TRADING\_PROFIT_{i,t} = {} & \beta 0 + \beta 1\ NEW\ CEO\_UNFRUGAL_i + \beta 2\ TRADE\_NEW\ CEO_{i,t} \\ & + \beta 3\ CHANGE\_CEO\ TYPE_i + \beta 4\ NEW\ CEO\_UNFRUGAL_i * TRADE\_NEW\ CEO_{i,t} \\ & + \beta 5\ NEW\ CEO\_UNFRUGAL_i * CHANGE\_CEO\ TYPE_i \\ & + \beta 6\ TRADE\_NEW\ CEO_{i,t} * CHANGE\_CEO\ TYPE_i \\ & + \beta 7\ NEW\ CEO\_UNFRUGAL_i * TRADE\_NEW\ CEO_{i,t} * CHANGE\_CEO\ TYPE_i + \varepsilon_{i,t} \end{aligned} \quad (11)$$

where *NEW CEO_UNFRUGAL* is a dummy variable that equals 1 if the new CEO is unfrugal and 0 otherwise, *TRADE_NEW CEO* is a dummy variable that equals 1 if the trade takes place when the new CEO is in office and is 0 otherwise, and *CHANGE_CEO TYPE* is a dummy variable that equals 1 if there is a change in type from the predecessor to the successor CEO and 0 otherwise. Given that a change in CEO is due to an exogenous shock to the firm (i.e., death of predecessor CEO), a change in the profitability of non-

CEO senior executives' trades over an exogenous change in CEO type will more cleanly identify the influence of CEO type on the insider trading behavior of other non-CEO senior executives.[32]

Table 8 Panel B reports the results. The profitability of purchases by non-CEO senior executives increases significantly after a frugal CEO is replaced by an unfrugal CEO in absolute terms and relative to all other transitions (significant at the .05 level or better). Specifically, senior executives' purchases earn higher returns of .009% per day following a change from a frugal to an unfrugal CEO. The corresponding change in daily returns associated with other transitions are frugal –> frugal .002%, unfrugal -> frugal -.001%, unfrugal -> unfrugal .006%. The increase in returns upon the transition from a frugal to unfrugal CEO is significantly greater than the other three types of transitions above at the .01, .01, and .05 levels, respectively. These results are consistent with the hypothesized effect of CEO frugality on the profitability of trades by a firm's other non-CEO senior executives. These results are robust to the exclusion of senior executives who were not included in the sample above both before and after the CEO death, suggesting that the results are not driven by a change in the mix of senior executives upon the death of the CEO.

The above results suggest that unfrugal CEOs oversee a corporate culture that is conducive to more opportunities for profitable insider trading by other senior executives in the firm. This raises the interesting question of how the psychological type of the CEO affects different aspects of the information and control environment of a firm, and as a result how it shapes the overall corporate culture. While we provide some evidence of the effect of CEO type on the control environment of firms in Davidson et al. [2013], in a follow up paper we examine in depth how CEO psychology impacts and shapes a firm's information environment, including various measures of transparency, earnings quality and information asymmetry, as well as a firm's corporate governance environment, including measures of the quality of board monitoring and incentive compensation. Our preliminary results reveal that the information environment becomes more opaque and the governance environment becomes weaker during the tenure of unfrugal CEOs both in an absolute sense and relative to such changes during the tenure of frugal CEOs.

[32] It is possible that a change in the mix of non-CEO senior executives' type changes upon the death of the CEO, affecting the change in the estimated trading profits from model (8) before vs. after the CEO death.

7. Summary and Conclusions

We examine how and why the profitability and timing of insider trades vary across senior executives and their firms. Our first set of analyses tests the hypothesis that senior executives who are unfrugal (i.e. materialistic), identified through their ownership of luxury goods, and executives with a legal record, have a relatively high propensity to trade on inside information, given the opportunity. The risk-adjusted stock returns following share purchases by unfrugal senior executives and by recordholders are significantly higher than the risk-adjusted returns following purchases by other senior executives of the same firms. Further, the trading decisions of materialistic executives and recordholders are more closely related to subsequent earnings news, as compared with other executives. Given our controls for firm fixed effects, we interpret these results as supporting the hypothesis that unfrugal and recordholder executives have a relatively high propensity to exploit inside information when they purchase shares and time their trades, given the opportunity.

Our second set of analyses tests the hypothesis that the trading profits and strategic timing of high propensity executives (i.e. unfrugal executives and recordholders) increase with opportunities to trade on inside information as measured by our proxies for a relatively opaque information environment and a relatively weak corporate control environment, and that these effects are more pronounced than for low propensity executives (i.e., frugal executives and nonrecordholders). As expected, the profitability of unfrugal executives' purchases, as well as the strategic timing of their net purchase vs. net sales decisions (including only quarters where an actual trade occurs) increase significantly with our five measures of trading opportunities, and, as expected, these effects are significantly larger than for frugal executives. These results suggest that "active" inside trading by high-propensity unfrugal executives varies in an intuitive way with firms' information and control environments. However, the measure of the executive's strategic timing based on the decision to engage in a net purchase, net sale, or neither (i.e. including all quarters, whether or not a trade occurred) is not significantly related to our measures of director monitoring. This measure of strategic timing captures the influence of inside information both on the decision to purchase or sell shares (active inside trading), and on the decision to withhold from share purchases and sales (passive inside

trading). Given that we do not expect director monitoring to limit the latter, the "nonresults" for this measure vs. the strategic timing measure based only on active trading are intriguing. The analogous results for recordholders are less pronounced, as might be expected if recordholders have low self-control and/or a low respect for rules, mitigating the deterrent effect of corporate controls.

Our third and final set of analyses test the hypothesis that inside trading is more prevalent in firms run by unfrugal CEOs (presumably due to a more opaque information environment and weaker controls in such firms). As predicted, we find that the profitability of non-CEOs' purchases is higher in firms run by unfrugal (vs. frugal) CEOs. The effect of CEO type on the profitability of trades by other senior executives is corroborated on a sample of firms whose CEO died in office by the incremental profits detected upon the transition from a frugal to unfrugal CEO in absolute terms and relative to the behavior of trading profits upon other unplanned CEO transitions.

The interpretation of our results is subject to several limitations. First, our analysis does not directly address the issue of *illegal* insider trading. Second, the quality of our inferences is potentially compromised by sample selection and research design issues including the use of a nonrandom sample, the endogenous sorting of executives into firms, and reverse causality as a potential explanation for the relation between the ownership of luxury goods and the profitability of insiders' trades. We conduct a variety of tests to mitigate these concerns. However, our results should be interpreted with these caveats in mind.

Subject to these caveats, the paper provides the first evidence (of which we are aware) of how insider trading by senior executives varies in an intuitive way with their psychological type, and of how executive type tempers the relation between insider trading and firms' information and control environments. Our finding that insider trading by high propensity executives varies in an intuitive way with firms' information and control environments, while trading by low propensity executives and by the pooled sample of low and high propensity executives does not, underscores the importance of incorporating executive type in research on the effects of firms' information and control environments on insider trading (and possibly other) activities.

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Table 1
Sample Composition

SAMPLE	*TOTAL*	*FRAUD FIRMS*	*ERROR FIRMS*	*BANKRUPT FIRMS*	*OTHER FIRMS*
Firms in Compustat/CRSP 1988-2011	794	99	89	48	558
Executives:					
CEOs	959	99	89	48	723
Non-CEO Senior Executives	2,868	416	357	94	2001
Sub-analyses requiring information on executives' legal infractions and luxury asset ownership:					
CEOs	959	99	89	48	723
Non-CEO Senior Executives	419	72	73	-	274

Non-CEO Senior Executive Roles

President	Chief Technology Officer
Chief Operating Officer	Executive Vice President
Chief Financial Officer	Senior Vice President
Chief Investment Officer	

Our sample is constructed from various subsamples of firms and executives. Table 1 summarizes the types and number of firms included in the sample. In addition to firms involved in fraud, errors, and bankruptcy, the "Other" firms in our sample include banks, a matched non-fraud sample of firms, firms randomly chosen from major industries and a sample of firms where the CEO was deceased and replaced by another CEO. The table also describes the number of executives who file Form 16 (CEO and non-CEO senior executives) that were contributed by each of the subsamples. We defined executive designations based on the Role Codes that Thomson-Reuters uses in its insider trading database. For each analysis, we require non-missing data for all control variables. Specifications that need executive type data (legal infractions and luxury asset ownership data) further limits our sample of non-CEO senior executives.

Table 2, Panel A
Summary of Executives' Prior Legal Records and Luxury Asset Ownership Data

	CEOS *(N = 959)*	*NON-CEO SENIOR EXECUTIVES* *(N = 419)*
	Number	*Number*
Prior Legal Infractions		
Executives with any legal infractions (Traffic violations, domestic violence, reckless behavior, DUI, drug related charges)	143	44
All legal infractions	231	75
Executives with serious legal infractions (Domestic violence, reckless behavior, DUI, drug related charges)	34	11
Serious legal infractions	50	16
Luxury Asset Ownership		
Executives owning any luxury assets (Cars worth more than $75,000, boats longer than 25 feet, homes worth more than twice the average of median home prices of neighboring zip codes)	512	205
Cars worth more than $75,000	551	226
Boats longer than 25 feet	500	189
Homes worth more than twice the average of median home prices of neighboring zip codes	632	258

Table 2, panel A presents the composition of the data on executives' (including the CEO and non-CEO senior executives) legal infractions and asset ownership for the sample.

Table 2, Panel B
Summary Statistics

	MEAN	*MEDIAN*	*STD. DEV.*
Insider Trading Profits - Daily Abnormal Return (Percentage)			
CEO Purchases	0.076***	0.061***	0.186
CEO Sales	0.032	0.022	0.141
Non-CEO Senior Executives' Purchases	0.049***	0.037***	0.173
Non-CEO Senior Executives' Sales	0.022	0.017	0.136
Trading Behavior			
STRAT_TIMING	1.03	0.66	5.65
Frequency of CEO Purchases	0.54	0	3.11
Frequency of CEO Sales	2.86	1	6.37
Frequency of Non-CEO Senior Executive Purchases	0.44	0	2.89
Frequency of Non-CEO Senior Executive Sales	2.21	1	5.44
Size of CEO Purchases	39549	3750	308150
Size of Non-CEO Senior Executive Purchases	18451	1500	149172
Information and Control Environment			
FOG	19.46	19.30	1.86
BAS	0.21	0.20	0.11
LOW_DIR_SHARES	-0.07	-0.03	0.19
SOCIAL	0.41	0.00	0.58
GOVSCORE	1.63	2.00	0.48

Table 2, panel B presents the mean, median and standard deviations of insider trading profits of various executives, trading behavior, information environment, and control environment variables over all sample years. The insider trading variables include trading profits from purchases and sales made by all sample CEOs and non-CEO senior executives. Trading profits is equal to α (- α) for purchases (sales) 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: $(Ri - Rf) = \alpha + \beta 1\ (Rmkt - Rf) + \beta 2\ SMB + \beta 3\ HML + \beta 4\ UMD + e$. 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; *STRAT_TIMING* is the coefficient estimate of a CEO specific regression of 3-day abnormal returns centered on a firm's earnings announcement on whether the CEO was a net purchaser, did not trade, or net seller of his firm's shares in the 90 days preceding the earnings announcement; *Frequency* is the number of purchases or sales the CEO as an individual or non-CEO senior executives collectively engages in per year; *Size* is the number of shares an individual purchases per trade; *FOG* is the Fog index obtained from the data provided by Li (2008) and is calculated from firms' annual reports as (words per sentence + percent of complex words) * 0.4; *BAS* is the adverse selection component of the bid-ask spread scaled by price, estimated using the model in Glosten and Harris (1988); *LOW_DIR_SHARES* is the median negative value of stock-based compensation of the independent directors measured as -1 x the total number of shares owned by independent directors as a percentage of total shares outstanding of the firm for the year; *SOCIAL* is a dummy variable that equals 1 if the CEO is socially connected with any of his/her independent board members via mutual alma maters, military, clubs and social organizations and prior employment for the year; *GOVSCORE* is the overall governance score for the year developed by GMI (ranging from 1 to 5 with higher scores denoting poorer governance) which incorporates various accounting and governance information. ***, **, and * denote statistical significance at the .01, .05, and .10 levels respectively and are only provided for trading profits.

Table 3: Propensity Analysis
Panel A: Intra-Firm Analysis - Executive Type and Insider Trading Profits

$$TRADING\_PROFIT_{i,t} = \beta 0 + \beta 1\ EXEC\_TYPE_i + \beta 2\ CEO_i + \beta 3\ EXEC\_TYPE_i * CEO_i + \varepsilon_{i,t}$$

	PURCHASES	SALES	PURCHASES	SALES
	COEF.	COEF.	COEF.	COEF.
	(T)	(T)	(T)	(T)
INTERCEPT	0.023***	0.024	0.028***	0.019
	(3.31)	(1.22)	(3.27)	(1.50)
RECORD	0.037**	0.010		
	(2.25)	(0.82)		
UNFRUGAL			0.040**	0.011
			(2.44)	(1.03)
CEO	0.008	0.008	0.011	0.009
	(1.39)	(1.14)	(1.55)	(1.08)
*CEO * RECORD*	0.010	0.004		
	(1.42)	(0.52)		
*CEO * UNFRUGAL*			0.012	0.004
			(1.31)	(0.83)
T-statistics:				
*RECORD + CEO * RECORD*	2.47**	0.92		
*UNFRUGAL + CEO * UNFRUGAL*			2.54**	1.21
FIRM FIXED EFFECTS	YES	YES	YES	YES
ADJUSTED R2	0.47	0.21	0.49	0.19
NO. OF OBSERVATIONS	419	3,496	688	5,323

Table 3, panel A presents the results of intra-firm regressions of executive type and trading profits for a subsample of CEOs and non-CEO senior executives. *TRADING_PROFIT* is equal to α (-α) for purchases (sales) 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; *RECORD* is a dummy variable that equals 1 if the executive was convicted of any legal infractions, 0 otherwise; *UNFRUGAL* is a dummy variable that equals 1 if the executive owns a boat >25 feet, a car worth more than $75,000, a primary residence worth more than twice the average of median home prices in the zip codes within fifteen miles of his corporate headquarters, or additional homes worth more than twice the average home price in the corresponding metropolitan area, 0 otherwise; *CEO* is a dummy variable that equals 1 if the executive is a CEO, and equals 0 otherwise. T-statistics are based on standard errors clustered by firm and transaction date. ***, **, * denote statistical significance at the 1, 5, and 10% levels respectively.

Table 3, Panel B: Years to Reveal Unfrugal Executive Type and Insider Trading Profits

$$TRADING\_PROFIT_{i,t} = \beta 0 + \beta 1\ TIME\_TO\_UNFRUGAL_i + \beta 2\ CEO_i + \beta 3\ TIME\_TO\_UNFRUGAL_i * CEO_i + \varepsilon_{i,t}$$

	PURCHASES	PURCHASES
	COEF. (T)	COEF. (T)
INTERCEPT	0.061***	0.05
	(2.80)	(1.48)
TIME_TO_UNFRUGAL	-0.003**	-0.002**
	(-2.24)	(-2.02)
CEO	0.011**	0.016**
	(2.35)	(2.19)
*TIME_TO_UNFRUGAL * CEO*	-0.000	-0.000
	(-1.04)	(-0.83)
FIRM FIXED EFFECTS	NO	YES
ADJUSTED R2	0.29	0.65
NO. OF OBSERVATIONS	1,724	343

Table 3, panel B presents the results of the analysis of the time it takes for an executive to reveal his type as unfrugal and his trading profits. *TRADING_PROFIT* is equal to α for 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; *TIME_TO_UNFRUGAL* is the number of years an individual was a senior executive before he purchases a luxury asset that classifies him as unfrugal; *CEO* is a dummy variable that equals 1 if the executive is a CEO, and equals 0 otherwise. T-statistics are based on standard errors clustered by firm and transaction date. ***, **, * denote statistical significance at the 1, 5, and 10% levels respectively.

Table 3, Panel C: Real Time Classification of CEO Type

	DESCRIPTIVE STATISTICS				
	Mean	*Std Dev*	*25th Percentile*	*50th Percentile*	*75th Percentile*
YEARS TO RECORD	10.44	8.42	4.00	10.00	14.00
YEARS TO UNFRUGAL	8.06	6.31	3.00	8.00	12.00

$$TRADING\_PROFIT_{i,t} = \beta 0 + \beta 1\ CEO\ RECORD_{i,t} + \varepsilon_{i,t}$$

	REQUIRED NUMBER OF YEARS IN TENURE									
	1	2	3	4	5	6	7	8	9	10
INTERCEPT	0.039**	0.038***	0.038**	0.036**	0.031**	0.029**	0.028**	0.026**	0.026**	0.024**
	(2.56)	(2.60)	(2.51)	(2.47)	(2.42)	(2.30)	(2.33)	(2.29)	(2.26)	(2.18)
CEO RECORD	0.011	0.014	0.016	0.017	0.021	0.024*	0.028*	0.030**	0.033**	0.038**
	(1.29)	(1.34)	(1.42)	(1.50)	(1.59)	(1.65)	(1.99)	(2.09)	(2.32)	(2.40)
ADJ. R2	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.03	0.05	0.05
NO. OF OBS.	2,978	2,873	2,829	2,769	2,561	2,471	2,382	2,293	2,114	1,965

$$TRADING\_PROFIT_{i,t} = \beta 0 + \beta 1\ CEO\ UNFRUGAL_{i,t} + \varepsilon_{i,t}$$

	REQUIRED NUMBER OF YEARS IN TENURE									
	1	2	3	4	5	6	7	8	9	10
INTERCEPT	0.031**	0.031**	0.026**	0.027**	0.027**	0.025**	0.024**	0.022**	0.022**	0.021**
	(2.47)	(2.46)	(2.42)	(2.40)	(2.35)	(2.37)	(2.31)	(2.29)	(2.21)	(2.23)
CEO UNFRUGAL	0.016	0.020	0.023*	0.025*	0.030**	0.031**	0.035**	0.037**	0.040***	0.044***
	(1.54)	(1.64)	(1.66)	(1.75)	(2.11)	(2.22)	(2.37)	(2.44)	(2.57)	(2.69)
ADJ. R2	0.01	0.01	0.01	0.01	0.02	0.02	0.03	0.04	0.06	0.07
NO. OF OBS.	2,978	2,873	2,829	2,769	2,561	2,471	2,382	2,293	2,114	1,965

Panel C presents the summary statistics of the number of years it takes to reveal the type of an executive and the results of models that examine the relation between trading profits and executive type, where executive type is measured in real time, i.e., based only on their *prior* purchase of assets or *prior* criminal records. We estimate several versions of these models where we vary the cutoff (from 1 to 10) for the number of years required for the CEO's tenure, and include only the CEO's trades after that cutoff. *TRADING_PROFIT* is equal to α for 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: $(Ri - Rf) = \alpha + \beta 1\ (Rmkt - Rf) + \beta 2\ SMB + \beta 3\ HML + \beta 4\ UMD + e$. 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; *CEO RECORD* is a dummy variable that equals 1 if the CEO was convicted of any legal infractions as of the year of the measurement of trading profits, 0 otherwise; *CEO UNFRUGAL* is a dummy variable that equals 1 if as of the year of the measurement of trading profits a CEO owns a boat >25 feet, a car worth more than $75,000, a primary residence worth more than twice the average of median home prices in the zip codes within fifteen miles of his corporate headquarters, or additional homes worth more than twice the average home price in the corresponding metropolitan area, 0 otherwise. T-statistics appear in parentheses and are based on standard errors clustered by firm and transaction date. ***, **, * denote statistical significance at the 1, 5, and 10% levels respectively.

Table 4: Strategic Timing Analysis

$$ANN\_CRET_{i,q} = \beta 0 + \beta 1\ EXEC\ \ TYPE_i + \beta 2\ TRADE\_BEHAV_{i,q} + \beta 3 TRADE\_BEHAV_{i,q} * EXEC\ \ TYPE_i + \varepsilon_{i,q}$$

	CEOS		*SENIOR EXECUTIVES*	
	COEF. (T)	COEF. (T)	COEF. (T)	COEF. (T)
INTERCEPT	0.308**	0.288**	0.294**	0.276**
	(2.46)	(2.36)	(2.24)	(2.27)
RECORD	-0.015		-0.002	
	(-0.25)		(-0.13)	
UNFRUGAL		0.062		0.027
		(0.72)		(0.55)
TRADE_BEHAV	0.201	0.160	0.181	0.122
	(1.52)	(1.41)	(1.35)	(1.06)
TRADE_BEHAV × RECORD	0.322**		0.235**	
	(2.35)		(2.07)	
TRADE_BEHAV × UNFRUGAL		0.322**		0.208*
		(2.35)		(1.97)
T-statistics: *TRADE_BEHAV + TRADE_BEHAV * EXEC TYPE ≠ 0*	2.61**	2.31**	2.19**	2.00**
F-statistics: *TRADE_BEHAV * CEO TYPE > TRADE_BEHAV * SENIOR EXEC TYPE*	1.21	1.42		
ADJUSTED R2	0.04	0.04	0.05	0.05
NO. OF OBSERVATIONS	7,840	7,840	1,844	1,844

Table 4 presents the results of the strategic timing analysis which examines whether recordholder and unfrugal CEOs' and non-CEO senior executives' trading behaviors are consistent with their taking advantage of the news in earnings surprises. *ANN_CRET* is the 3-day market adjusted buy and hold return centered on an earnings announcement for the quarter; *RECORD* is a dummy variable that equals 1 if the CEO or senior executive was convicted of any legal infractions, 0 otherwise; *UNFRUGAL* is a dummy variable that equals 1 if the CEO or senior executive owns a boat >25 feet, a car worth more than $75,000, a primary residence worth more than twice the average of median home prices in the zip codes within fifteen miles of his corporate headquarters, or additional homes worth more than twice the average home price in the corresponding metropolitan area, 0 otherwise; *TRADE_BEHAV* is equal to 1 if the executive was a net purchaser of shares in the 90 days prior to the earnings announcement, 0 if the executive did not trade or had no net trades in the 90 days prior to the earnings announcement, and -1 if the executive was a net seller in the 90 days prior to the earnings announcement. T-statistics appear in parentheses and are based on standard errors clustered by firm and quarter. ***, **, * denote statistical significance at the 1, 5, and 10% levels respectively.

Table 5: Bankruptcy Analysis
Panel A: Net Share Purchases by CEOs before Bankruptcy

	Time Before Bankruptcy			
	12 months	*24 months*	*36 months*	*24 months before bankruptcy – 24 through 48 months before bankruptcy*
FRUGAL CEOS	-5,555	4,828	-16,542	82,422
UNFRUGAL CEOS	-74,859	-183,526	-257,107	-82,571
T-statistics:	1.60	2.10**	2.00**	2.08**

Table 5, panel A presents the number of net share purchases by frugal and unfrugal CEOs in various periods prior to bankruptcy. A CEO is designated as *UNFRUGAL* if he or she owns a boat >25 feet, a car worth more than $75,000, a primary residence worth more than twice the average of median home prices in the zip codes within fifteen miles of his corporate headquarters, or additional homes worth more than twice the average home price in the corresponding metropolitan area; otherwise the CEO is designated as *FRUGAL*. T-statistics of the differences are presented as well. ***, **, * denote statistical significance at the 1, 5, and 10% levels respectively.

Panel B: Abnormal Profits of CEOs from Open Market Sales before Bankruptcy

$$TRADING\_PROFIT_{i,t} = \beta 0 + \beta 1\ UNFRUGAL_i + \varepsilon_{i,t}$$

	Sales within:			
	12 months of Bankruptcy	*24 months of Bankruptcy*	*36 months of Bankruptcy*	*All Sales during a CEO's Tenure*
	COEF. (T)	COEF. (T)	COEF. (T)	COEF. (T)
INTERCEPT	0.002	-0.001	-0.001	0.000
	(1.15)	(-0.27)	(-0.28)	(0.13)
UNFRUGAL	0.008***	0.011***	0.006**	0.003
	(6.32)	(3.91)	(2.41)	(1.58)
ADJUSTED R2	0.17	0.25	0.13	0.04
NO. OF OBSERVATIONS	84	275	490	1,454

Table 5, panel B presents the results of the analysis of abnormal profits from open market sales by CEOs of bankrupt firms. *TRADING_PROFIT* is equal to -α for sales 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: $(Ri - Rf) = \alpha + \beta 1\ (Rmkt - Rf) + \beta 2\ SMB + \beta 3\ HML + \beta 4\ UMD + e$. 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; *UNFRUGAL* is a dummy variable that equals 1 if the executive owns a boat >25 feet, a car worth more than $75,000, a primary residence worth more than twice the average of median home prices in the zip codes within fifteen miles of his corporate headquarters, or additional homes worth more than twice the average home price in the corresponding metropolitan area, 0 otherwise. T-statistics appear in parentheses and are based on standard errors clustered by executive. ***, **, * denote statistical significance at the 1, 5, and 10% levels respectively.

Table 6: Executive Propensity, Opportunity and Insider Trading Profitability
Panel A: CEO Trading Profits and the Information Environment

$$TRADING\_PROFIT_{i,t} = \beta 0 + \beta 1\ INFORMATION_{i,t} + \beta 2\ CEO\ TYPE_i + \beta 3\ CEO\ TYPE_i * INFORMATION_{i,t} + \varepsilon_{i,t}$$

	INFORMATION ENVIRONMENT VARIABLE					
	FOG			BAS		
	COEF. (T)	COEF. (T)	COEF. (T)	COEF. (T)	COEF. (T)	COEF. (T)
INTERCEPT	0.266**	0.014*	0.013*	0.259**	0.016**	0.011*
	(2.13)	(1.72)	(1.77)	(2.46)	(2.06)	(1.80)
INFORMATION	0.007	0.005	0.003	0.008*	0.006	0.005
	(1.59)	(1.48)	(1.44)	(1.66)	(1.41)	(1.53)
CEO RECORD		0.022**			0.017**	
		(2.31)			(2.02)	
CEO UNFRUGAL			0.036**			0.033**
			(2.24)			(2.50)
CEO RECORD × *INFORMATION*		0.004			0.004*	
		(0.72)			(1.92)	
CEO UNFRUGAL × *INFORMATION*			0.005**			0.006**
			(2.07)			(2.05)
T-statistics: *INFORMATION* + *CEO TYPE* * *INFORMATION*		1.57	2.46**		2.05**	2.98**
ADJUSTED R2	0.01	0.03	0.04	0.01	0.04	0.05
NO. OF OBSERVATIONS	2,162	2,162	2,162	1,801	1,801	1,801

Table 6, Panel B: CEO Trading Profits and the Control Environment

$$TRADING\_PROFIT_{i,t} = \beta 0 + \beta 1\ CONTROL\ ENV_{i,t} + \beta 2\ CEO\ TYPE_i + \beta 3\ CEO\ TYPE_i * CONTROL\ ENV_{i,t} + \varepsilon_{i,t}$$

	CONTROL ENVIRONMENT VARIABLE								
	LOW_DIR_SHARES			SOCIAL			GOVSCORE		
	COEF. (T)	COEF. (T)	COEF. (T)	COEF. (T)	COEF. (T)	COEF. (T)	COEF. (T)	COEF. (T)	COEF. (T)
INTERCEPT	0.028**	0.020*	0.016*	0.038**	0.021*	0.022*	0.027**	0.019	0.015*
	(2.13)	(1.94)	(1.95)	(2.37)	(1.88)	(1.96)	(2.24)	(1.57)	(1.72)
CONTROL ENV	0.002	0.002	-0.001	0.010	0.007	-0.004*	0.012	-0.001	-0.001
	(1.04)	(1.11)	(-0.38)	(0.56)	(0.48)	(-1.85)	(1.07)	(-0.14)	(-0.10)
CEO RECORD		0.021**			0.033**			0.024**	
		(2.35)			(2.12)			(2.24)	
CEO UNFRUGAL			0.028**			0.031**			0.032**
			(2.15)			(2.27)			(2.31)
CEO RECORD × CONTROL ENV		0.003**			0.002			0.028**	
		(2.07)			(0.84)			(2.01)	
CEO UNFRUGAL × CONTROL ENV			0.005**			0.021**			0.023**
			(2.43)			(2.75)			(2.48)
T-statistics: *CONTROL ENV + CEO TYPE * CONTROL ENV*		2.74**	2.15**		1.08	2.16**		1.81*	2.24**
ADJUSTED R2	0.01	0.03	0.05	0.01	0.01	0.02	0.01	0.02	0.03
NO. OF OBSERVATIONS	1,135	1,135	1,135	1,608	1,608	1,608	1,304	1,304	1,304

Table 6 (Cont.)

Table 6 presents the results of models that examine the relation between CEOs' trading profits from purchases as a function of variables representing aspects of the information and control environment and the type of the executive. Panel A considers proxies for the information environment (*FOG*, *BAS*) and Panel B considers proxies for the governance / control environment of the firm (*SOCIAL*, *LOW_DIR_SHARES*, *GOVSCORE*). *TRADING_PROFIT* is equal to α for 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: $(Ri - Rf) = \alpha + \beta 1\ (Rmkt - Rf) + \beta 2\ SMB + \beta 3\ HML + \beta 4\ UMD + e$. 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; *CEO RECORD* is a dummy variable that equals 1 if the CEO was convicted of any legal infractions, 0 otherwise; *CEO UNFRUGAL* is a dummy variable that equals 1 if the CEO owns a boat >25 feet, a car worth more than $75,000, a primary residence worth more than twice the average of median home prices in the zip codes within fifteen miles of his corporate headquarters, or additional homes worth more than twice the average home price in the corresponding metropolitan area, 0 otherwise; *FOG* is the Fog index obtained from the data provided by Li (2008) and is calculated from firms' annual reports as (words per sentence + percent of complex words) * 0.4; *BAS* is the adverse selection component of the bid-ask spread scaled by price, estimated using the model in Glosten and Harris (1988); *LOW_DIR_SHARES* is the median negative value of the shareholdings of the independent directors measured as -1 x the total number of shares owned by independent directors as a percentage of total shares outstanding of the firm for the year; *SOCIAL* is a dummy variable that equals 1 if the CEO is socially connected with any of his independent board members via mutual alma maters, military, clubs and social organizations and prior employment for the year; *GOVSCORE* is the overall governance score for the year developed by GMI (ranging from 1 to 5 with higher scores denoting poorer governance) which incorporates various accounting and governance information. T-statistics appear in parentheses and are based on standard errors clustered by firm and transaction date. ***, **, * denote statistical significance at the 1, 5, and 10% levels respectively.

Table 7: Executive Propensity, Opportunity and the Timing of Insider Trades
Panel A: CEO Strategic Timing with Respect to the Decision to Trade and the Information Environment

$$STRAT\_TIMING_i = \beta 0 + \beta 1\ INFORMATION_{i,t} + \beta 2\ CEO\ TYPE_i + \beta 3\ INFORMATION_{i,t} * CEO\ TYPE_i + \varepsilon_{i,t}$$

	INFORMATION ENVIRONMENT VARIABLE					
	FOG			BAS		
	COEF. (T)	COEF. (T)	COEF. (T)	COEF. (T)	COEF. (T)	COEF. (T)
INTERCEPT	-0.251	-0.489	-1.735	1.242***	1.134**	2.669***
	(-0.77)	(-0.14)	(-0.37)	(4.13)	(2.44)	(3.93)
INFORMATION	0.252	0.290	0.132	0.866	-0.472	-2.150**
	(0.44)	(0.46)	(0.55)	(0.83)	(-0.24)	(-2.09)
CEO RECORD		4.730**			0.276**	
		(2.09)			(2.14)	
CEO UNFRUGAL			0.458**			0.070*
			(2.00)			(1.64)
CEO RECORD × INFORMATION		-0.140			1.583	
		(-1.48)			(0.25)	
CEO UNFRUGAL × INFORMATION			0.093*			6.246***
			(1.78)			(2.86)
T-statistics: *INFORMATION + CEO TYPE * INFORMATION*		0.23	1.80*		0.42	2.14**
ADJUSTED R2	0.01	0.01	0.01	0.01	0.01	0.01
NO. OF OBSERVATIONS	894	894	894	757	757	757

Table 7, Panel B: CEO Strategic Timing with Respect to the Decision to Trade and the Control Environment

$$STRAT\_TIMING_i = \beta 0 + \beta 1\ CONTROL\ ENV_{i,t} + \beta 2\ CEO\ TYPE_i + \beta 3\ CONTROL\ ENV_{i,t} * CEO\ TYPE_i + \varepsilon_{i,t}$$

	CONTROL ENVIRONMENT VARIABLE								
	LOW_DIR_SHARES			SOCIAL			GOVSCORE		
	COEF. (T)	COEF. (T)	COEF. (T)	COEF. (T)	COEF. (T)	COEF. (T)	COEF. (T)	COEF. (T)	COEF. (T)
INTERCEPT	1.214***	1.241***	0.714**	0.942***	0.962***	0.611	0.840	1.122	0.552
	(5.08)	(4.76)	(2.29)	(3.22)	(3.03)	(1.52)	(0.67)	(0.82)	(0.30)
CONTROL ENV	0.001	0.001	0.001	1.152	1.474	4.339	0.157	-0.172	0.176
	(1.56)	(1.83)	(1.21)	(0.59)	(0.68)	(1.43)	(0.43)	(-0.21)	(0.96)
CEO RECORD		0.189**			3.282**			0.542**	
		(1.97)			(2.17)			(2.16)	
CEO UNFRUGAL			0.343**			3.655**			0.329**
			(2.26)			(2.48)			(2.01)
CEO RECORD × *CONTROL ENV*		0.01			-1.646			0.189	
		(0.23)			(-0.31)			(0.57)	
CEO UNFRUGAL × *CONTROL ENV*			0.001			-2.223			0.27**
			(0.21)			(-1.29)			(2.04)
T-statistics: *CONTROL ENV + CEO TYPE * CONTROL ENV*		-1.56	-0.98		-0.11	0.47		0.15	2.08**
ADJUSTED R2	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
NO. OF OBSERVATIONS	640	640	640	501	501	501	744	744	744

Table 7, Panel C: CEO Strategic Timing with Respect to Purchase and Sale Transactions and the Control Environment

$$STRAT\_TIMING^{*}i = \beta 0 + \beta 1\ CONTROL\ ENVi,t + \beta 2\ CEO\ TYPEi + \beta 3\ CONTROL\ ENVi,t * CEO\ TYPEi + \varepsilon i,t$$

	CONTROL ENVIRONMENT VARIABLE								
	LOW_DIR_SHARES			SOCIAL			GOVSCORE		
	COEF. (T)	COEF. (T)	COEF. (T)	COEF. (T)	COEF. (T)	COEF. (T)	COEF. (T)	COEF. (T)	COEF. (T)
INTERCEPT	1.115***	1.206***	0.837**	0.951**	0.934***	0.662	0.782	1.035	0.686
	(3.98)	(4.15)	(2.18)	(3.14)	(2.75)	(1.60)	(0.74)	(0.90)	(0.55)
CONTROL ENV	-0.001	-0.001	-0.001	0.501	0.602	-0.404	0.188	0.142	0.105
	(-1.42)	(-1.51)	(-1.21)	(0.64)	(0.78)	(-1.03)	(0.79)	(0.83)	(0.53)
CEO RECORD		0.205**			2.884**			0.737**	
		(2.04)			(2.25)			(2.25)	
CEO UNFRUGAL			0.38**			2.636**			0.596**
			(2.17)			(2.31)			(2.18)
CEO RECORD × CONTROL ENV		0.003			-0.305			0.308	
		(0.56)			(-0.16)			(1.02)	
CEO UNFRUGAL × CONTROL ENV			0.01*			1.006***			0.317**
			(1.94)			(2.85)			(2.21)
T-statistics: *CONTROL ENV + CEO TYPE * CONTROL ENV*		0.36	1.72*		0.18	2.01**		0.25	2.29**
ADJUSTED R2	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
NO. OF OBSERVATIONS	441	441	441	330	330	330	544	544	544

Table 7 (Cont.)

Table 7 presents the results of models that examine the relation between CEOs' strategic timing of trades with respect to the decision to trade or not (Panels A and B) and with respect to purchase and sale transactions only (Panel C) as a function of variables representing aspects of the information and control environment and CEO type. Panel A considers proxies for the information environment (*FOG*, *BAS*) and Panels B and C consider proxies for the governance / control environment of the firm (*SOCIAL*, *LOW_DIR_SHARES*, *GOVSCORE*). The dependent variable is defined as follows. In Panels A and B: *STRAT_TIMING* equals the coefficient β obtained from estimating the following model for each CEO over all quarters during his or her tenure: $ANN\_CRET = \alpha + \beta\ TRADE\_BEHAV + e$. In this model, *ANN_CRET* is the 3-day market adjusted buy and hold return centered on an earnings announcement for the quarter, and *TRADE_BEHAV* equals 1 in quarters when the CEO was a net purchaser of shares in the 90 days prior to the earnings announcement, equals 0 if the CEO did not trade or had zero net trades in the 90 days prior to the earnings announcement, and equals -1 if the CEO was a net seller of shares in the 90 days prior to the earnings announcement; In Panel C: *STRAT_TIMING** is estimated as defined above, but we modify *TRADE_BEHAV** to equal 1 in quarters when the CEO was a net purchaser of shares in the 90 days prior to the earnings announcement, to equal 0 if the CEO was a net seller of shares in the 90 days prior to the earnings announcement, excluding quarters with no net purchases or sales by the executive. The independent variables are defined as follows: *CEO RECORD* is a dummy variable that equals 1 if a CEO was convicted of any legal infractions, 0 otherwise; *CEO UNFRUGAL* is a dummy variable that equals 1 if a CEO owns a boat >25 feet, a car worth more than $75,000, a primary residence worth more than twice the average of median home prices in the zip codes within fifteen miles of his corporate headquarters, or additional homes worth more than twice the average home price in the corresponding metropolitan area, 0 otherwise; *FOG* is the Fog index obtained from the data provided by Li (2008) and is calculated from firms' annual reports as (words per sentence + percent of complex words) * 0.4; *BAS* is the adverse selection component of the bid-ask spread scaled by price, estimated using the model in Glosten and Harris (1988); *LOW_DIR_SHARES* is the median negative value of the shareholdings of the independent directors measured as -1 x the total number of shares owned by independent directors as a percentage of total shares outstanding of the firm for the year; *SOCIAL* is a dummy variable that equals 1 if the CEO is socially connected with any of his independent board members via mutual alma maters, military, clubs and social organizations and prior employment for the year; *GOVSCORE* is the overall governance score for the year developed by GMI (ranging from 1 to 5 with higher scores denoting poorer governance) which incorporates various accounting and governance information. T-statistics appear in parentheses. ***, **, * denote statistical significance at the 1, 5, and 10% levels respectively.

Table 8, Panel A: CEO Type and Executives' Trading Profits

$$TRADING\_PROFIT_{i,t} = \beta 0 + \beta 1\ CEO\ RECORD_i + \beta 2\ CEO\ UNFRUGAL_i + \beta 3\ FRAUD_i + \beta 4\ ERROR_i + \beta 5\ BANKRUPT_i + \varepsilon_{i,t}$$

	NON-CEO SENIOR EXECUTIVE TRADES	
	PURCHASE TRADES	SALE TRADES
	COEF. (T)	COEF. (T)
INTERCEPT	0.025***	-0.006
	(2.84)	(-1.07)
CEO RECORD	0.016	0.002
	(0.67)	(0.10)
CEO UNFRUGAL	0.027**	0.027
	(2.55)	(1.33)
FRAUD	0.021	-0.010
	(0.86)	(-0.41)
ERROR	0.025	-0.017
	(1.15)	(-1.45)
BANKRUPT	0.001	0.004
	(0.15)	(0.37)
ADJUSTED R2	0.01	0.01
NO. OF OBSERVATIONS	2,666	13,402

Table 8, Panel A presents the results for the relation between CEO type and the profitability of non-CEO senior executives' purchases and sales transactions. *TRADING_PROFIT* equal to α (-α) for purchases (sales) made by non-CEO senior 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; *CEO RECORD* is a dummy variable that equals 1 if a CEO was convicted of any legal infractions, 0 otherwise; *CEO UNFRUGAL* is a dummy variable that equals 1 if a CEO owns a boat >25 feet, a car worth more than $75,000, a primary residence worth more than twice the average of median home prices in the zip codes within fifteen miles of his corporate headquarters, or additional homes worth more than twice the average home price in the corresponding metropolitan area, 0 otherwise; *FRAUD* is a dummy variable that equals 1 if the firm was involved in accounting fraud over the tenure of the CEO, and 0 otherwise; *ERROR* is a dummy variable that equals 1 if the firm was involved in reporting material clerical errors in reported numbers over the tenure of the CEO, and 0 otherwise; *BANKRUPT* is a dummy variable that equals 1 if the firm filed for bankruptcy over the tenure of the CEO (or within a year of the CEO being in office), and 0 otherwise. T-statistics appear in parentheses and are based on standard errors clustered by firm and transaction date. ***, **, * denote statistical significance at the 1, 5, and 10% levels respectively.

Table 8, Panel B: Non-CEO Senior Executive Trading Profits and Change in CEO Type

$$TRADING\_PROFIT_{i,t} = \beta 0 + \beta 1\ NEW\ CEO\_UNFRUGAL_i + \beta 2\ TRADE\_NEW\ CEO_{i,t} + \beta 3\ CHANGE\_CEO\ TYPE_i + \beta 4\ NEW\ CEO\_UNFRUGAL_i * TRADE\_NEW\ CEO_{i,t} + \beta 5\ NEW\ CEO\_UNFRUGAL_i * CHANGE\_CEO\ TYPE_i + \beta 6\ TRADE\_NEW\ CEO_{i,t} * CHANGE\_CEO\ TYPE_i + \beta 7\ NEW\ CEO\_UNFRUGAL_i * TRADE\_NEW\ CEO_{i,t} * CHANGE\_CEO\ TYPE_i + \varepsilon_{i,t}$$

	COEF. *(T)*
INTERCEPT	0.002
	(0.37)
NEW CEO_UNFRUGAL	0.014**
	(2.40)
TRADE_NEW CEO	0.002
	(0.51)
CHANGE_CEO TYPE	0.008*
	(1.82)
NEW CEO_UNFRUGAL × TRADE_NEW CEO	0.004**
	(2.04)
NEW CEO_UNFRUGAL × CHANGE_CEO TYPE	-0.005
	(-1.60)
TRADE_NEW CEO × CHANGE_CEO TYPE	-0.003*
	(-1.77)
NEW CEO_UNFRUGAL × TRADE_NEW CEO × CHANGE_CEO TYPE	0.006***
	(2.63)
ADJUSTED R2	0.45
NO. OF OBSERVATIONS	284

Analysis of Predecessor-Successor Changes: Estimated Slopes

PREDECESSOR		*SUCCESSOR*		*CHANGE* *Coef.*	*(t-Stat)*
Unfrugal (β0+β1)	0.016	Unfrugal (β0+β1+β2+β4)	0.022	0.006**	(2.29)
Frugal (β0)	0.002	Frugal (β0+β2)	0.004	0.002	(0.51)
Unfrugal (β0+β3)	0.010	Frugal (β0+β2+β3+β6)	0.009	-0.001	(-1.01)
Frugal (β0+β1+β3+β5)	0.019	Unfrugal (β0+β1+β2+β3+β4+β5+β6+β7)	0.028	0.009***	(2.73)

Table 8, Panel B presents the results of the model that examines the relation between non-CEO senior executives' trading profits from purchases and a change in CEO type resulting from a new CEO being hired on the death of the incumbent CEO. A CEO is classified as unfrugal he/she owns a boat >25 feet, a car worth more than $75,000, a primary residence worth more than twice the average of median home prices in the zip codes within fifteen miles of his corporate headquarters, or additional homes worth more than twice the average home price in the corresponding metropolitan area. *TRADING_PROFIT* equal to α for 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: $(Ri - Rf) = \alpha + \beta 1\ (Rmkt - Rf) + \beta 2\ SMB + \beta 3\ HML + \beta 4\ UMD + e$. 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; *NEW CEO_UNFRUGAL* is a dummy variable that equals 1 if the new CEO hired is unfrugal, and 0 otherwise; *TRADE_NEW CEO* is a dummy variable that equal 1 if a trade took place once the new CEO was in office, and 0 otherwise; *CHANGE_CEO TYPE* is a dummy variable that equals 1 if there was a change in type from the incumbent CEO to the new CEO, and 0 otherwise. T-statistics appear in parentheses and are based on standard errors clustered by firm and transaction date. ***, **, * denote statistical significance at the 1, 5, and 10% levels respectively.

Appendix

Definition of Variables and Data Sources

Variable	Measurement	Data Source
Trading profits from purchases or sales made by an insider who file Form 16. (*TRADING_PROFIT*)	Equals α (- α) for purchases (sales) 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.	Thomson Reuters, CRSP and Fama-French data
Frequency of trades made by an executive. (*FREQUENCY*)	The number of purchase transactions an executive has in a year.	Thomson Reuters
Trading behavior of an executive. (*TRADE_BEHAV*)	This variable is set equal to 1 in quarters when an executive was a net purchaser of shares in the 90 days prior to the earnings announcement, 0 when an executive did not trade at all or had zero net trades in the 90 days prior to the earnings announcement, -1 if an executive was a net seller of shares in the 90 days prior to the earnings announcement. A modified version of *TRADE_BEHAV*, *TRADE_BEHAV**, is set equal to 1 in quarters when an executive was a net purchaser of shares in the 90 days prior to the earnings announcement, and 0 when an executive was a net seller of shares in the 90 days prior to the earnings announcement. (excludes quarters with no net purchases or sales.)	Thomson Reuters
Strategic timing of insider trades by an executive. (*STRAT_TIMING*)	Equals the coefficient β1 obtained from estimating the following model for each executive using all quarters over his or her tenure: *ANN_CRET* = α + β1 *TRADE_BEHAV* + e. In this model, *ANN_CRET* is the 3-day market adjusted buy and hold return centered around an earnings announcement for the quarter, and *TRADE_BEHAV* is described above. The coefficient β1 measures the degree to which an executive strategically times his purchases and sales or decision to not trade to maximize his or her financial gain. *STRAT_TIMING** equals the coefficient β1 obtained from estimating the following model for each executive using all quarters over his or her tenure: *ANN_CRET* = α + β1 *TRADE_BEHAV** + e. In this model, *ANN_CRET* is the 3-day market adjusted buy and hold return centered on an earnings announcement for the quarter, and *TRADE_BEHAV** is described above. The coefficient β1 measures the degree to which an executive strategically times his purchases and sales.	Thomson Reuters and CRSP

Appendix (Cont.)

Variable	Measurement	Data Source
The opacity of financial reports. (*FOG*)	The Fog index is calculated from firms' annual reports as (words per sentence + percent of complex words) * 0.4.	Data shared by Li (2008)
Information asymmetry. (*BAS*)	The adverse selection component of the bid-ask spread estimated using the model in Glosten and Harris (1988), where we conduct the following firm-specific regressions estimated from 1/1 in the current year through 3/31 of the following year: Change in price = α + β1 (Tic) + β2 (Tic*Size) + β3 (Change Tic) + β4 (Change Tic * Size) + e. Change in price is difference between current and previous trade; Tic equals 1 (-1) if the current price is greater than (less than) the previous price; Size is number of shares; Change Tic equals 0 if Tic and lag Tic are equal, equals 1 if Tic is 1 and lag Tic is -1, and equals -1 if Tic is -1 and lag Tic is 1. BAS is then calculated as: 2(Tic+Tic*Size*average trade size for the firm) / [2(Tic+Tic*Size*average trade size for firm) + 2 (Change Tic + Change Tic * Size * average trade size for firm)]	TAQ
The stock-based compensation of a director. (*LOW_DIR_SHARES*)	The median negative value of stock-based compensation of the independent directors measured as -1 x the total number of shares owned by independent directors as a percentage of total shares outstanding of the firm for the year.	RiskMetrics, hand collected from SEC DEF 14A filings
Social connections between CEO and director. (*SOCIAL*)	A dummy variable that equals 1 if the CEO is socially connected to any of the independent directors on the board. Social connections between CEOs and directors include mutual alma maters, worked in the same company/ companies in the past, served in the military together, are currently members of the same clubs as the CEO, serve in the same charitable or belong to other non-professional organizations as the CEO.	BoardEx
Overall governance quality. (*GOVSCORE*)	The governance score for the year ranging from 1 to 5 with higher scores denoting poorer governance. This is developed by GMI by incorporating information on various accounting and governance information including incidences of accounting fraud, other regulatory violations, restatements, regulatory filings, stock information, financial statement data, earnings growth, CEO-chairman pairings, class action lawsuits, compensation ratios and officer changes.	Governance Metrics International (GMI)
Legal infractions of an executive (*RECORD*; *CEO RECORD*)	A dummy variable that equals 1 if an executive (a CEO or a non-CEO senior executive) has any legal infractions, and 0 otherwise. Legal infractions include driving under the influence of alcohol, other drug-related charges, domestic violence, reckless behavior, disturbing the peace and traffic violations (including speeding tickets).	Find Out the Truth.com (FOTT)

Appendix (Cont.)

Variable	Measurement	Data Source
Luxury asset ownership by an executive. (*UNFRUGAL*; *CEO UNFRUGAL*)	A dummy variable that equals 1 if an executive (a CEO or a non-CEO senior executive) owns any luxury assets, and 0 otherwise. Luxury assets include cars costing more than $75,000, boats greater than 25 feet in length and yachts, primary residences worth more than twice the average of the median home prices in the zip codes within fifteen miles of the corporate headquarters, and additional residences or vacation home worth twice the average home prices in that metropolitan area (as defined by the Core Based Statistical Area (CBSA)).	Find Out the Truth.com (FOTT)
Length of time required to acquire luxury asset. (*TIME_TO_UNFRUGAL*)	The number of years an individual was a senior executive before he/she purchases a luxury asset that classifies him/her as unfrugal	BoardEx
CEO indicator. (*CEO*)	A dummy variable that equals 1 if the executive is a CEO, and equals 0 otherwise.	BoardEx, ExecuComp and Thomson Reuters
Firm involved in accounting fraud. (*FRAUD*)	A dummy variable that equals 1 if the firm was involved in accounting fraud and had an AAER issued against it by the SEC over the tenure of the CEO.	SEC AAERs
Firm involved in accounting errors. (*ERROR*)	A dummy variable that equals 1 for the years a firm had a material clerical error in reported numbers and had to issue a restatement due to this error over the tenure of the CEO.	Audit Analytics
Firm involved in bankruptcy. (*BANKRUPT*)	A dummy variable that equals 1 for the years a firm declared bankruptcy over the tenure of the CEO (or within one year of the CEO's tenure in the firm).	Hand collected from proxy statements and news articles and press releases from Factiva.
Earnings announcement returns. (*ANN_CRET*)	The 3 day market adjusted buy and hold return centered on an earnings announcement for the quarter.	CRSP/ Compustat
Earnings Surprise. (*CH_EARN)*	The earnings surprise for the quarter from a seasonal random walk model of quarterly earnings scaled by total assets.	Compustat
Net trades made by an insider. (*NET_TRADES)*	The sum of standard open market purchase and sales transactions made by the insider (CEO, non-CEO senior executive or lesser officer) over the 90 days prior to an earnings announcement.	Thomson Reuters
Change in CEO type to unfrugal. (*NEW_CEO_UNFRUGAL*)	A dummy variable that equals 1 if the new CEO hired after the death of the predecessor CEO is unfrugal, and 0 otherwise.	Find Out The Truth.com (FOTT)
Trade under the regime of CEO. (*TRADE_NEW_CEO*)	A dummy variable that equals 1 if a trade took place once the new CEO was in office after the death of the predecessor CEO, and 0 otherwise.	Thomson Reuters.
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)
Wealth of an executive. (*WEALTH*)	The wealth of an executive is the sum of the following: the value of unexercised exercisable options + the value of unexercised unexercisable options + the value of restricted stock holdings + the value of long-term incentive plan (pension) + the profit from option exercises + the profit from open market trading activity of common stock + cash based compensation multiplied by the number of years the executives has worked as a senior executive.	ExecuComp, Thomson Reuters.