Executives' Legal Records, Lavish Lifestyles and Insider Trading Activities

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Abstract

We examine how and why the profitability of insider trading varies across firms and executives. The risk-adjusted stock returns following share purchases by unfrugal (i.e. materialistic) senior executives identified through their ownership of luxury goods, and by senior executives with a legal record, are significantly higher than the risk-adjusted returns following purchases by other senior executives of the same firms. Given our controls for fixed firm effects, we interpret this as support for the hypothesis that unfrugal and recordholder executives have a relatively high propensity to exploit inside information when they purchase shares, given the opportunity. The profitability of unfrugal executives' purchases increases significantly with opportunities to trade on inside information, as measured by all of our 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, and this difference increases over the tenure of the unfrugal CEO as the information and control environments become more conducive to trading on inside information. 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 unexpected transition from a frugal to unfrugal CEO relative to the behavior of trading profits upon other unexpected CEO transitions.

Keywords: Executive frugality, legal infractions, insider trading.

JEL Classification Codes: G30; G34; G38

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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, 1988; Lakonishok and Lee, 2001, among others). However, little research exists on the personal characteristics of executives associated with inside trading.[1]

We examine how and why the profitability of insiders' trades varies across individual senior executives and their firms. In principle, the profitability of executives' trades will depend on both 1) the *opportunity* to exploit inside information (i.e. the extent to which an executive possesses material value relevant inside information (hereafter "information environment") and the extent to which control systems fail to restrict trading on such information (hereafter "control environment")),[2] and 2) an executive's *propensity* to exploit inside information, given the opportunity.

We examine how the propensity to exploit inside information, as measured by the risk-adjusted stock returns following senior executives' trades, varies by executive "type", controlling for firm fixed effects to hold constant the opportunity to exploit inside information (i.e. the information and control environment). We measure an executive's type based on two aspects of his behavior outside the 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 non-recordholders to exploit inside information. We interpret the ownership of luxury goods, including

[1] Section 16(b) of the Securities and Exchange Act of 1934 provides guidance regarding purchases and sales of securities by firm officers and directors. Officers and directors are often referred to as "Section 16 insiders". We refer to these individuals as "insiders".

[2] 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.

expensive cars, homes, or yachts, as a symptom of relatively low "frugality" (i.e. high materialism) (Lastovicka, Bettencourt, Hughner and Kuntze, 1999), and posit that unfrugal (i.e. materialistic) executives have a higher propensity than frugal executives to exploit inside information for financial gain.

As predicted, the profitability of share purchases by recordholders and unfrugal executives is significantly higher than the profitability of purchases by other senior executives at the same firms. We interpret this as support for the hypothesis that recordholders and unfrugal executives have a relatively high personal propensity to exploit nonpublic information when they purchase shares in their firms. Further, the profitability of share purchases by those who acquire luxury goods sooner (vs. later) after their appointment as a senior executive is significantly higher (with and without fixed firm effects), suggesting that the propensity to exploit inside information is positively related to the speed of acquiring luxury goods upon assuming a senior-level executive position (interpreted as the intensity of materiality).

We examine how the profitability of executives' purchases varies with proxies for their firms' information and control environments as a function of the executive's type. We predict that a firm's information and control environments have a relatively strong relation to the profitability on trades of unfrugal (vs. frugal) executives given unfrugal executives' relatively high propensity to exploit inside information. As predicted, the profitability of purchases by unfrugal senior executives is significantly positively related to all of our proxies for information asymmetry (Fog index (Li, 2008) and the information asymmetry component of the stock's bid-ask spread) and weak controls (social connections between outside directors and the CEO, low outside director monitoring incentives, poor overall governance score), and these effects are significantly stronger than for frugal (i.e. low propensity) executives.

We predict that a firm's information environment also has a relatively strong relation to the profitability of trades of recordholders (vs. non-recordholders) given recordholders' relatively high propensity to exploit inside information. However, if legal records successfully identify executives with relatively low self-control and/or a low respect for rules and norms, it is not clear that a strong control environment would deter recordholders' insider trading activities. The results are more mixed than those

documented for the relation between profitability of frugal (vs. unfrugal) executives' purchases and firms' information and control environments.

We explore how the profitability of inside purchases by non-CEO senior executives, as well as the firm's underlying information and control environment, vary by CEO type and CEO tenure. 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. Further, these differences become more pronounced over the tenure of unfrugal CEOs as the information and control environments deteriorate. In light of the evidence in our companion paper, we predict that in firms run by unfrugal (vs. frugal) CEOs, the information and control environments are more conducive to profitable insider trading, and these differences intensify over the tenure of unfrugal CEOs. Given that Davidson et al. (2013) find little evidence of a weak or deteriorating culture during the reign of recordholder CEOs, we do not have strong priors about these effects. However, we examine these relations for completeness.

As predicted, our proxies for high information asymmetry and weak controls are significantly higher in firms run by unfrugal (vs. frugal) CEOs. And these proxies increase significantly over the tenure of unfrugal CEOs in an absolute sense and relative to frugal CEOs, suggesting an increase in the opportunities to trade on inside information under the reign of unfrugal CEOs. Consistent with this interpretation, the profitability of trades by CEOs and non-CEO senior executives is relatively high in firms run by unfrugal CEOs, and increases significantly over the tenure of unfrugal CEOs, particularly when accompanied by an increase in our proxies for information asymmetry and weak controls. To reduce endogeneity concerns, we 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 transitions, consistent with the hypothesized effect of CEO frugality on the profitability of trades by a firm's other senior executives.

In contrast, we do not find that the profitability of purchases by non-CEO senior executives differs in firms run by recordholder vs. non-recordholder CEOs, or that these profits vary over the tenure of recordholder CEOs. And we find relatively weak, mixed evidence of changes in the information and control environment during the tenure of recordholder CEOs.

In summary, we find that senior executives who have legal records or own luxury goods have a relatively high propensity to exploit inside information when they purchase shares in their firms, controlling for fixed firm effects. Further, while the profitability of purchases by unfrugal (vs. frugal) executives increases significantly with proxies for information asymmetry and weak corporate controls, the exploitation of inside information by recordholders appears less sensitive to the control environment. And finally, the information and control environment are more conducive to insider trading in firms run by unfrugal (vs. frugal) CEOs, and these differences become more pronounced over the tenure of unfrugal CEOs.

The analysis above does not speak to the predictive value of *prior* legal records or asset ownership for the profitability of *future* insider trades because we consider all asset purchases and legal infractions to identify unfrugal and recordholder executives, regardless of timing.[3] To provide practical insight pertaining to the real time use of data on legal records and asset ownership, we retest the relation between the profitability of insiders' purchases and executive type defined solely on the basis of *prior* asset purchases and legal records, varying the minimum *prior* tenure as a senior executive required for inclusion in the sample. The longer the prior tenure requirement, the more time each executive has to reveal his true type, but the fewer the executives included. The relation between the profitability of executives' future share purchases and their prior asset ownership (legal record) is statistically significant, consistent with our main findings, when the sample is restricted to executives with three (six) or more prior years of service as a senior executive.

The interpretation of our results is subject to several caveats. First, our sample size is small and not entirely randomly selected due to the high cost of the background checks we use to obtain data on legal

[3] This approach is based on our assumption that each executive is of a particular (i.e. stable) type, and on our desire to minimize the number of unfrugal executives and recordholders that are misclassified due to a delay in revealing their type.

records and asset ownership. These sample limitations reduce the power of our tests and limit inferences about the magnitude of the effects of executive type on the probability of insider trading in the general population of public U.S. companies. Second, the endogenous sorting of executives to firms may compromise the interpretation of our results. And third, 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, the latter two concerns.

Our paper makes several contributions, subject to the caveats above. We provide evidence that senior executives' propensity to exploit opportunities to trade on inside information varies in an intuitive way with executive "type", identified on the basis of luxury good ownership and legal records, and provide evidence on the extent to which real time data on the prior purchase of luxury goods or legal infractions explains variation in the profitability of senior executives' future trades. We document that the profitability of share purchases by unfrugal senior executives, and to a less extent, recordholders, increases with proxies for information asymmetry and a relatively weak corporate control environment in an absolute sense and relative to other (i.e. low propensity) executives. We also provide evidence of how and why CEO type is related to opportunities to trade on inside information (i.e. firms' information and control environments) and to the profitability of trades by other senior executives. Overall, the intuitive results documented here supplement evidence in Davidson et al. (2013) that our measures "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 and Section 7 provides a summary and preliminary 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, Larcker and Taylor, 2011). One explanation for this asymmetry in trading profits is the risk of litigation (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. On the other hand, lawsuits are less likely following insider purchases as 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.

Other studies examine insider trading around major corporate events (Elliot, Morse and Richardson, 1984; John and Lang, 1991; Sivakumar and Waymire, 1994; Seyhun and Bradley, 1997; Agrawal and Nasser, 2012) and insider trading in high information asymmetry environments (Aboody and Lev, 2000; Beneish and Vargus, 2002; Frankel and Li, 2004; Aboody, Hughes and Liu, 2005; Piotroski and Roulstone, 2005; Huddart and Ke, 2007). Other studies document that insiders strategically choose their disclosure policies and time their trades so as to maximize their trading profits (Cheng and Lo, 2006; Noe, 1999). These studies indicate that insiders take advantage of outsiders by trading on advance knowledge of specific firm events or privileged understanding of certain firm characteristics, such as R&D. In a recent study, Jagolinzer,

Larcker and Taylor (2011) document that the general counsel can effectively mitigate informed trade and that the choice of corporate governance affects the extent to which insiders trade on superior information. In a related study, 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.

Prior research treats executives as homogeneous with respect to their propensity to trade on inside information, given the opportunity. In contrast, we predict that the propensity to trade on inside information is relatively high for executives with a legal record and executives who own luxury goods.

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 actually 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, Schlegel, Fassbender and Klein (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, Little and Goggin, 1996; Shu, Francesca and Bazerman, 2009). Fisman and Miguel (2007) find that UN diplomats' unpaid parking tickets in NYC 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.

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, Bettencourt, Hughner and Kuntze, 1999). We interpret executives' ownership of luxury goods as a manifestation of relatively low frugality (i.e. high materialism).[4] If the ownership of luxury goods captures meaningful variation in the materialism of senior executives, we expect the temptation to trade on inside information to be relatively strong among executives who own luxury goods, ceteris paribus.

Our second set of hypotheses concerns the relation between executives' trades and firms' information and control environments. We expect the profitability of executives' trades to depend on both 1) the *opportunity* to exploit inside information (i.e. the extent to which an executive possesses material value relevant inside information (hereafter "information environment") and the extent to which control systems fail to restrict trading on such information (hereafter "control environment")), and 2) an executive's *propensity* to exploit inside information. We predict that the inside trading profits of "high-propensity executives" (i.e. unfrugal and recordholder executives) increases 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 the less severe restrictions on inside trading). And we expect the relation between the profitability 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 by unfrugal and recordholder executives. Further, we 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,

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

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 stock-based compensation 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. These measures are motivated by recent papers documenting that these are correlated with the quality of board monitoring (Hwang and Kim, 2009; Bhagat and Bolton, 2008; Bhagat, Carey and Elson, 1999, Davidson, Dey, and Smith, 2013). We predict that the profitability 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 in firms run by unfrugal CEOs, and these differences intensify over the tenure of unfrugal CEOs. This third set of hypotheses 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), and these elements of the control environment are shown to deteriorate over the tenure of unfrugal CEOs. We test analogous hypotheses for recordholder vs. nonrecordholder CEOs, but do not have strong priors given the lack of consistent evidence in Davidson et al. (2013) that the control environment is weak or deteriorates over the tenure of recordholder CEOs.

3. Sample 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, other senior executives, and/or lower officers 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. We include all other employees who are classified as Officers by Thomson-Reuters as "lesser officers". 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.[5]

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.[6] 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. *UNFRUGAL* is an indicator variable equal to 1 if the executive owns any luxury assets as of 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.[7]

Due to the high cost of the background checks used for data on legal records and asset ownership, we combine samples from our related research. As a result, our sample includes 99 firms that were subsequently involved in corporate fraud (and 101 non-fraud firms which had been matched to the fraud firms), 89 firms wherein a material reporting error occurred during the CEO's tenure, and 51 firms that eventually filed for bankruptcy. We use executive data for a sample of 67 banks as well as a random selection of 69 firms from

[5] 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.

[6] Our acquisition and use of asset data conforms to all provisions of the Driver's Privacy Protection Act (DPPA).

[7] 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 the desire to minimize the number of recordholders and unfrugal executives misclassified otherwise.

the seven largest industries defined using 2-digit SIC codes. Finally, we use executive data for 36 firms that experienced CEO turnover due to the death of the predecessor CEO[8]

Our final sample, described in Table 1, panel A, includes 512 firms for which we purchase background checks to determine the legal record and asset ownership of the CEO (538 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 538 CEOs of the 512 sample firms, and for all 2,968 non-CEO senior executives, and all 2,032 lower officers of the 512 sample firms.[9]

Given that our sample is not selected randomly, we compare the industry distribution and some key firm characteristics of our final sample with the Compustat population (Table 1, panels B and C). The industry distribution of our sample is generally similar to that of the Compustat firms. Our sample has the highest concentration in the high technology industry (20% of our sample vs. 15.5% of the Compustat population). Our sample firms are significantly larger (in terms of both market capitalization and sales) and have significantly higher market to book ratios than Compustat firms.

We obtain data for measures of the information environment and board monitoring from several sources. We use the Fog index developed by Li (2008) as a measure of opacity. We also estimate the adverse selection component of the bid-ask spread as a measure of information asymmetry using data from the Trade and Quote (TAQ) database. We use stock-based compensation of independent directors from the RiskMetrics database, supplemented with hand-collected data from annual proxy statements.

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 active companies. Links in the dataset are constructed by cross-referencing employment history, educational background and professional qualifications. To examine the social connections of independent

[8] We include indicators for fraud, error and bankruptcy in all relevant analyses to allow for different behavior in these three subsamples of firms.
[9] We use transaction data for *all* non-CEO senior officers and lower officers of sample firms (regardless of whether we know their type) in the analyses that do not require executive type below the CEO level.

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, 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.

We use an overall measure of the quality of corporate governance from Governance Metrics International (GMI). GMI uses various accounting (including regulatory violations, financial statement and earnings data) and governance information to develop an overall governance score for firms from 1 to 100, where higher scores indicate weaker governance.

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 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 describes record and asset information for sample CEOs and non-CEO senior executives. Table 2, panel B presents the summary statistics for the insider trading, information and control environment variables for sample firms.

4. Empirical Results

4.1. Propensity to Trade on Inside Information: Intra-Firm Analysis

In this section we test the hypothesis that executives with records and executives who purchase luxury goods have a relatively high propensity to trade on inside information. We examine whether executives' trading profits vary with his or her type (recordholder or unfrugal), controlling for fixed firm effects. This analysis is based on all 538 sample CEOs and 419 randomly selected subordinates who are either C-level officers, Executive Vice President, Senior Vice Presidents or Presidents for whom we purchased background checks. 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:

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

where *EXEC TYPEi* is either *RECORD* or *UNFRUGAL* for executive i. In addition to firm fixed effects, we include an indicator variable, *CEOi*, set equal to 1 if the executive is the CEO, and 0 otherwise to allow for CEOs' differential trading profits.

Following Larcker 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:

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

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 the average daily risk-adjusted return to a net purchase (sale) during the 180 days following the transaction, i.e., $TRADING\_PROFIT_{i,t}$[10]

Table 3, panel A presents the results.[11] The coefficients on both *RECORD* and *UNFRUGAL* are statistically significant (.01 level) for purchases, but not for sales. The coefficient on *RECORD* in column (1) indicates that executives with a legal record earn 0.036% higher risk-adjusted returns per day following purchases as compared to nonrecordholders in the same firm. The coefficient on *UNFRUGAL* in column (3) indicates that unfrugal executives earn 0.04% higher returns per day following purchases than frugal executives in the same firm. We interpret these 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.

[10] As pointed out by Larcker et al. (2009), 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 (2) 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.

[11] 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. As described above, our approach is designed to allow the maximum time for unfrugal executives to reveal their true type, assuming type is stable.[12] [13]

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

$$TRADING\_PROFIT_{i,t} = \beta 0 + \beta 1\ DURATION_i + \beta 2\ CEO_i + \varepsilon_{i,t} \quad (3)$$

where *CEO* is an indicator variable that equals 1 if the executive is the CEO, and *DURATION* is the number of years an individual is a senior executive before his initial acquisition of luxury goods (i.e., the length of time it takes each of our unfrugal executives to reveal his "type")[14]. If, as we argue, the acquisition of luxury goods captures the materiality (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 materiality. 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 materiality interpretation, not reverse causality. The sooner a senior executive requires luxury goods, the more materialistic he is likely to be, and the more our estimate of the profitability of his trades is based on transactions *after* the asset purchase (i.e. not reverse causality).

We run the above model 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

[12] As a verification of this assumption we compare the trading profits from trades by unfrugal and record holder 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.

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

[14] We measure *DURATION* 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.

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 *DURATION* (at the .05 level) in both estimations, supporting our materiality 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.[15] Further, the correlation between *UNFRUGAL* and executive wealth is insignificantly different from zero. Finally, in section 6, we modify our approach for identifying unfrugal executives allowing executive type to change from frugal to unfrugal during the sample period upon the initial acquisition of luxury goods.

4.2. Propensity to Trade on Inside Information: Interactions with the Information and Control Environment

In this section we test 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 2) these effects are significantly stronger for high propensity vs. low propensity (i.e. non-recordholder and frugal) executives. We estimate the following models separately for CEOs and other senior executives:

$$TRADING\_PROFIT_{i,t} = \beta 0 + \beta 1\ INFORMATION_{i,t} + \beta 2\ EXEC\ TYPE\ i + \beta 3\ INFORMATION_{i,t} * EXEC\ TYPE_i + \varepsilon_{i,t} \quad (4a)$$

$$TRADING\_PROFIT_{i,t} = \beta 0 + \beta 1\ CONTROL\ ENV_{i,t} + \beta 2\ EXEC\ TYPE\ i + \beta 3\ INFORMATION_{i,t} * EXEC\ TYPE_i + \varepsilon_{i,t} \quad (4b)$$

[15] 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 dependent variable is the trading profits from purchases made by CEOs or non-CEO senior executive i , date t. The variable *INFORMATION ENVi,t* is either *FOG* which is the Fog index developed by Li (2008), or *BAS* which is the 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 stock based compensation of an independent director (*DIR_SHARES*), the social ties between a CEO and an independent director (*SOCIAL*), or the overall governance score (*GOV SCORE*) for firm i, year t. We interpret high values of *FOG* and *BAS* as a relatively opaque information environment and low values of *DIR_SHARES* and high values of *SOCIAL* and *GOV SCORE* as a relatively weak control environment. Finally, *EXEC TYPE* is either *RECORD* or *FRUGAL*, indicating the given executive's type.

Table 4, panels A and B present results for our proxies for the information environment and control environment, respectively, based on CEOs. Beginning with the results for which high (low) propensity executives are defined as unfrugal (frugal), the t statistics at the bottom of Table 4 (significance of $\beta 1 + \beta 3$ in models 4a and 4b) indicate that the trading profits from purchases by *unfrugal* CEOs increase significantly (.05 level) with the opacity of the information environment as measured by both *FOG* and *BAS* (panel A, columns (2) and (4)), and with all three measures of the weakness of the control environment (panel B, columns (2), (4), and (6)). In contrast, trading profits from purchases by *frugal* CEOs are not significantly related to any of the proxies for the opportunity to trade on inside information ($\beta 1$ of models 4a and 4b) except *SOCIAL* (panel B, column (4) marginally significant at the .10 level). Further, the interaction ($\beta 3$) term is significant and in the predicted 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 (.05 level) for unfrugal (vs. frugal) CEOs. We find similar (but somewhat weaker) results in Table 4, panels C and D based on non-CEO senior executives. Overall these results support our prediction that inside trading profits from purchases by unfrugal executives increase with our proxies for an opaque information environment and a weak control environment, and these effects are significantly stronger than for frugal executives.

Turning to the results for which high (low) propensity executives are defined as recordholders (nonrecordholders), the t statistics at the bottom of Table 4 (significance of $\beta 1 + \beta 3$ in models 4a and 4b) 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 (3)) but not *FOG* (panel A, column (1)), and with two measures of the weakness of the control environment, *DIR_SHARES* (.05 level) (panel B, column (1)) and *GOVSCORE* (.10 level) (panel B, column (5)), but not *SOCIAL* (panel B, column (3)). 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 4a and 4b).

For non-CEO senior executives (panels C and D), the results indicate that inside trading profits from purchases by recordholders vary significantly with *BAS* (.05 level), but not *FOG*, and with only one measure of the control environment (*DIR_SHARES* (.10 level)). Further, *BAS* and *DIR_SHARES* are the only two opportunity variables with significant interactions with *RECORD.* The main effects of *RECORD* are significantly greater than zero in all models. 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 control environment appear less pronounced than documented for unfrugal executives.[16] This is intuitively appealing if *RECORD* captures a lack of self-control and disregard for rules and norms.

5. CEO Type and Insider Trading Profitability

In this section we test whether the profitability of executives' trades is relatively high in firms run by unfrugal (vs. frugal) CEOs (sections 5.1 and 5.2), and whether these differences intensify over the tenure of unfrugal CEOs (section 5.3). Finally, we test whether the information and control environments weaken over the tenure of unfrugal CEOs, and the sensitivity of insider trading profits to these changes (Section 5.4). We

[16] Untabulated tests comparing the sensitivity of trading profits to our three proxies for the control environment for the sample of non-CEO senior executives who are recordholders vs. unfrugal executives indicate that the relation is significantly stronger for unfrugal executives than for recordholders for all three control environment measures (*DIR_SHARES*, *SOCIAL*, and *GOVSCORE*).

conduct analogous tests distinguishing firms run by recordholder (vs. non-recordholder) CEOs, but do not have strong priors.

5.1. CEO Type and Insider Trading Profitability: CEOs, non-CEO Senior Officers, & Lesser Executives

The first analysis in this section separately examines the profitability of share purchases and sales by CEOs, other senior executives, and lower officers, allowing for variation by CEO "type", and for variation across firms that experienced fraud, material reporting errors, or bankruptcy. The second analysis examines the relation between the net trades of CEOs, other senior executives, and lower officers and future earnings news, allowing for variation by CEO type.

To test whether the profitability of trades of CEOs, other senior executives, and lesser officers varies by CEO type, we estimate model (5) separately for the purchases and sales of each of the three groups of executives:

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

where $TRADING\_PROFIT_{i,t}$ is the measure of trading profit on executive i's transaction on day t based on the intercept of equation (2). $RECORD_i$ and $UNFRUGAL_i$ 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). $FRAUD_i$ and $ERROR_i$ are indicator variables set equal to 1 if the firm of executive i restated financial statements due to reporting fraud or a material error, respectively, and 0 otherwise, and $BANKRUPT$ is an indicator variable set equal to 1 if the firm went bankrupt, and 0 otherwise. Because fraud, error, and bankrupt firms are over represented in our sample, we include these three indicators to allow for differential insider trading profits in such firms. 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 ($\beta 1$), except for the analysis based on the trading profits of CEOs (since recordholder CEOs have a high propensity to exploit inside information).

Table 5, panel A presents the results. As predicted, the profitability of purchases by non-CEO senior executives is significantly higher in firms run by unfrugal (vs. frugal) CEOs. The slope on *UNFRUGAL* in column (3) indicates that the daily trading profits following purchases by non-CEO senior executives are .028% higher in firms run by unfrugal (vs. frugal) CEOs (t-stat.=2.53). 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 in column (3), is .022%. 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-CEO senior executives are not different in firms run by CEOs with vs. without a record.

The trading profits following purchases of lesser officers are significantly smaller than the trading profits at higher executive levels, and do not vary significantly by CEO type.[17]

Finally, the estimated slope on *RECORD* in column (1) indicates that the daily profits following purchases by recordholder CEOs are .039% higher (t-stat. = 2.56) than for nonrecordholder CEOs, and the slope on *UNFRUGAL* indicates that the daily profits of unfrugal CEOs are .045% higher (t stat. = 2.79) than for frugal CEOs. These results capture the combined effects of CEO type on the information and control environment and on CEOs' propensity to exploit inside information when they purchase shares.

The results reported in columns (2), (4), and (6) fail to detect insider trading profits for sales transactions or significant differences in the profitability of sales transactions by CEO type. They also do not detect significant differences in the profitability of insiders' purchases or sales for the subsample of firms with reporting fraud, errors, or bankruptcy vs. firms without these events.

While we interpret significant risk-adjusted returns following executives' purchases as evidence of trading on superior favorable information, it is possible that these abnormal returns result from "piling on" by other investors mimicking the trades of insiders. We examine the relation between net trades of executives

[17] The magnitude of the trading profits for CEOs is significantly larger than the other two groups. The rank ordering (CEOs > non-CEO senior executives > lower officers) is intuitively appealing given that executives in higher positions within a firm are likely to possess more proprietary information.

and future earnings surprises in an attempt to mitigate this concern. We estimate model (6) separately for CEOs, other senior executives, and lower executives:

$$SURPRISE\ i,q = \beta 0 + \beta 1\ NET\_TRADESi,q + \beta 2\ RECORDi + \beta 3\ NET\_TRADESi,q * RECORDi + \beta 4\ UNFRUGALi + \beta 5\ NET\_TRADESi,q * UNFRUGALi + \beta 6\ MKT\_CAPi,q + \beta 7\ BTMi,q + \varepsilon i,q \quad (6)$$

where the dependent variable *SURPRISE i,q* is either *CH_EARN i,q* or *ANN_CRET i,q*. The variable *CH_EARNi,q* is the forecast error of firm i in quarter q from a seasonal random walk model of quarterly earnings scaled by total assets, and *ANN_CRETi,q* is the quarterly earnings announcement period return of firm i in quarter q, measured as the three-day market-adjusted buy-and-hold return centered on the quarterly earnings announcement date. *NET_TRADESi,q* is the net trades of the executives of a given level (i.e. CEOs, other senior executives, or lesser officers) of firm i (volume of buys less volume of sales, as a percent of shares outstanding) over the three months prior to the earnings announcement in quarter q. *RECORD* and *UNFRUGAL* are indicator variables for the CEO type of firm i. We include these indicator variables to allow the earnings news to vary by CEO type (main effect of *RECORD* and *UNFRUGAL*), and to test whether the exploitation of inside information about earnings news varies by CEO type (the interaction of *RECORD* and *UNFRUGAL* with *NET_TRADES*). Finally, we include two controls variables, *MKT_CAPi,q* (the natural log of market capitalization value of firm i at the beginning of quarter q) and *BTMi,q* (book value scaled by market value of firm i at the beginning of quarter q). This regression estimation is conducted at the firm-quarter level (separately for CEOs, other senior executives, and lower officers).

Table 5, panel B presents the results. The results in columns (3) and (4) indicate that earnings surprises (as measured by both *ANN_CRET* and *CH_EARN*) are significantly positively related to trades by non-CEO senior executives during the prior 90 days in firms run by unfrugal CEOs ($\beta 1 + \beta 5 > 0$, t stat. = 1.88 and 2.03 in columns (3) and (4)). The significant interactions between *UNFRUGAL* and *NET_TRADES* indicate that the relation between earnings surprises and the prior net trades of non-CEO senior executives is significantly higher in firms run by unfrugal (vs. frugal) CEOs. These results suggest that non-CEO senior

executives' net trades exploit nonpublic information related to future quarterly earnings news to a greater extent in firms run by unfrugal CEOs.

The results in column (5) and (6) suggest that the net trades of lower officers are not significantly related to future earnings surprises, regardless of CEO type. And the results in columns (1) and (2) indicate that the net trades of CEOs who are recordholders or unfrugal are significantly positive related to future earnings news, while the net trades of other CEOs are not. The significant interaction terms indicate that the differences are significant. As before, the results for CEOs reflect the combined effects of CEO type on the opportunities to trade on inside information and CEOs' propensity to do so.

Overall, the results in panel B are similar to those in panel A, providing additional assurance that our measure of trading profits reflects insiders' use of nonpublic information.

5.2. Profitability of Inside Purchases by Non-CEO Senior Officers Before vs. After CEO Deaths

To provide further evidence on how the profitability of executives' trades varies by CEO type and to reduce endogeneity concerns, we 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. We estimate the following model:

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

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 senior executives' trades over an exogenous change in CEO type will more cleanly identify the influence of CEO type on the insider trading opportunities of other non-CEO senior executives.[18]

Table 5 panel C 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.

5.3. CEO Tenure and Insider Trading Profitability by CEO Type

To test how trading profits vary over CEO tenure, we estimate the following model separately for CEOs and non-CEO senior executives:

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

where *CEO TYPEi* is an indicator variable capturing the CEO's type (*UNFRUGAL* or *RECORD*) for executive i's firm, and $TENURE_{i,t}$ =0 for the first three years of the CEO's tenure at firm i, and 1 for years 4 and thereafter. The three year cut off is used to allow time for the CEO to shape the firms' information and control environments.[19] We predict that the profitability of executives' purchases increases over the tenure of *unfrugal* CEOs ($\beta 2 + \beta 3 > 0$), where *CEO TYPE* is measured by *UNFRUGAL* (i.e. =1 if CEO is unfrugal, 0

[18] 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 (7) before vs. after the CEO death.
[19] The results are robust to using a four year cutoff.

otherwise), and increases over the tenure of unfrugal CEOs more than over the tenure of frugal CEOs ($\beta 3 > 0$).

The results in Table 6 panel A, columns (2) and (4) support the prediction that the profitability of share purchases by CEOs and by other senior executives increase significantly (.05 level) during the tenure of unfrugal CEOs (($\beta 2 + \beta 3 > 0$), t stat. = 2.51 for CEOs and 2.36 for other senior executives), and increases significantly more (.05 level) than during the tenure of frugal CEOs (($\beta 3 > 0$), t stat = 2.25 for CEOs and 2.18 for other senior executives).[20] Results in Columns (1) and (3) do not detect an analogous change in the profitability of executives' purchases during the tenure of recordholder CEOs.

Given our evidence of an increase in profitability of executives' purchases during the reign of unfrugal CEOs, we next test for a weakening of the information and control environment of their firms, increasing opportunities for insider trading.

5.4. CEO Tenure and the Information and Control Environment by CEO Type

In this section, we examine whether CEO type is associated with *changes* in their firm's information and control environments.[21] Specifically, we test the prediction that the information environment becomes more opaque and the control environment becomes weaker during the reign of unfrugal CEOs in an absolute sense, and relative to changes during the reign of frugal CEOs. We estimate the following models for each of the information environment variables (*FOG, BAS)* and the control environment variables (*DIR_SHARES*, *SOCIAL* and *GOV_SCORE):*

[20] We rerun the model for the non-CEO senior executives with control variables measuring the percentage of the firm's non-CEO senior officers who are unfrugal or who are recordholders early vs. late during the CEO's tenure. The results for the absolute change in insider trading profits over the tenure of unfrugal CEOs are unchanged.

[21] In untabulated analyses of the relation between CEO type and our proxies for the information and control environment on average during the reign of CEOs, we find that the information environment is significantly more opaque (.05 level) in firms run by unfrugal (vs. frugal) CEOs (as measured by *FOG* and *BAS* averaged over each CEO's reign), and the control environment is significantly weaker (as measured by *DIR_SHARES*, *SOCIAL*, and *GOV_SCORE*) (.05 level).

$$\textit{INFORMATION VARIABLE}_{i,t} = \beta 0 + \beta 1\ \textit{CEO TYPE}_i + \beta 2\ \textit{TENURE}_{i,t} + \beta 3\ \textit{TENURE}_{i,t} * \textit{CEO TYPE}_i + \textit{CONTROLS}_{i,t} + \varepsilon_{i,t} \quad (9a)$$

$$\textit{CONTROL ENV VARIABLE}_{i,t} = \beta 0 + \beta 1\ \textit{CEO TYPE}_i + \beta 2\ \textit{TENURE}_{i,t} + \beta 3\ \textit{TENURE}_{i,t} * \textit{CEO TYPE}_i + \textit{CONTROLS}_{i,t} + \varepsilon_{i,t} \quad (9b)$$

We include control variables in each of the above regressions for each dependent variable based on prior research (e.g., Li, 2008; Benston and Hagerman, 1974; Copeland and Galai, 1988; Hwang and Kim, 2009; Bhagat and Bolton, 2008; Dey and Liu, 2011).

Table 7, panels A and B report the results for models (9a) and (9b), respectively. The results in panel A, columns (2) and (4) indicate that the information environment as measured by *FOG* and *BAS* is significantly more opaque in firms run by unfrugal CEOs in both the early years (coefficient on *UNFRUGAL* significant at .10 level) and later years (coefficient on *UNFRUGAL* + *UNFRUGAL* * *TENURE* significant at .05 level) of CEO tenure. The results provide only weak evidence of the predicted changes in opacity from the early to the later years. Specifically, the increase in *FOG* over the tenure of unfrugal CEOs is marginally significant in absolute terms (coefficient on *TENURE* + *UNFRUGAL* * *TENURE* significant at .10 level), and not significant in relative terms (coefficient on *UNFRUGAL* * *TENURE* insignificant). And the increase in *BAS* over the tenure of unfrugal CEOs is significantly higher (.05 level) than the change in *BAS* during the tenure of frugal CEOs, but does not increase significantly in an absolute sense. A possible explanation for the significant difference in the opacity of firms run by unfrugal (vs. frugal) CEOs during both the early and late years of CEO tenure, and little change from the early to late years is that Fog and BAS can adjust rapidly.

As predicted, the results in Panel B, columns (2), (4), and (6) indicate that the control environment, as measured by *DIR SHARES*, *SOCIAL*, and *GOV SCORE*, weakens significantly from the early to later years of the tenure of unfrugal CEOs (coefficient for *TENURE* + *UNFRUGAL***TENURE* significant at .10, .01, and.05 levels, respectively), and weakens significantly more than during the tenure of frugal CEOs (coefficient on *UNFRUGAL* * *TENURE* all significant at .05 levels). (The insignificant slope on *TENURE*

provides no evidence that the control environment changes during the tenure of frugal CEOs.) In sum, the results in Table 7 provide fairly strong evidence that proxies for the opportunity to trade on inside information associated with a weak control environment increase in firms run by unfrugal CEOs from the early to later years in the CEO's tenure in an absolute sense and relative to firms run by frugal CEOs, and mixed evidence that the information environment weakens from the early to later years of the unfrugal CEOs' tenure. However, the information environment is weaker in firms run by unfrugal (vs. frugal) CEOs during both the early and later years of their tenure.

Turning to recordholders, the results in Panel A, column (3) indicate that the opacity of the information environment as measured by *BAS* increases significantly more over the tenure of recordholders (vs. nonrecordholders) (coefficient on *RECORD * TENURE* significant at .05 level), but does not change significantly in an absolute sense (coefficient on *TENURE + RECORD * TENURE* insignificant). And the results on column (1) provide no evidence of a change in *FOG* over the tenure of recordholders in an absolute or relative sense.

Finally, the results in Panel B, columns (1), (3), and (5) provide mixed evidence of a weakening of the control environment during the tenure of recordholders. Specifically *DIR SHARES* declines significantly more over the tenure of recordholder (vs. nonrecordholder) CEOs (coefficient on *RECORD*TENURE* significant at .05 level), but does not change significantly in an absolute sense (coefficient on *TENURE + RECORD*TENURE* is insignificant). And the results in column (5) indicate that *GOV SCORE* increases marginally (.10 level) in both an absolute and relative sense, providing some evidence of weakening corporate governance. The results in column (3) provide no evidence of a change *SOCIAL* in firms run by recordholders in an absolute or relative sense. In sum, the results in Table 7 provide weak evidence that our proxies for the opportunity to trade on inside information increase from the early to later years of recordholder CEOs.

Given our evidence of an association between CEO type and changes in firms' information and control environments, we attempt to provide further insight into the how the opportunities provided by the changes in the information and control environments over CEO tenure explain trading profits made by CEOs and

senior executives. We estimate model (10) three times based on firms run by CEOs who are recordholders (Table 8, panel A), unfrugal (Table 8, panel B), and neither recordholder nor unfrugal CEOs (Table 8, panel C):

$$TRADING\_PROFIT_{i,t} = \beta 0 + \beta 1\ INFORMATION\ or\ CONTROL\ ENV\ VARIABLE_{i,t} + \beta 2\ TENURE_{i,t} + \beta 3\ INFORMATION\ or\ CONTROL\ ENV\ VARIABLE_{i,t} * TENURE_{i,t} + \varepsilon_{i,t} \quad (10)$$

We estimate the model using trading profits for both CEOs and non-CEO senior executives and the results are similar for both sets of executives. The results in Table 8, panel B indicate that the profitability of purchases by CEOs and non-CEO senior executives increases significantly over the tenure of unfrugal CEOs, and this increase in profitability is most pronounced if accompanied by an increase in our proxies for information asymmetry (Fog index, adverse selection component of the bid-ask spread) and weak controls (director shares, social ties and governance score) (the interaction with *TENURE* is significant at the .05 level for all variables except the Fog index).

The results in the left half of panel A provide some evidence that the profitability of recordholder CEOs' purchases increases over their tenure, but little interaction with our proxies for the information and control environments (except *BAS*). And the results in the right half of panel A provide little evidence of any change in the profitability of non-CEO senior executives' purchases over the tenure of recordholder CEOs, and little evidence of interactions with proxies for the information and control environments. Finally, the results in panel C provide no evidence that the profitability of CEOs' or non-CEO senior executives' purchases changes over the tenure of CEOs who are neither recordholders nor unfrugal, and no evidence of significant interactions with proxies for the information and control environment.

6. Real Time Classification of Executives

Throughout our analysis we consider luxury asset purchases and legal infractions regardless of when they occurred to identify unfrugal and recordholder executives. While this may minimize the misclassification of executives, it does add a "look ahead" bias in our analysis – i.e., our tests consider the

profitability of insider trades of some unfrugal and recordholder executives before they reveal their type through their purchasing behavior or illegal activity.

In this section we modify our analysis of relation between executive type and the profitability of insider trades by reclassifying executives into types based solely on their *prior* legal records or asset ownership. In other words, we use only information available at a given point in time to classify each executive, and consider the profitability of their future insider purchases. We repeat our analysis using this classification method and re-estimate the model:

$$TRADING\_PROFIT_{i,t} = \beta 0 + \beta 1\ EXEC\ TYPE_{i,t} + CEO_{i,t} + \varepsilon_{i,t} \qquad (11)$$

We note that the real time classification of executives can introduce measurement error because individuals may take several years after becoming a senior executive to reveal their type. To reduce the prevalence of such errors we estimate model (11) by requiring a certain number of prior years of service as a senior executive before inclusion in the analysis, varying the number of years of minimum prior service as a senior executive from 1 to 10 years. [22]

Table 9 reports the results of this analysis. We find that unfrugal executives and recordholders earn significantly higher profits on purchases than other executives. The results are statistically significant for unfrugal executives when we require at least 2 years of prior tenure (at the .10 level for 3 and 4 year tenure requirements and at the .05 level for all other years). For recordholder executives the results are significant from year 6 onwards (at the .10 level for years 6 and 7 and at .05 level for the remaining years).

The results in this section are consistent with our main findings and reflect the time required for an executive (particularly recordholders) to reveal his/ her type. This evidence provides practical implications for the real time use of our data on legal records and asset ownership to assess the future profitability of insider trading activities.

[22] The median number of years it takes for an unfrugal (recordholder) executive to reveal his type after appointment as a senior executive is 8 years (10 years) (see Table 9).

7. Summary and Conclusions

We examine how and why the profitability of insider trading varies across firms and executives. The risk-adjusted stock returns following share purchases by unfrugal (i.e. materialistic) senior executives identified through their ownership of luxury goods, and by senior executives with a legal record, are significantly higher than the risk-adjusted returns following purchases by other senior executives of the same firms. Given our controls for fixed firm effects, we interpret this as support for the hypothesis that unfrugal and recordholder executives have a relatively high propensity to exploit inside information when they purchase shares, given the opportunity.

The profitability of unfrugal executives' purchases increases significantly with opportunities to trade on inside information, as measured by all of our 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.

As predicted, the profitability of non-CEOs' purchases is higher in firms run by unfrugal (vs. frugal) CEOs, and this difference increases over the tenure of the unfrugal CEO as the information and control environments become more conducive to trading on inside information. 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 unexpected transition from a frugal to unfrugal CEO relative to the behavior of trading profits upon other unexpected CEO transitions.

As described above, our paper is subject to several limitations, including a small and nonrepresentative sample, 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 the latter two concerns. However, our results should be interpreted with these caveats in mind.

Overall, the intuitive results documented here supplement evidence in Davidson et al. (2013) suggesting that our measures of "off-the-job" behavior capture meaningful differences in managerial style and may be useful in other research contexts. Finally, we provide evidence on the extent to which real time data on the prior purchase of luxury goods or legal infractions explains variation in the profitability of senior executives' future trades, shedding some light on the real time use of data on executives' asset ownership and legal records.

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Table 1, Panel A
Sample Composition

SAMPLE	*TOTAL*	*FRAUD FIRMS*	*ERROR FIRMS*	*BANKRUPT FIRMS*	*OTHER FIRMS*
Firms in Compustat/CRSP 1988-2011	502	99	89	51	263
Executives:					
CEOs	538	99	89	51	299
Non-CEO Senior Executives	2,968	475	412	181	1900
Lessor Officers	2,032	298	286	101	1347
Sub-analyses requiring information on executives' legal infractions and luxury asset ownership:					
CEOs	538	99	89	51	299
Non-CEO Senior Executives	419	72	73	-	274

Our sample is constructed from various subsamples of firms and executives. Table1, panel A summarizes the information regarding the types of firms included in the sample and the number of firms contributed by each of the subsample of firms. 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, non-CEO senior executives and lesser officers) that were contributed by each of the subsamples. We defined executive designations based on the Role Codes that Thomson-Reuters uses in the insider trading database. Non-CEO Senior executives are any C-level executive (chief financial/investment/operations/technology officer), president, executive vice president or senior vice president. All other employees of a firm who file Form 16 who are classified as "officers" by Thomson-Reuters are included in our Lesser Officers sample. These do not include directors of the firms. 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 1, Panel B
Industry Composition

	SAMPLE *NUMBER (%)*	*COMPUSTAT* *NUMBER (%)*
Consumer Durables	20 (3.9%)	541 (2.0%)
Consumer Nondurables	24 (4.7%)	1,157 (4.2%)
Manufacturing	56 (10.9%)	2,546 (9.2%)
Energy	24 (4.7%)	1,522 (5.5%)
High Technology	104 (20.3%)	4,312 (15.5%)
Telephone and Television Transmission	12 (2.3%)	766 (2.8%)
Retail/ Shops	77 (15.0%)	2,191 (7.9%)
Healthcare, Medical Equipment and Drugs	47 (9.2%)	2,191 (7.9%)
Utilities	15 (2.9%)	550 (2.0%)
Other – Mines, Construction, Building Management, Transportation, Hotels, Bus Services, Entertainment and Finance	133 (25.9%)	11,961 (43.1%)
Total	**512**	**27,737**

Table1, panel B reports the industry distribution for our sample firms and the Compustat population.

Table 1, Panel C
Firm Characteristics

	SAMPLE			*COMPUSTAT*		
	MEAN	MEDIAN	STD	MEAN	MEDIAN	STD
MKT_CAP	7.53	7.42	1.86	6.65**	6.60***	1.82
MTB	1.67	1.32	1.24	1.45*	0.89*	2.38
LOG_SALES	7.22	7.16	1.86	6.42***	6.43***	1.89

Table1, panel C reports some firm characteristics for our sample firms and the Compustat population. *MKT_CAP* is the natural logarithm of market capitalization of the firm; *MTB* is the market value of equity divided by the book value of equity; *LOG_SALES* is the natural logarithm of sales.

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

	CEOS *(N = 538)*	*NON-CEO SENIOR EXECUTIVES* *(N = 419)*
	Number	*Number*
Prior Legal Infractions		
Executives with any legal infractions	64	41
(Traffic violations, domestic violence, reckless behavior, DUI, drug related charges)		
All legal infractions	105	65
Executives with serious legal infractions	23	13
(Domestic violence, reckless behavior, DUI, drug related charges)		
Serious legal infractions	31	16
Luxury Asset Ownership		
Executives owning any luxury assets	318	205
(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)		
Cars worth more than $75,000	334	226
Boats longer than 25 feet	312	189
Homes worth more than twice the average of median home prices of neighboring zip codes	365	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			
CEO Purchases	0.062	0.051	0.073
CEO Sales	0.016	0.013	0.049
Non-CEO Senior Executives' Purchases'	0.036	0.029	0.061
Non-CEO Senior Executives' Sales	0.013	0.01	0.045
Lesser Officers' Purchases	0.017	0.011	0.056
Lesser Officers' Sales	0.011	0.007	0.034
Information Environment			
FOG	19.48	19.34	2.05
BAS	0.21	0.2	0.1
Control Environment			
DIR_SHARES	0.07	0.03	0.18
SOCIAL	0.41	0	0.58
GOVSCORE	1.62	2	0.49

Table 2, panel B presents the mean, median and standard deviations of insider trading profits (which are trade specific profits from estimating transaction day specific regressions of daily returns on common factors) of various executives, 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, non-CEO senior executives and lesser officers. The variables are estimated / defined as follows. Trading profits equal to α ($-\alpha$) 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; *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); *DIR_SHARES* is the median stock-based compensation of the independent directors measured as 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.

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

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

	Purchases	*Sales*	*Purchases*	*Sales*
	Coeff. (t-stat)	*Coeff. (t-stat)*	*Coeff. (t-stat)*	*Coeff. (t-stat)*
INTERCEPT	0.025**	0.007	0.019**	0.006
	-2.14	-1.01	-2.07	-1.05
RECORD	0.036***	0.004		
	-2.72	-0.48		
UNFRUGAL			0.040***	0.009
			-2.68	-1.22
CEO	0.014**	0.003	0.011**	0.005
	-2.49	-0.35	-2.24	-0.73
FIRM FIXED EFFECTS	YES	YES	YES	YES
ADJUSTED R2	0.69	0.26	0.56	0.24
NO. OF OBSERVATIONS	868	8,432	1,069	15,727

Panel B: Years to Reveal Executive Type and Insider Trading Profits

$$TRADING\_PROFIT_{i,t} = \beta 0 + \beta 1\ DURATION_i + \beta 2\ CEO_i + \varepsilon_{i,t}$$

	Purchases	*Purchases*
	Coeff. (t-stat)	*Coeff. (t-stat)*
INTERCEPT	0.062***	0.049
	-2.88	-1.45
DURATION	-0.003**	-0.002**
	(-2.39)	-2.01
CEO	0.011**	0.017**
	-2.44	-2.38
FIRM FIXED EFFECTS	NO	YES
ADJUSTED R2	0.59	0.65
NO. OF OBSERVATIONS	1,724	343

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. Panel B presents the results of the analysis of the time it takes for an executive to reveal his/her type as unfrugal and his/her trading profits in an intra-firm setting. The dependent and independent variables are defined as follows. *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) = 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 a CEO or senior executive was convicted of any legal infractions, 0 otherwise; *UNFRUGAL* is a dummy variable that equals 1 if a 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; *DURATION* is the number of years an individual was a senior executive before he/she purchases a luxury asset that classifies him/her as unfrugal; *CEO i*s 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 4: Executive Propensity, Corporate Culture and Insider Trading Profitability
Panel A: CEO Trading Profits and the Information Environment

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

	INFORMATION ENVIRONMENT VARIABLE			
	FOG		BAS	
	COEF. (T)	COEF. (T)	COEF. (T)	COEF. (T)
INTERCEPT	0.012*	0.013*	0.018**	0.015*
	(1.68)	(1.74)	(2.05)	(1.79)
INFORMATION	0.005	0.003	0.007	0.005
	(1.55)	(1.37)	(1.44)	(1.52)
RECORD	0.024**		0.018**	
	(2.36)		(2.01)	
UNFRUGAL		0.033**		0.030**
		(2.18)		(2.41)
RECORD × INFORMATION	0.003		0.004*	
	(0.60)		(1.86)	
UNFRUGAL × INFORMATION		0.005**		0.006**
		(2.04)		(2.09)
T-statistics: *INFORMATION + CEO TYPE * INFORMATION*	1.52	2.54 **	2.02 **	3.01 ***
ADJUSTED R2	0.05	0.07	0.06	0.07
NO. OF OBSERVATIONS	1,829	1,829	1,435	1,435

Panel B: CEO Trading Profits and the Control Environment

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

	CONTROL ENVIRONMENT VARIABLE					
	DIR_SHARES		SOCIAL		GOVSCORE	
	COEF. (T)	COEF. (T)	COEF. (T)	COEF. (T)	COEF. (T)	COEF. (T)
INTERCEPT	0.022* (1.90)	0.015* (1.94)	0.018* (1.84)	0.021* (1.91)	0.021 (1.58)	0.014* (1.70)
CONTROL ENV	-0.002 (-1.07)	0.001 (0.44)	0.008 (0.56)	-0.005* (-1.83)	-0.001 (-0.12)	-0.001 (-0.02)
RECORD	0.017** (2.46)		0.033** (2.12)		0.022** (2.28)	
UNFRUGAL		0.029** (2.16)		0.034** (2.11)		0.033** (2.26)
RECORD × CONTROL ENV	-0.003** (-2.16)		0.001 (0.74)		0.027** (1.98)	
UNFRUGAL × CONTROL ENV		-0.005** (-2.39)		0.022*** (2.88)		0.024** (2.50)
T-statistics: *CONTROL ENV + CEO TYPE * CONTROL ENV*	-2.88 ***	-2.08 **	1.01	2.18 **	1.80 *	2.11 **
ADJUSTED R2	0.19	0.26	0.09	0.19	0.04	0.09
NO. OF OBSERVATIONS	1,361	1,361	506	506	1,243	1,243

Panel C: Non-CEO Senior Executives' Trading Profits and the Information Environment

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

	INFORMATION ENVIRONMENT VARIABLE			
	FOG		BAS	
	COEF. (T)	COEF. (T)	COEF. (T)	COEF. (T)
INTERCEPT	0.010	0.009*	0.014*	0.012*
	(1.48)	(1.70)	(1.97)	(1.68)
INFORMATION	0.003	0.003	0.005	0.004
	(1.04)	(1.22)	(1.43)	(1.27)
RECORD	0.008*		0.013**	
	(1.78)		(2.04)	
UNFRUGAL		0.025**		0.022**
		(2.09)		(2.16)
RECORD × INFORMATION	0.002		0.003*	
	(0.49)		(1.84)	
UNFRUGAL × INFORMATION		0.003**		0.004**
		(1.98)		(2.07)
T-statistics: *INFORMATION + EXEC TYPE * INFORMATION*	1.26	2.32 **	2.03 **	2.64 ***
ADJUSTED R2	0.03	0.05	0.01	0.04
NO. OF OBSERVATIONS	984	984	898	898

Panel D: Non-CEO Senior Executives' Trading Profits and the Control Environment

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

	CONTROL ENVIRONMENT VARIABLE					
	DIR_SHARES		SOCIAL		GOVSCORE	
	COEF. (T)	COEF. (T)	COEF. (T)	COEF. (T)	COEF. (T)	COEF. (T)
INTERCEPT	0.018*	0.014*	0.016*	0.018*	0.015	0.013*
	(1.84)	(1.92)	(1.76)	(1.85)	(1.50)	(1.74)
CONTROL ENV	-0.003	0.001	0.009	-0.002*	-0.002	-0.001
	(-0.86)	(0.56)	(0.60)	(1.34)	(-0.29)	(-0.14)
RECORD	0.014**		0.021**		0.016**	
	(2.27)		(2.02)		(2.04)	
UNFRUGAL		0.016**		0.023**		0.024**
		(2.00)		(2.04)		(2.05)
RECORD × CONTROL ENV	-0.002**		0.001		0.014	
	(1.99)		(0.52)		(1.56)	
UNFRUGAL × CONTROL ENV		-0.004*		0.016**		0.017**
		(1.86)		(2.11)		(2.31)
T-statistics: *CONTROL ENV + EXEC TYPE * CONTROL ENV*	-1.79 *	-1.72 *	1.01	1.90 *	1.53	2.01 **
ADJUSTED R2	0.03	0.06	0.07	0.01	0.02	0.02
NO. OF OBSERVATIONS	833	833	209	209	583	583

Table 4 (Cont.)

Table 4 presents the results of models that examine the relation between executives' trading profits from purchases as a function of variables representing aspects of the information and control environment and the type of the executive. Panels A and B analyze CEO purchases. Panels C and D analyze non-CEO senior executives. Panels A and C consider proxies for the information environment (FOG, BAS) and Panels B and D consider proxies for the governance / control environment of the firm (SOCIAL, DIR_SHARES, GOVSCORE). The variables are defined as follows: 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; RECORD is a dummy variable that equals 1 if a CEO (or a senior executive) was convicted of any legal infractions, 0 otherwise; UNFRUGAL is a dummy variable that equals 1 if a CEO (or a 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; 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); DIR_SHARES is the median stock-based compensation of the independent directors measured as 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 5, Panel A: CEO Type and Insider Trading Profits

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

	CEO TRADES		*NON-CEO SENIOR EXECUTIVE TRADES*		*LESSER OFFICER TRADES*	
	PURCHASE TRADES	SALE TRADES	PURCHASE TRADES	SALE TRADES	PURCHASE TRADES	SALE TRADES
	Coeff. (T-Stat)	Coeff. (T-Stat)	Coeff. (T-Stat)	Coeff. (T-Stat)	Coeff. (T-Stat)	Coeff. (T-Stat)
INTERCEPT	0.033**	0.011	0.022**	0.009	0.012**	0.009
	(2.51)	(1.44)	(2.29)	(1.34)	(2.05)	(0.98)
RECORD	0.039**	0.004	0.015	0.002	-0.003	0.004
	(2.56)	(0.78)	(1.51)	(0.31)	(-0.38)	(0.42)
UNFRUGAL	0.045***	0.010	0.028**	0.008	0.008	0.003
	(2.79)	(1.35)	(2.53)	(1.16)	(1.40)	(0.56)
FRAUD	0.008	0.007	0.002	0.004	-0.003	0.002
	(1.28)	(1.02)	(0.58)	(0.73)	(-0.43)	(0.25)
ERROR	0.004	0.005	0.004	-0.001	-0.002	0.002
	(0.68)	(0.79)	(0.35)	(-0.14)	(-0.36)	(0.29)
BANKRUPT	0.003	0.007	-0.004	0.007	-0.002	0.003
	(0.27)	(1.04)	(-0.60)	(0.86)	(-0.33)	(0.44)
ADJUSTED R2	0.01	0.01	0.01	0.01	0.01	0.01
NO. OF OBSERVATIONS	2,049	28,765	2,017	12,250	1,031	9,149

Table 5, Panel A (CONTD.)

Table 5, panel A presents the results for the relation between CEO type and the profitability of insiders' purchases and sales transactions. We consider three groups of insiders – CEOs, non-CEO senior executives and lesser officers. The dependent variable for each executive group is the trading profits for purchases or sales. The dependent and independent variables are defined as follows. *TRADING_PROFIT* 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: $(Ri - Rf) = \alpha + \beta1\ (Rmkt - Rf) + \beta2\ SMB + \beta3\ HML + \beta4\ UMD + e$. 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 a CEO was convicted of any legal infractions, 0 otherwise; *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.

Tests for the differences in coefficients for *RECORD* and *UNFRUGAL* across executives' transactions are as follows:

RECORD:	CEO purchases – Senior Executive purchases > 0	p-value = 0.04**
	CEO purchases – Officer purchases >0	p-value = 0.01***
	Senior Executive purchases – Officer purchases >0	p-value = 0.08*
UNFRUGAL:	CEO purchases – Senior Executive purchases >0	p-value = 0.02**
	CEO purchases – Officer purchases >0	p-value = 0.01***
	Senior Executive purchases – Officer purchases >0	p-value = 0.27

Table 5, Panel B: Predictive Ability of Executive Trades for Future Operating Performance

$$SURPRISE_{i,q} = \beta 0 + \beta 1\ NET\_TRADES_{i,q} + \beta 2\ RECORD_i + \beta 3\ NET\_TRADES_{i,q} * RECORD_i + \beta 4\ UNFRUGAL_i + \beta 5\ NET\_TRADES_{i,q} * UNFRUGAL_i + \beta 6\ MKT\_CAP_{i,q} + \beta 7\ BTM_{i,q} + \varepsilon_{i,q}$$

	CEO TRADES		*NON-CEO SENIOR EXECUTIVE TRADES*		*LESSER OFFICER TRADES*	
	ANN_CRET	*CH_EARN*	*ANN_CRET*	*CH_EARN*	*ANN_CRET*	*CH_EARN*
	Coeff. (t-stat)	Coeff. (t-stat)	Coeff. (t-stat)	Coeff. (t-stat)	Coeff. (t-stat)	Coeff. (t-stat)
INTERCEPT	0.048**	-0.059	0.052*	-0.053	0.058*	-0.050
	(2.06)	(1.55)	(1.88)	(-1.23)	(1.94)	(-1.24)
NET_TRADES	-0.193	0.028	-0.137	0.014	-0.152	0.019
	(-0.30)	(0.23)	(-0.22)	(0.36)	(-0.20)	(0.12)
RECORD	-0.005	0.002	0.001	0.002	-0.002	0.003
	(-1.21)	(0.14)	(0.24)	(0.17)	(-0.18)	(0.21)
*RECORD * NET_TRADES*	1.382**	0.783**	0.542	0.202	0.124	0.141
	(2.48)	(2.26)	(1.32)	(1.27)	(0.48)	(0.55)
UNFRUGAL	0.004	-0.003	0.002	-0.001	0.002	-0.003
	(0.95)	(-0.65)	(0.37)	(-0.18)	(0.54)	(-0.31)
*UNFRUGAL * NET_TRADES*	0.899**	0.917**	0.631**	0.592**	0.289	0.203
	(2.56)	(2.09)	(2.04)	(2.04)	(1.42)	(1.18)
MKT_CAP	-0.002***	-0.003	-0.001***	-0.005	-0.002**	-0.006
	(-3.02)	(-1.41)	(-2.90)	(-1.50)	(2.52)	(-1.24)
BTM	0.005	-0.003	0.005	-0.003	0.003	-0.008
	(0.67)	(-0.78)	(0.53)	(-0.64)	(0.42)	(-0.82)
T-statistics: *NET_TRADES + RECORD * NET_TRADES*	2.05 **	2.57 **	1.04	1.38	-0.26	0.18
T-statistics: *NET_TRADES + UNFRUGAL * NET_TRADES*	1.98 *	2.44 **	1.88*	2.03**	0.94	1.22
ADJUSTED R2	0.01		0.01		0.01	
NO. OF OBSERVATIONS	2,936		1,791		1,145	

Table 5, panel B presents the results of the regressions of future operating performance on CEOs', non-CEO senior executives' and lesser officers' insider trading activities. The dependent variable *SURPRISE* is either *ANN_CRET* or *CH_EARN*. The variables are defined as follows: *ANN_CRET* is the 3 day market adjusted buy and hold return centered around an earnings announcement for the quarter; *CH_EARN* is the earnings surprise for the quarter from a seasonal random walk model of quarterly earnings scaled by total assets; *RECORD* is a dummy variable that equals 1 if a CEO was convicted of any legal infractions, 0 otherwise; *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; *NET_TRADES* is 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; *MKT_CAP* is the natural logarithm of market capitalization of the firm; *BTM* is the book value of equity divided by the market value of equity. 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, Panel C
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

Table 5, panel C 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 (from frugal to unfrugal or vice versa) 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. The variables are defined as follows: *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.

Table 6
Executive Trading Profits, CEO Type and CEO Tenure

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

	CEOS		*NON-CEO SENIOR EXECUTIVES*	
	COEF. (T)	COEF. (T)	COEF. (T)	COEF. (T)
INTERCEPT	0.018*	0.016*	0.018**	0.016*
	(1.79)	(1.84)	(2.04)	(1.90)
RECORD	0.038***		0.007	
	(2.65)		(0.47)	
UNFRUGAL		0.035*		0.009
		(1.97)		(1.22)
TENURE	0.009	0.011	0.008	0.005
	(1.56)	(0.81)	(0.81)	(0.52)
RECORD × TENURE	-0.003		0.005	
	(-0.21)		(0.66)	
UNFRUGAL × TENURE		0.031**		0.018**
		(2.25)		(2.18)
T-statistics: *TENURE +CEO TYPE * TENURE*	1.01	2.51**	1.29	2.36**
ADJUSTED R2	0.05	0.07	0.04	0.05
NO. OF OBS.	2,049	2,049	2,017	2,017

Table 6 (CONTD.)

Table 6 presents the results of the relation between executives' trading profits from purchases and the type of the CEO over the tenure of the CEO. The variables are defined as follows: *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; *RECORD* is a dummy variable that equals 1 if a CEO was convicted of any legal infractions, 0 otherwise; *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; *TENURE* is a dummy variable that equals 1 if the CEO has been in his current position for more than 3 years, 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 7: Shaping of Information and Control Environment
Panel A: Information Environment

$$INFORMATION_{i,t} = \beta 0 + \beta 1\ CEO\ TYPE_i + \beta 2\ TENURE_{i,t} + \beta 3\ TENURE_{i,t} * CEO\ TYPE_i + \sum \beta n\ CONTROLS_{i,t} + \varepsilon_{i,t}$$

	INFORMATION ENVIRONMENT VARIABLE			
	FOG		BAS	
	COEF. (T)	COEF. (T)	COEF. (T)	COEF. (T)
INTERCEPT	17.761***	17.546***	0.379***	0.377***
	(38.89)	(39.27)	(11.97)	(10.45)
RECORD	0.083		0.011	
	(0.79)		(1.60)	
UNFRUGAL		0.248*		0.072**
		(1.81)		(1.99)
TENURE	0.176	0.104	-0.017**	-0.043**
	(1.46)	(0.86)	(-2.30)	(-2.25)
RECORD × TENURE	0.005		0.020**	
	(0.34)		(2.14)	
UNFRUGAL × TENURE		0.048		0.009**
		(1.28)		(2.11)
FIRM AGE	-0.006	-0.005		
	(-1.54)	(-1.20)		
SPECIAL ITEMS	-1.130	-0.264		
	(-0.25)	(-1.14)		
EARNINGS VOL	0.001	0.001		
	(1.10)	(1.17)		
DELAWARE	0.049	0.066		
	(0.35)	(0.45)		
SEO	0.616***	0.508***		
	(3.98)	(3.50)		
MKT_CAP	0.129**	0.126**	-0.019***	-0.018***
	(2.45)	(2.38)	(-7.56)	(-7.05)
TRADING VOL			-0.001***	-0.001***
			(-8.29)	(-8.41)
SHARE PRICE			0.001***	0.001***
			(5.10)	(5.04)
EXCH			0.001	-0.004
			(0.03)	(-0.14)
RET VOLATILITY	0.566	0.751		
	(0.83)	(1.13)		
T-statistics: *TENURE +CEO TYPE * TENURE ≠ 0*	1.54	1.74 *	0.48	0.58
T-statistics: *CEO TYPE +CEO TYPE * TENURE ≠ 0*	0.88	2.04**	2.33**	2.48**
ADJUSTED R2	0.03	0.04	0.17	0.18
NO. OF OBSERVATIONS	2,380	2,380	2,353	2,353

Panel B: Control Environment

$$CONTROL\ ENV_{i,t} = \beta 0 + \beta 1\ CEO\ TYPE_i + \beta 2\ TENURE_i + \beta 3\ TENURE_i * CEO\ TYPE_i + \sum \beta n\ CONTROLS_{i,t} + \varepsilon_{i,t}$$

	CONTROL ENVIRONMENT VARIABLE					
	DIR SHARES		SOCIAL		GOV SCORE	
	COEF. (T)	COEF. (T)	COEF. (T)	COEF. (T)	COEF. (T)	COEF. (T)
INTERCEPT	32.513*** (7.73)	33.001*** (6.95)	-0.172 (-0.74)	-0.262 (-1.06)	2.170*** (22.71)	2.041*** (24.65)
RECORD	-0.284 (-0.89)		-0.164 (-1.08)		-0.021 (-0.52)	
UNFRUGAL		-1.463 (-1.47)		0.087 (0.97)		0.049 (1.48)
TENURE	0.511 (0.31)	1.410 (0.88)	0.022 (0.37)	0.021 (0.33)	0.028 (0.74)	0.022 (0.65)
RECORD × TENURE	-0.689** (-2.01)		0.022 (1.58)		0.007* (1.69)	
UNFRUGAL × TENURE		-2.620** (-2.57)		0.048** (2.56)		0.014** (2.06)
MKT_CAP	-3.152*** (-6.46)	-3.195*** (-5.98)	0.045 (1.49)	0.048 (1.62)	0.058*** (5.78)	0.064*** (6.46)
MTB	0.013 (1.19)	0.015 (1.36)	-0.011* (-1.82)	-0.011** (-2.02)	0.001** (2.53)	0.001* (1.93)
LEVERAGE	-0.029 (-0.58)	-0.028 (-0.57)				
RET VOLATILITY			0.942** (2.45)	1.028*** (2.69)	0.656*** (3.80)	0.662*** (3.88)
T-statistics: *TENURE +CEO TYPE * TENURE ≠ 0*	-0.62	-1.82 *	1.56	2.62 ***	1.79 *	2.35 **
T-statistics: *CEO TYPE +CEO TYPE * TENURE ≠ 0*	-2.20**	-2.78***	-0.64	2.86***	0.27	2.57**
ADJUSTED R2	0.09	0.10	0.03	0.04	0.04	0.05
NO. OF OBS.	2,049	2,049	891	891	1,644	1,644

Table 7 (Cont.)

Table 7 presents the results of models that examine whether the CEO shapes various aspects of the information and control environment over his/ her tenure. Panel A considers proxies for the information environment (FOG, BAS), and Panel B considers proxies for the governance / control environment of the firm (SOCIAL, DIR_SHARES, GOVSCORE). The variables are defined as follows: 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); DIR_SHARES is the median stock-based compensation of the independent directors measured as 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; RECORD is a dummy variable that equals 1 if a CEO was convicted of any legal infractions, 0 otherwise; 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; TENURE is a dummy variable that equals 1 if the CEO has been in his current position for more than 3 years, and 0 otherwise; *FIRM AGE* is the number of years a firm has been on CRSP; *SPECIAL ITEMS* is the special items scaled by book value of assets; *EARNINGS VOL* is the standard deviation of operating earnings in the last five fiscal years; *DELAWARE* is a dummy variable that equals 1 if a company is incorporated in Delaware and 0 otherwise; *SEO* is a dummy variable that equals 1 if a firm issues debt or equity in the current year and 0 otherwise; *MKT_CAP* is the natural logarithm of market capitalization of a firm; *TRADING VOL* is the total trading volume over the 15 month period starting from 1/1 in the current year to 3/31 in the next year; *SHARE PRICE* is the closing stock price of the firm at the end of the year; *EXCH* is a dummy variable that equals 1 if the firm traded on the exchanges NYSE, NASDAQ, or AMEX; *RET VOLATILITY* is the standard deviation of monthly stock returns over the year; *MTB* is the market value of equity divided by the book value of equity; *LEVERAGE* is the debt to equity ratio of the firm for the year. T-statistics appear in parentheses and are based on standard errors clustered by firm and year. ***, **, * denote statistical significance at the 1, 5, and 10% levels respectively.

Table 8: Executive Trading Profits, Information and Control Environment and CEO Tenure

$TRADING\_PROFIT_{i,t} = \beta 0 + \beta 1\ INFORMATION_{i,t \text{ or } CONTROL\ ENV_{i,t}} + \beta 2\ TENURE_{i,t} + \beta 3\ INFORMATION_{i,t \text{ or } CONTROL\ ENV_{i,t}} * TENURE_{i,t} + \varepsilon_{i,t}$

Panel A: Firms Run by Record Holder CEOs

	CEO TRADES					*NON-CEO SENIOR EXECUTIVE TRADES*				
	INDEPENDENT INFORMATION / CONTROL ENVIRONMENT VARIABLE									
	FOG	BAS	DIR SHARES	SOCIAL	GOVSCORE	FOG	BAS	DIR SHARES	SOCIAL	GOVSCORE
	COEF. (T)	COEF. (T)	COEF. (T)	COEF. (T)	COEF. (T)	COEF. (T)	COEF. (T)	COEF. (T)	COEF. (T)	COEF. (T)
INTERCEPT	0.032**	0.023**	0.035***	0.370**	0.300**	0.018**	0.009*	0.024**	0.031*	0.018*
	(2.43)	(2.08)	(2.64)	(2.54)	(2.04)	(1.98)	(1.71)	(2.14)	(1.92)	(1.76)
INFORMATION or CONTROL ENV	0.004	0.004	-0.005	0.002	0.007	0.006	0.007	-0.008	0.003	0.010
	(1.15)	(1.34)	(-1.26)	(0.57)	(1.15)	(1.23)	(1.26)	(-1.41)	(0.24)	(0.39)
TENURE	0.008*	0.005	0.008*	0.004	0.015**	0.005	-0.010	0.005	0.07	0.006*
	(1.77)	(0.87)	(1.85)	(1.20)	(2.08)	(1.29)	(-0.11)	(0.86)	(1.14)	(1.79)
TENURE × INFORMATION or CONTROL ENV	0.003	0.007**	0.004	0.003	0.003	0.003	0.005*	0.007	0.003	0.008
	(0.56)	(2.17)	(0.95)	(0.40)	(1.04)	(0.37)	(1.95)	(1.07)	(0.54)	(1.34)
ADJUSTED R2	0.06	0.12	0.08	0.06	0.13	0.03	0.11	0.04	0.04	0.09
NO. OF OBSERVATIONS	308	169	263	108	130	259	110	152	67	122

Panel B: Firms Run by Unfrugal CEOs

	CEO TRADES					*NON-CEO SENIOR EXECUTIVE TRADES*				
	INDEPENDENT INFORMATION / CONTROL ENVIRONMENT VARIABLE									
	FOG	BAS	DIR SHARES	SOCIAL	GOVSCORE	FOG	BAS	DIR SHARES	SOCIAL	GOVSCORE
	COEF. (T)	COEF. (T)	COEF. (T)	COEF. (T)	COEF. (T)	COEF. (T)	COEF. (T)	COEF. (T)	COEF. (T)	COEF. (T)
INTERCEPT	0.036**	0.032**	0.041***	0.031**	0.350***	0.023*	0.018**	0.027**	0.022**	0.027**
	(2.18)	(2.38)	(2.62)	(2.33)	(2.87)	(1.94)	(2.23)	(2.28)	(2.04)	(2.37)
INFORMATION or CONTROLENV	0.003	0.004	-0.004	0.005*	-0.008	0.050	0.004	-0.003	0.003	-0.003
	(1.22)	(1.58)	(-1.44)	(1.72)	(0.67)	(1.38)	(1.01)	(-0.97)	(1.45)	(-0.30)
TENURE	0.021**	0.015**	0.020**	0.018***	0.014*	0.020**	0.015**	0.012*	0.015**	0.006
	(2.21)	(2.14)	(2.07)	(2.58)	(1.89)	(2.07)	(2.27)	(1.74)	(2.23)	(1.33)
TENURE × INFORMATION or CONTROL ENV	0.005*	0.006**	-0.008**	0.015***	0.016**	0.001	0.007**	-0.004**	0.008**	0.011**
	(1.78)	(2.07)	(-2.26)	(2.62)	(2.56)	(1.20)	(2.08)	(-2.02)	(2.16)	(2.06)
ADJUSTED R2	0.19	0.08	0.43	0.40	0.58	0.11	0.05	0.22	0.31	0.25
NO. OF OBSERVATIONS	773	542	546	267	439	498	410	318	147	286

Panel C: Firms Run by CEOs who are Neither Record Holders nor Unfrugal

	CEO TRADES					*NON-CEO SENIOR EXECUTIVE TRADES*				
	INDEPENDENT INFORMATION / CONTROL ENVIRONMENT VARIABLE									
	FOG	BAS	DIR SHARES	SOCIAL	GOVSCORE	FOG	BAS	DIR SHARES	SOCIAL	GOVSCORE
	COEF. (T)	COEF. (T)	COEF. (T)	COEF. (T)	COEF. (T)	COEF. (T)	COEF. (T)	COEF. (T)	COEF. (T)	COEF. (T)
INTERCEPT	0.018	0.015**	0.016*	0.026**	0.018**	0.022	0.007	0.007	0.018**	0.013*
	(1.18)	(2.04)	(1.97)	(2.15)	(2.08)	(1.31)	(1.64)	(1.38)	(2.20)	(1.71)
INFORMATION/ CONTROLENV	0.004	0.004	0.004	-0.007*	0.003	0.006	0.007	-0.001	-0.005	0.005
	(0.31)	(1.60)	(0.64)	(-1.73)	(0.75)	(0.64)	(1.62)	(-0.15)	(-1.30)	(0.82)
TENURE	0.007	0.004	0.007	0.003	0.005	0.004	0.007	0.005	0.006	0.001
	(1.46)	(1.03)	(1.28)	(0.97)	(1.53)	(1.26)	(0.54)	(0.99)	(0.74)	(0.86)
TENURE × INFORMATION/ CONTROL ENV	-0.002	0.005	-0.003	0.004	-0.001	-0.005	0.007	0.001	0.004	0.002
	(-0.88)	(1.55)	(-0.67)	(0.55)	(-0.12)	(-1.18)	(1.36)	(0.17)	(0.63)	(0.27)
ADJUSTED R2	0.02	0.10	0.06	0.19	0.06	0.02	0.08	0.02	0.10	0.02
NO. OF OBSERVATIONS	616	558	493	260	503	506	429	331	139	395

Table 8 (CONTD.)

Table 8 presents the results of models that examine whether the change in trading profits of CEOs' and non-CEO senior executives' purchases over the tenure of the CEO is associated with the changes in various aspects of a firm's information and control environment. These models are analyzed for subsamples of firms run by CEOs of certain types – record holder CEOs (Panel A), unfrugal CEOs (Panel B) and CEOs who are neither record holders nor unfrugal (Panel C). The variables are defined as follows: *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 ; TENURE is a dummy variable that equals 1 if the CEO has been in his current position for more than 3 years, and 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); DIR_SHARES is the median stock-based compensation of the independent directors measured as 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; RECORD is a dummy variable that equals 1 if a CEO was convicted of any legal infractions, 0 otherwise; 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. 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 9: Real Time Classification of Executive 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

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

	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)
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)
ADJUSTED 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

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

	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)
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)
ADJUSTED 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

Table 9 (CONTD.)

Table 9 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 on their prior purchase of assets or criminal records. We estimate several versions of these models where we require a minimum number of years (ranging from 1 through 10) in an executive's tenure for him/her to be included in the models. The variables are defined as follows: *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; RECORD is a dummy variable that equals 1 if a CEO was convicted of any legal infractions as of the year of the measurement of trading profits, 0 otherwise; 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.

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
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. (*DIR_SHARES*)	The median stock-based compensation of the independent directors measured as 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)

Appendix (CONTD.)

Variable	Measurement	Data Source
Legal infractions of an executive (*RECORD*)	A dummy variable that equals 1 if an 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)
Luxury asset ownership by an executive. (*UNFRUGAL*)	A dummy variable that equals 1 if an 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. (*DURATION*)	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. (*ERRORS*)	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 around 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
Firm Size. (*MKT_CAP*)	The natural logarithm of market capitalization of the firm.	Compustat
Book to market. (*BTM*)	The book value of equity divided by the market value of equity.	Compustat
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 incumbent CEO is unfrugal, and 0 otherwise.	Find Out The Truth.com (FOTT)

Appendix (CONTD.)

Variable	Measurement	Data Source
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 incumbent 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 incumbent CEO to the new CEO, and 0 otherwise	Find Out The Truth.com (FOTT)
The age of the firm. (*FIRM AGE*)	The number of years a firm has been on CRSP.	CRSP
Special items. (*SPECIAL ITEMS*)	The special items scaled by book value of assets.	Compustat
Earnings volume. (*EARNINGS VOL*)	The standard deviation of operating earnings in the last five fiscal years.	Compustat
Incorporation in Delaware. (*DELAWARE*)	A dummy variable that equals 1 if a company is incorporated in Delaware and 0 otherwise.	Compustat
Seasoned equity offerings. (*SEO*)	SEO is a dummy variable that equals 1 if a firm issued debt or equity in the current year and 0 otherwise.	Compustat
Trading volume. (*TRADING VOL*)	The total trading volume over the 15 month period starting from 1/1 in the current year to 3/31 in the next year.	TAQ
Share price. (*SHARE PRICE*)	The closing stock price of the firm at the end of the year.	Compustat
Exchange listing. (*EXCH*)	A dummy variable that equals 1 if the firm traded on the exchanges NYSE, NASDAQ and AMEX.	TAQ
Return volatility. (*RET VOLATILITY*)	The standard deviation of monthly stock returns over the year.	CRSP
Leverage. (*LEVERAGE*)	The debt to equity ratio of the firm for the year.	Compustat
Tenure. (*TENURE*)	A dummy variable that equals 1 if the CEO has been in his current position for more than 3 years, and 0 otherwise.	ExecuComp, BoardEx
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.