

# Executives' Legal Records and Insider Trading Activities

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## Abstract

We examine how and why insider trading varies across senior executives and their firms. As predicted, the profitability of both purchases and sales are higher for “recordholder” executives (those who have a record of legal infractions), than for other “non-recordholder” executives at the same firms. The profitability of recordholder executives’ purchases and sales decrease significantly with proxies for strong information and governance environments, suggesting that recordholders have a relatively higher propensity to exploit inside information given the opportunity. Finally, our classification of executives (recordholder status) can predict future firm returns and firm-specific news and information events.

**Keywords:** Legal infractions, insider trading; capital market information.

**JEL Classification Codes:** G30; G34; G38

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## 1. Introduction

Few corporate legal issues capture public attention like insider trading. These cases epitomize some of the worst stereotypes of Wall Street and often involve high profile individuals. Both the Securities and Exchange Commission (SEC) and the Department of Justice (DOJ) have publicly identified insider trading as an enforcement priority, and there has been a surge in insider trading cases prosecuted by the U.S Attorney's office in the last few years.<sup>1</sup> Despite heightened enforcement and crackdowns, trading on inside information is likely to continue being a widespread phenomenon, and understanding the minds and motives of the insiders behind the trades continues to serve as a promising research agenda.

The academic literature provides ample evidence of insiders possessing nonpublic information about their firms' future performance and of associated superior insider trading performance (e.g., Jaffe 1974, Seyhun 1986, Rozeff and Zaman 1998, Lakonishok and Lee 2001). However, little research exists on the personal characteristics of executives associated with insider trading, and on how these personal attributes moderate the relation between insider trading and firms' information and control environments. Further, if executives with certain characteristics are more likely to trade on inside information, then how the trading behaviors of these executives influence the information flow in capital markets is important to understand.<sup>2</sup>

Our objectives are two-fold. First, we examine how and why the profitability of insiders' trades varies across individual senior executives. In principle, the profitability of executives' trades will depend on both 1) an executive's *propensity* to exploit inside information and 2) the *opportunity* to exploit inside information based on the extent to which there is material private information and corporate control systems do not restrict trading on such information (hereafter "information and control environment").<sup>3</sup> Second, we examine whether the trading behaviors of "high propensity" executives provide information to the market about the firm's future performance.

We examine how the propensity to exploit inside information varies by executive "type", controlling for firm fixed effects to hold constant inside trading opportunities. We measure an executive's type based

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<sup>1</sup> Nate Raymond, "After Setbacks, N.Y. Prosecutors Resume Insider Trading Crackdown," June 3, 2016, <http://www.reuters.com/article/us-usa-insidertrading-idUSKCN0Z915C>.

<sup>2</sup> We use the terms "corporate insiders" or "insiders" to refer to those officers in a firm who are required to file trading reports under Section 16(a) of the Securities and Exchange Act of 1934 (often referred to as "Section 16 insiders"). Although Section 10(b) of the Securities and Exchange Act of 1934 and rule 10b-5 outlaws trades based on *material*, nonpublic information, we use the term "inside information" to refer to private information about a corporation that is available to insiders, whether that information is considered legally "material" under the securities laws. Therefore, the insider trading analyzed here is not necessarily illegal.

<sup>3</sup> 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 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 insider trading profits.

on one aspect of his behavior outside the workplace: whether the executive has broken the law (“recordholder”) or has a clean record (“non-recordholder”). We interpret legal infractions, including driving under the influence of alcohol, drug-related charges, domestic violence, reckless behavior, sexual assault, and speeding tickets, as a symptom of a relatively high disregard for rules/laws and lack of self-control, and posit that recordholders have a higher propensity to exploit inside information for financial gain.

As predicted, the profitability of both share purchases and sales by recordholder executives is significantly higher than for other senior executives *at the same firms*. Note that this analysis includes firm fixed effects to control for all other firm-specific factors that can affect trade profitability. Further, the profitability of both purchases and sales is significantly increasing in the severity of the infraction and the profitability of purchases is increasing in the number of infractions. Our results are robust to measuring type in real time (i.e., classifying executives based on their *prior* legal infractions only) and to analyzing trades both before and after infractions take place. We interpret these results as support for the hypothesis that recordholder executives have a relatively high propensity to trade on inside information.

Next, we examine whether the profitability of executives’ trades varies with proxies for their firms’ information and control environments. We find that the profitability of purchases and sales by recordholders is significantly negatively related to our proxies for strong information and corporate control environments (compared to non-recordholders). Interestingly, in the case of sales, a strong information environment reduces profits by non-recordholders as well. These results support the joint hypothesis that our proxies for firms’ information and control environments capture meaningful differences in opportunities to trade on inside information and that recordholder executives have a relatively high propensity to exploit inside information. Repeating the above tests by ignoring executive type generally yields insignificant results, suggesting that studies examining the relation between insider trading profits and firms’ information and/or control environments without taking into account an executive’s propensity to trade are possibly misspecified.

In our final set of tests, we examine whether recordholders’ trades can predict future returns and information events in the firm. We also analyze whether sophisticated market participants mimic insiders’ trades. One goal of this inquiry is to observe whether our classification of executive type provides incremental information to the market over and above the novel classification of trades in Cohen et al. (2012). Cohen et al. (2012) classify insiders as either “routine” or “opportunistic” traders by analyzing their past trading history and look for consistent patterns in the timing of their trades. They find that the trades of opportunistic traders are more powerful predictors of future firm returns and firm-specific news and events. We investigate whether our recordholder classification has incremental power in predicting

future returns over and above the routine-opportunistic classification. If so, then our analyses would provide another characteristic of insiders that can predict future firm-specific information.

We find that in addition to the routine-opportunistic classification, splitting trades on executive type (their past legal records) significantly increases their power in predicting returns. For instance, while following portfolio strategies of both opportunistic recordholders and opportunistic non-recordholders earns large significant returns, trades by opportunistic recordholders earn significantly higher returns than trades by opportunistic non-recordholders.

Further, our classification of executives provides incremental information on future earnings announcement returns. For example, opportunistic sales by recordholders have significant predictive power for future earnings announcement returns. However, the opportunistic sales of non-recordholder executives do not predict announcement returns. We deviate in this result from Cohen et al. (2012): they do not find evidence that opportunistic sales have significant predictive power for future announcement returns. Thus, these results imply that looking at an individual's psychological type can provide information incremental to that obtained from their prior trades and when used together results are even stronger. Finally, our results suggest that institutional investors adjust their holdings after opportunistic purchases by both types of executives and after opportunistic sales by recordholder executives. We find little evidence that institutions provide liquidity to either category of inside traders.

The interpretation of our results is subject to the caveat that our analysis does not directly address the issue of *illegal* insider trading. We use data on insider trading from publicly available reports filed with the SEC as required by Section 16(a) of the Securities and Exchange Act of 1934. As Bainbridge [2000] notes, it is not clear whether executives will report their violations of Rule 10b5-1 which prohibits insider trading based on material, nonpublic information, suggesting that we may not capture the most egregious cases of insider trading. Even if executives do report all trades, as we assume, we cannot isolate trades based on *material* non-public information. Moreover, our analysis does not capture insider trading accomplished by executives disclosing inside information to others to trade on their behalf. To shed some light on whether executive type is associated with inside trading based on material non-public information, we conduct additional analyses on a sample of firms that declared bankruptcy between 1996 and 2008. We find results consistent with our main hypotheses -- insider selling starts several years preceding bankruptcy, but the net sales over the 3 years prior to bankruptcy are driven largely by recordholder CEOs.

Our paper makes several contributions. First, we provide evidence that senior executives' propensity to exploit inside trading opportunities varies in an intuitive way with their "psychological type", identified on the basis of their legal records. This is a key addition to research on insider trading because how an executive's traits (holding firm-level incentives and opportunities constant), in particular a disregard for

laws, are associated with his insider trading activities has received little attention in the literature. Further, the literature in general has documented abnormal returns following purchases, but failed to do so for sales. Our analyses produce evidence that the profitability of *both purchases and sales* by recordholder executives is significantly higher than for other senior executives at the same firm.

The above results supplement the evidence in Davidson et al. (2015) (on the relation between CEO type and financial statement fraud) that recordholder status captures meaningful differences in managerial style that may be useful in other contexts. The evidence in this paper adds to the conclusions of Davidson et al. (2015) in two ways. First, one potential issue in Davidson et al. (2015) is the generalizability of their conclusions. Financial fraud is rare (occurring in less than 1% of firms in the Compustat population) and is an indication of extreme corporate misconduct. However, most senior executives trade in their firm's stock and therefore our results here further validate the role of executive psychological type on different types of corporate outcomes. Next, fraud represents an extreme act of misconduct and one may have to be a special "psychological type" to have the propensity to engage in such activity. While the most notorious cases of illegal trading exemplify extreme misconduct, a major portion of insider trading is perhaps less egregious due to the fact that what constitutes "material" non-public information and an act of breach of fiduciary duty can sometimes be open to interpretation. On average, it may be easier to rationalize and in many cases difficult to prove the illegality of insiders' trades. Thus, the propensity to engage in insider trading activities may not require an individual to have a high disregard for laws and lack of self-control, as characterized by our recordholder measure. That we find evidence of significant associations between executives' recordholder status and their trading profits as well as subsequent capital market events establishes that this measure can capture behavioral differences for a wide range of corporate activities, and informs about another determinant and market consequence of insider trading activities.

Second, we document that the profitability of trades by recordholder senior executives decreases significantly with proxies for relatively strong information and control environments both in an absolute sense and relative to other executives. In contrast, we fail to detect significant negative relations in most cases between insider trading and any of our proxies for information or control environments when executives are treated as homogeneous. This alludes to the importance of incorporating executive type in models and provides a possible explanation for mixed results in the prior literature on the effects of information and control environments on insider trading profits.

Next, our results complement Cohen et al. (2012) in documenting that our recordholder classification of executives influences the information flow in capital markets through their trades, and this information is incremental to that from an examination of the prior trading behavior of these executives.

Finally, our paper in conjunction with Davidson et al. (2015) provides evidence on how the stewardship of corporate resources varies with the recordholder status of top executives and thus may

have practical implications for corporate boards. The collective evidence that even minor transgressions are systematically associated with insider trading profits and corporate misreporting raises the issue of whether boards need to be alert to criminal records (including traffic violations which are unlikely to be monitored) during the hiring process or afterwards. Additionally, we find that the majority of executives (68% of our sample) commit their first crime after being hired, indicating the benefits of monitoring executives' "off-the-job" behavior during their tenure. Our results may also be of interest to regulators and policy makers that wish to discourage opportunistic inside trading as a means of investor protection.<sup>4</sup>

## **2. Theoretical Framework and Outline of Analyses**

A large body of research suggests that senior officers and directors trade on more valuable information than those outside the firm (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 (Lakonishok and Lee 2001, Ravina and Sapienza 2010, Jagolinzer et al. 2011). One reason for these findings is that regardless of propensity to exploit inside information many insider sales will be for liquidity purposes. Another explanation for this asymmetry in trading profits is litigation risk (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 management traded on material private information. Lawsuits are less likely following insider purchases because price increases following purchases only result in opportunity costs for investors.

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

Two recent studies examine the relation between insider trading profitability and firms' control environments. Jagolinzer et al. (2011) document that the general counsel can effectively mitigate informed trading and that the choice of corporate governance affects the extent to which insiders trade on superior information. Ravina and Sapienza (2010) measure governance using G-score and board size, and

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<sup>4</sup>For instance, the SEC has paid a lot of attention recently to "bad actors" in the private placement space (<http://media.mofo.com/files/uploads/Images/130715-Bad-Actor-Disqualifications.pdf>).

find that insiders earn higher trading profits at firms with the “weakest” governance. There is also evidence that insider trading profits are associated with a firm’s quality of internal control systems and its anti-shareholder mechanisms (Skaife et al. 2013; Cziraki et al. 2013).

In general, while prior research has studied insider trading across various firm-specific, institutional and economic environments, most of it has treated executives as homogeneous with respect to their propensity to trade on inside information. There are two exceptions. Bhattacharya and Marshall (2012) document that top managers who were indicted for illegal insider trading between 1989 and 2002 were richer and better paid. They speculate but do not test whether psychological factors contribute to insider trading behavior. Hillier et al. (2015) document that personal attributes of an executive (as proxied by fixed effects) explain up to a third of the variability in insider trading performance and dominate unobservable and observable firm and trade characteristics. While the fixed effect approach points out the importance of individual characteristics, it does not tell us which characteristics matter. Hillier et al. (2015) do find that the individual fixed effects are correlated with observable characteristics such as the insider’s year of birth, education and gender and surmise that these characteristics are likely related to more fundamental attributes that lead to differences in style.<sup>5</sup> Our paper complements and adds to this emerging line of research and examines how an unobservable psychological trait in an executive (as proxied by his legal record) is related to an individual’s trading behavior.<sup>6</sup>

Our first set of hypotheses concerns the relation between executives’ propensity to trade on information and their psychological type. The hypothesized association between legal records and the propensity to trade on inside information is based on the criminology and psychology literatures. The criminology literature defines crime as an act of force or fraud undertaken in the pursuit of self-interest, and argues that individuals with greater propensities to commit crimes are likely to have low self-control and are less likely to conform to social norms and laws (Gottfredson and Hirschi 1990). Blickle et al. (2006) argue that low self-control and high hedonism are positively related to the likelihood of

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<sup>5</sup> While the evidence in Hillier et al. (2015) is informative, we note that it is not clear why observable demographics, such as gender and education, are a measure of an individual’s fundamental values. For instance, research on gender and ethics has produced mixed results, which questions the relation as well as the directional predictions (see for example, Babin and Robin 1997; Dato-On et al. 2006). Nevertheless, it is possible that these demographics capture some aspects of values and cognitive biases in individuals, and we check that our measure of legal infractions is capturing a different dimension.

<sup>6</sup> In unreported analyses (available in the Internet Appendix, which is included at the end of this manuscript for convenience) we test the correlations between the recordholder measure and other observable and unobservable characteristics of senior executives whenever data is available (namely, wealth, MBA degree, top MBA degree, age, gender, overconfidence, military experience, born during a recession, career start during a recession, and narcissism). We also estimate a regression with our measure of recordholder status as the dependent variable and the above characteristics as independent variables. We do not find statistically significant associations between recordholder status and these traits (other than gender; however, only 4% of our sample comprises female executives and our results continue to hold once we eliminate these observations), indicating that this measure is capturing a different attribute.

committing white-collar crime. Further, individuals displaying unethical tendencies, such as past criminal behavior, tend to persist in this type of behavior (Gendreau et al. 1996, Shu et al. 2011). Fisman and Miguel (2007) find that United Nations diplomats' unpaid parking tickets in New York City are significantly related to corruption and legal enforcement in their home country, suggesting that even minor legal violations can capture differential behavioral norms. Finally, Davidson et al. (2015) 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 earn larger abnormal returns from their trades. Alternatively, two arguments oppose finding such a relation. First, the determination that a trade made by an executive is based on *material* non-public information is often open to interpretation. Furthermore, the timing of the trade may also be controversial, especially if an insider trades contemporaneously with public disclosure of the material non-public information in his possession (Bainbridge 2000). Thus, it is difficult to establish the illegality of insider trades in most cases, and perhaps the decision to trade is easier to rationalize by an insider. The degree of disregard for laws and self-control needed for such rationalization behind trading may be quite low, thus mitigating any behavioral differences between recordholder and non-recordholder executives. Second, the trades reported by executives include both legal and illegal trades. In fact, we are perhaps missing the most egregious cases of insider trading as executives are unlikely to report those (we are also missing trades made due to insiders tipping friends and other acquaintances). This biases against finding a significant relation between an insiders' trading profits and their recordholder status. Ultimately, this is an empirical question.

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

Alternatively, one may argue that high propensity individuals are more willing to engage in improper insider trading behaviors regardless of enforcement mechanisms in place. Therefore, trading profits by high propensity executives could be insensitive to corporate control systems. A similar alternative argument is less likely for the quality of the information environment, as the ability to trade on superior information is directly related to the extent of the material private information an executive possesses. While the ultimate relation is an empirical question, our priors are that greater opportunities to trade will



lower the cost to insider trading and high propensity executives are more likely to profitably trade under these circumstances.

We measure the overall quality of the information environment using an index created by Governance Metrics International (GMI) (now owned by Morgan Stanley Capital International) called the Corporate Accounting Score (CAS). We predict that abnormal returns are decreasing in the quality of a firm's information environment for recordholder executives in absolute terms and relative to non-recordholder executives. Prior research on the relation between insider trading profits and proxies for the information environment reports mixed results (Lin and Howe 1990, Huddart and Ke 2007). However, these studies pool across executives failing to take into account the role of an executive's propensity to trade on inside information.

We use the Corporate Governance Score (CGS), another index created by GMI, as a proxy for the strength of a firm's control environment. We predict that abnormal returns are decreasing in the quality of a firm's control environment for recordholder executives in absolute terms and relative to non-recordholder executives.

Finally, we examine whether the trading of recordholder executives provides information to the market on the firm's future performance. This set of analyses is inspired by the results in Cohen et al. (2012), who develop an innovative approach to identifying insiders who are likely to trade on firm-specific information. Cohen et al. (2012) classify insiders as either "routine" or "opportunistic" traders by analyzing their past trading history and looking for consistent patterns in the timing of their trades. Their methodology is simple: a trader who trades in the same calendar month for the past three years is more likely trading for diversification or liquidity reasons, and is unlikely to be trading on information about the firm (such as Bill Gates, who trades in a pre-announced and routine fashion). They classify such traders as routine traders. Insiders who trade in three consecutive years but without trades in the same month in each year are classified as opportunistic traders. Their results indicate that trades of opportunistic traders provide informative signals and are more powerful predictors of future firm returns and firm-specific news and events.

Given the results in Cohen et al. (2012), we have three goals for our third set of analyses: first, to examine if recordholders are more likely to be opportunistic traders; second, to examine whether our recordholder classification provides information on insiders' propensities to trade incremental to looking at past trading patterns; and third, to examine whether recordholders' trades inform capital markets.

Specifically, we examine the performance and stock return predictability of recordholder vs. non-recordholder insiders, whether recordholders' trades are better predictors of earnings announcement returns (vs. non-recordholders' trades) and whether institutional investors recognize that recordholder executives' trades are informative as evident in their trading patterns.

### 3. Sample, Data, and Descriptive Statistics

Our potential sample includes firms on ExecuComp and CRSP with at least one insider trading transaction by a CEO during 1988-2012 on the Thomson Financial insider trading database. For these firms, we assign executive designations based on Thomson Reuters' Role Codes. Specifically, non-CEO "senior executives" include any C-level executive (chief operating/financial/investment/technology/marketing/risk officer), president, executive vice president, senior vice president and general counsel. Data requirements for each transaction include: share price, number of shares traded, transaction codes (we consider codes P, S, J, and G) and the type of trade (purchase or sale). Consistent with prior research, our analyses only include non-compensation related equity purchases as well as sales of common stock under a Section 16 officer's direct control.

We randomly select 744 firms from the above universe for inclusion in the final sample.<sup>7</sup> Due to the high cost of the background checks for data on legal records, we also include non-randomly selected firms for which data was previously acquired. Doing so increases our sample size considerably. This latter sample comprises 99 firms that were subsequently involved in financial statement fraud (and 101 non-fraud firms that had been matched to the fraud firms). We also include 106 firms that eventually filed for bankruptcy.

In robustness analysis (where appropriate) we re-estimate our models by either including indicator variables for fraud or bankrupt firms or by excluding such firms from the analysis. The indicators are never statistically significant and the exclusion of fraud and bankrupt firms does not change the statistical or economic significance of our variables of interest. Given this, we present results including all applicable observations to maximize our samples in the main body of the paper.

Our final sample, described in Table 1, includes 1,050 firms for which we purchase background checks to determine the legal record of the CEO (1,343 CEOs in total), and of 708 non-CEO senior executives randomly selected from those who had at least one purchase or sale transaction.<sup>8</sup>

Our data on executives' legal infractions are obtained from numerous federal, state, and county databases accessed by licensed private investigators. The legal infractions include traffic violations, driving under influence of alcohol and other drug related charges, reckless endangerment, assault,

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<sup>7</sup> The number of firms selected was based on the funds available to purchase background checks for executives.

<sup>8</sup> Given that some of our sample is not randomly selected, we compare the industry distribution and some key firm characteristics of our final sample with the Execucomp population (reported in the Internet Appendix). We find that the industry distribution of our sample is similar (though we have more financial firms) to the Execucomp population based on the Fama and French seventeen industry classification scheme. Our sample firms have larger market capitalization and sales but similar return on assets and market-to-book ratios.

domestic violence and sexual assault. We set an indicator variable, *Record*, equal to 1 if the executive has any such convictions as of December 31, 2012 and 0 otherwise.<sup>9,10</sup>

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

$$(R_i - R_f) = \alpha + \beta_1 (R_{mkt} - R_f) + \beta_2 SMB + \beta_3 HML + \beta_4 UMD + e \quad (1)$$

where  $R_i$  is the daily return to firm  $i$ 's equity,  $R_f$  is the daily risk-free interest rate;  $R_{mkt}$  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  $\alpha$  ( $-\alpha$ ) is  $Trading\ Profit_{i,t}$ , the average daily risk-adjusted return to a net purchase (sale) during the 180 days following the transaction.<sup>11</sup>

We use the Corporate Accounting Score and the Corporate Governance Score to measure the quality of a firm's information and governance environments respectively. GMI collects information on various accounting inputs including restatements, securities class action lawsuits, and SEC enforcement actions and various key aspects of corporate governance including officer and director profiles and compensation data to develop *Corporate Accounting Score* and *Corporate Governance Score*. In addition, their models include forensic metrics analyzing regulatory filings, financial statements and footnotes data, mergers, restructures, and divestitures. The scores are developed based on analysis of over 18,000 firms. The *Corporate Accounting Score* ranges from 1 through 5, and the *Corporate Governance Score* is either 1 or 2, with higher scores reflecting better accounting and governance qualities.<sup>12</sup>

Tables 1 and 2 provide summary statistics of our main variables (all continuous variables are winsorized at the 1% and 99% levels). Table 1 describes the legal record information for our sample. We note that out of the 246 CEOs with a legal record, 77 of them (31%) have violations more serious than traffic violations. The corresponding ratio is 37% for non-CEO senior executives. We also find that a

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<sup>9</sup> The Appendix at the end of the paper presents all definitions and data sources for our main variables.

<sup>10</sup> We include an executive's legal infractions regardless of when they occur to define *Record* for that executive. This is based on our assumption that executive type is stable and revealed with a delay, and our desire to minimize the number of recordholders classified otherwise. Given the age of the senior executives in our sample and how far back in time we are able to collect legal infractions we only include violations that took place after an individual was at least 30 years old.

<sup>11</sup> As pointed out by Jagolinzer et al. (2011), this approach has at least two advantages. First, estimating average daily abnormal returns avoids the biases inherent in statistical tests of long-run buy-and-hold returns, and second, computing trade-day specific risk-adjusted returns relative to the Fama-French model controls for differences in risk across transactions (i.e. transaction-day specific factor loadings) and provides a trade-specific measure of profitability. Results are robust to estimating equation (1) including one and two lags of all factors to correct for infrequent trading and to measuring trading profits using six-month market-adjusted buy-and-hold returns.

<sup>12</sup> In addition we also verify the robustness of our results using other measures of the information and control environments used in prior research. These include the Fog index (Li 2008), the adverse selection component of the bid-ask spread (Glosten and Harris 1988), social ties between the CEO and the board of directors, independence of the board, institutional investment, and analyst following of the company. Results are available in the Internet Appendix.

significant portion of our sample executives (68%) commit their first crime after they were hired by the firm. Specifically, 70% of non-CEO senior executives and 63% of CEOs obtain a legal record after they became executives at their firms. Table 2 presents summary statistics for insider trading and firm-level variables for sample firms separated into firms led by recordholder and non-recordholder CEOs. Mean and median trading profits from purchases by recordholders are significantly higher than those for non-recordholders. While negative, recordholder executives earn significantly higher returns from sales as well (the median differences are insignificant). While only one of the mean or median is significant in some cases, it appears that recordholder CEOs exchange fewer shares in both purchase and sale transactions than non-recordholder CEOs. Recordholder senior executives exchange shares in smaller quantities for purchases and in larger quantities for sales than do non-recordholder senior executives. Abnormal returns from trades by recordholder CEOs are generally similar to those by recordholder senior executives. Except for recordholder CEOs' purchases the trading frequencies of recordholders are not significantly different from those of non-recordholders. Finally, firms run by recordholder CEOs are significantly smaller than those run by non-recordholder CEOs. None of the other firm-level variables are significantly different between the two groups.

Some additional analyses revealed the following insights. We find that the average tenures of recordholder CEOs (non-CEO senior executives) is 9 years (4.4 years<sup>13</sup>) and that of non recordholder CEOs (non-CEO senior executives) is 9.4 years (4.5 years), and these differences are not statistically significant. The total wealth of recordholder and non-recordholder CEOs and senior executives is not significantly different either (we measure wealth as in Dittman and Maug (2007), who consider an executive's salary (after tax), dividend income from shares held in own company (after tax), value of restricted stock granted, personal taxes on vested restricted stock, net value realized from exercising options (after tax) and cash paid for purchasing additional stock to compute wealth; see the Appendix for a detailed description). An executive stays at the firm for an average of 3.5 years after committing his first crime, and typically those leaving the firm, in particular CEOs, are older and closer to the retirement (age of 65). Performance (as measured by return on assets and stock returns) of firms led by recordholder CEOs is not significantly different from that of firms led by non-recordholder CEOs. Further, the performance of firms whose CEOs left shortly after committing their first infraction is not significantly different from those whose CEOs remained in office after the commission of their first legal infraction. Finally, a CEO is no more likely to be terminated within a year (or two years) following a legal violation than at any other time during their tenure (this is true for both minor violations as well as more serious violations). Collectively, these results reduce the possibility of survivorship bias, i.e., the recordholder

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<sup>13</sup> This represents the individual's tenure for a given role within the firm (CFO, COO, etc.) and not necessarily their tenure at the firm in multiple senior roles so that it is measured in the same manner as the tenure of CEOs.

CEOs and/or senior executives that remain in our sample (vs. those who are fired or leave for other reasons) are somehow “better” than average, which may explain their higher returns from trading.

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

##### 4.1. Profitability of Trades and Executive Type

To test our first hypothesis we examine whether executives’ trading profits vary with their type (recordholder). This intra-firm analysis holds constant time-invariant firm-level factors in an attempt to control for the opportunity to trade on inside information (the firm’s information and control environments). We estimate the following model with firm fixed effects:

$$Trading\ Profit_{i,t} = \beta_0 + \beta_1 Record_i + \beta_2 CEO_i + \beta_3 Record_i * CEO_i + \varepsilon_{i,t} \quad (2)$$

where  $Trading\ Profit_{i,t}$  is the average daily risk-adjusted return to a net purchase (sale) by executive  $i$  during the 180 days following the transaction on day  $t$  ( $\alpha$  ( $-\alpha$ ) from equation (1)),  $Record_i$  is an indicator variable set equal to 1 if executive  $i$  has a legal infraction in their record, and 0 otherwise, and  $CEO_i$  is an indicator variable set equal to 1 if executive  $i$  is the CEO, and 0 otherwise to allow for CEOs’ potential differential trading profits.

Table 3, columns (1) and (2) presents the results.<sup>14</sup> The coefficient on *Record* for both purchases and sales transactions is significantly greater than zero (at the .05 level or better). The coefficient on *Record* in column (1) indicates that non-CEO senior executives with a legal record earn 0.027% higher risk-adjusted returns per day (incremental returns totaling 4.86% over 180 days) following purchases and 0.011% higher risk-adjusted returns per day (incremental returns totaling 1.98% over 180 days) following sales than non-recordholder peers in the same firm. These incremental returns are economically significant in absolute terms and relative to the profitability of trades of other executives. For example, the intercepts in columns (1) and (2) of Table 3 indicate that the average daily risk-adjusted return following purchases (sales) by non-CEOs who are not recordholders is 0.041% (-0.042%).

We find similar results for CEOs. The summation of coefficients for *Record* and *Record \*CEO* suggests that recordholder CEOs earn significantly higher profits from both purchases and sales than non-recordholder CEOs (at the .05 level or better). Specifically, recordholder CEOs earn 0.021% higher risk-adjusted returns per day (incremental returns totaling 3.78% over 180 days) following purchases and 0.014% higher risk-adjusted returns per day (incremental returns totaling 2.52% over 180 days) following sales than non-recordholder CEOs.<sup>15</sup> As an additional test, we re-estimate equation (2) and include a

<sup>14</sup> In all models with trading profits as the dependent variables, t statistics are computed using standard errors clustered by executive and year to correct for cross sectional and time series dependence. Results are robust to clustering by firm and year or by any one individual dimension.

<sup>15</sup> To provide more evidence on how trading profits vary by CEO type and to further reduce any potential endogeneity concerns, we re-estimate equation (2) for a subset of CEO transitions where the type of the CEO changed (i.e., a non-recordholder CEO was replaced by a recordholder CEO and vice versa). We conduct this

dummy variable denoting pre- and post -Sarbanes Oxley Act (SOX) trades.<sup>16</sup> We find that the association between *Record* and *Trading Profit* is unchanged from that in Table 3 and not significantly different across the pre and post SOX reporting periods. Overall, we interpret our results as support for the prediction that recordholder executives have a higher propensity to exploit inside information when they trade than other executives.<sup>17</sup>

For completeness we examine whether recordholder executives' transactions sizes and frequencies differ significantly from those of non-recordholders. Columns (3) through (6) in Table 3 presents these results. However, we find no evidence that recordholder executives have significantly larger trade sizes or that they trade more frequently than non-recordholder executives. It is possible that frequent trading or trading in particularly large blocks can attract additional attention at the time of the trade, while profits are not known until well after the trade. We find that CEOs on average have significantly larger trade sizes for both purchases and sales transactions, and they sell more frequently as compared to other senior executives.

#### 4.1 Types and Number of Legal Infractions

Prior research does not provide much theory regarding the extent to which the various types of legal infractions or the frequency of infractions capture variance in self-control or disregard for laws compared to one another. Given that we know the violations committed by each executive, we also investigate if there are differences in our results based on the severity and the number of legal infractions. To that end, we extend our analyses in equation (2) by considering only the sample of recordholder executives, and estimate the following equation:

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analysis both for a sample of all CEO turnovers and for a sample of relatively exogenous turnovers (retirements). In both cases, we find that abnormal returns from both purchases and sales are significantly higher (at the 0.05 or better) for the recordholder CEO. While the number of observations in the transition analysis is much smaller (1,163 for purchases and 4,428 for sales for all turnovers), these results provide us with additional assurance on the relation between trading profits and recordholder status of an executive. Results are provided in the Internet Appendix.

<sup>16</sup> Effective August 29, 2002, SOX required that all corporate insiders (including executive officers, directors and greater than 10% beneficial owners) report changes in beneficial ownership by the end of the second business day following the date of execution of any transaction. Reportable transactions include purchases and sales, option or warrant exercises, security-based swap agreements, 401(k) transactions, gifts, and the award, exercise, cancellation, expiration or conversion of related derivative instruments. Previously, insiders did not have to report most transactions until the tenth day of the month following the month in which the transaction occurred, meaning that an insider transaction could go unreported for as many as 40 days. Results are presented in the Internet Appendix. We exclude the CEO dummy to avoid triple interactions but including it does not change the interpretation of our results.

<sup>17</sup> To further establish the relation between high propensity executives and higher trading profits we randomly assign *Record* to executives in these same firms such that each firm has one recordholder, one non-recordholder, and the same total number of recordholders as in our main sample. We then re-estimate equation (2) 100 times, and consider the mean results of this falsification test. The coefficient for *Record* is not statistically significant when randomly assigned, providing more evidence on the direct link between trading profits and recordholder executives. Results are available in the Internet Appendix.

$$\text{Trading Profit}_{i,t} = \beta_0 + \beta_1 \text{Serious}_i + \beta_2 \text{Size}_{i,t} + \beta_3 \text{Market-to-book}_{i,t} + \beta_4 \text{Return}_{i,t} + \varepsilon_{i,t} \quad (3)$$

In the above specification, *Serious* is an indicator variable that equals 1 for executives that have committed serious violations (all violations in our sample except traffic violations) and 0 otherwise. We repeat the analysis in equation (3) by replacing *Serious* with the variable *Multiple*, which equals the number of legal infractions in an executive's record. If the severity of infractions and/or repeated breaking of the law is a sign of lower self-control and greater disregard for laws, then we expect the coefficients for *Serious* and *Multiple* will be positively associated with the abnormal returns an executive earns from his trades. We also include controls for well-known determinants for profits, namely size (natural logarithm of the market capitalization of the firm), market-to-book ratio, and the firm's lagged annual returns. This analysis does not include firm fixed effects because we do not have enough intra-firm variation among recordholders alone for a meaningful sample.

Table 4 presents the results. We find that the association between trading profits and *Serious* for both purchases and sales is positive and statistically significant (at the .05 level). Further, the relation between abnormal returns from purchases is positive and significant (at the .10 level) for minor traffic violations. Thus, even minor traffic violations measure an individual's disregard for rules and laws (corroborating the results in Fisman and Miguel 2007) and are associated with an individual's propensity to trade on inside information for financial gain. We also find that *Multiple* is positively associated with abnormal returns though significantly so only for purchases.<sup>18</sup>

#### 4.2 Real-Time Classification of Executives

We consider legal infractions regardless of when they occur to classify executives as recordholders. To provide practical insight on the real time use of data on legal records in predicting future trade profitability, we reclassify executives (this section only) based solely on prior legal records (measure their type in real time). We extend equation (2) by examining the relation between trading profits and executive type when type is measured in real time. The results, presented in Table 5 columns (1) and (2), indicate that in a cross-sectional setting, recordholder senior executives earn significantly higher profits both from purchases and sales than do other senior executives (at the .05 level or better), providing insight into the real time usefulness of data on legal records to assess the future profitability of insider trading activities.

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<sup>18</sup> We repeat the analyses in Table 4 for our full sample (including both recordholders and non-recordholders), and modify equation (3) to include two dummies, *Serious* and *Traffic* as proxies for the severity of crimes. We find that executives with both severe and minor violations earn significantly higher abnormal returns compared to the non-recordholder executives and that *Multiple* remains significant as well. Results are available in the Internet Appendix.

While results measured in real time are significant, our maintained assumption is that type is invariant<sup>19</sup>; we therefore measure whether an executive is a recordholder ex post by considering legal violations through 2012.<sup>20</sup> As verification of this assumption we compare the trading profits from trades by recordholder executives before and after they break the law (before and after they reveal their type) with executive fixed effects. In columns (3) and (4), we find no difference in trading profits for executives before and after their infractions were committed, supporting our assumption that as it pertains to trading behavior, observing an executive break the law is a signal of type and not a signal of a change in type.

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

In this section we examine 1) whether the profitability of trades by recordholders varies with proxies for the opportunity to trade on inside information, and 2) whether these effects are significantly different for high propensity vs. low propensity executives. We estimate the following models for CEOs and non-CEO senior executives:

$$\begin{aligned} \text{Trading Profit}_{i,t} = & \beta_0 + \beta_1 \text{Record}_i + \beta_2 \text{CAS/CGS}_{i,t} + \beta_3 \text{Record}_i * \text{CAS/CGS}_{i,t} \\ & + \beta_4 \text{Size}_{i,t} + \beta_5 \text{Market-to-book}_{i,t} + \beta_6 \text{Return}_{i,t} + \varepsilon_{i,t} \end{aligned} \quad (4)$$

For comparison purposes, we also examine the above relations without incorporating executive type and the interactions. The dependent variable is the trading profits made by executive  $i$  in year  $t$ . The variable  $\text{CAS/CGS}$  is either the *Corporate Accounting Score* or the *Corporate Governance Score*, our proxies for the overall information and governance environments for firm  $i$ , year  $t$  respectively. We interpret higher values of  $\text{CAS}$  and  $\text{CGS}$  as relatively stronger information and control environments.

Table 6 present the results (Panel A for purchases and Panel B for sales). For both purchases and sales, we find that the interaction term  $\beta_3$  is negative and significant (at the .05 level or better for purchases and at the .10 level for sales), indicating that the relation between inside trading profits and the opportunity to trade on inside information is significantly stronger for recordholder executives. In contrast, trading profits from purchases by non-recordholder executives ( $\beta_2$ ) are unrelated to *Corporate Governance Score* for both purchases and sales, and unrelated to *Corporate Accounting Score* for purchases. However, the relation between trading profits from sales and *Corporate Accounting Score* is negative and statistically significant for non-recordholders as well. The p-values at the bottom of Table 6 (significance of  $\beta_2 + \beta_3$ ) indicate that, in absolute terms, the trading profits from both purchases and sales by recordholder executives increase significantly (at the .05 level or better) with weaker information and control environments.

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<sup>19</sup> In a practical sense our assumption is that type is invariant by the time an individual is old enough to hold a senior executive position at a publicly traded firm. This is not arguing that someone is simply born one way or another or that environmental factors do not influence how people develop.

<sup>20</sup> Some of our data was acquired in 2013 so we only consider legal infractions through 2012.



Overall, these results suggest that the trading behavior of recordholder executives is influenced by the information and control environments of their firms. Relative to non-recordholders, a stronger information and control environment is associated with lower trading profits made by recordholder executives for purchases and sales.

One factor that is perhaps important to consider is whether recordholder CEOs shape their governance and/ or information environments differently over their tenures to suit their style of management (vs. non-recordholder CEOs). We note that Davidson et al (2015) do not find evidence of such shaping by recordholder CEOs as compared to non-recordholder CEOs. Nevertheless, we repeat the above tests for trading profits from purchases in the first two years of the CEOs tenure (when he had little ability to alter the existing systems much). We obtain similar results to those reported in Table 6 Panel A.<sup>21</sup>

Finally, Table 6 presents results for the simplified version of equation (4) ignoring executive type. Panel A presents the results for purchases and Panel B presents the results for sales. We find that the profitability of neither executives' purchases nor sales is significantly related to *CGS*. The profitability of executives' purchases is also not significantly related to *CAS*. However, in the case of executives' sales, we find a significant negative association between trading profits and *CAS*. This is consistent with the results including executive type, where we find that a strong information environment is associated with lower profits from sales both for recordholder and non-recordholder executives. In sum, these results suggest that models that examine the relation between insider trading profits and the information and control environment are likely misspecified if they do not take into account the propensity of the executive to take advantage of trading opportunities (particularly for purchases), potentially contributing to mixed results in prior studies.

## **6. Performance and Information Content of Recordholder Executives' Trades**

We next examine whether recordholders' trades can predict future returns and information events in the firm. We then examine whether sophisticated market participants mimic their trades. Our analyses in this section follow the methodology and approach in Cohen et al. (2012). They classify each insider as either a "routine" or an "opportunistic" trader by analyzing their past trading history. Briefly, a trader who trades in the same calendar month for the past three years is more likely to be trading for diversification or liquidity reasons, and they classify such traders as routine traders. Insiders trading for three consecutive years but without trades in the same month each year are classified as opportunistic traders.

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<sup>21</sup> Unfortunately, we cannot rely on the results from similar tests for sales, as we have very few observations for sales when we consider only the first year of a CEO's tenure. This is expected, as a CEO is not likely to have enough shares during their first year to engage in many sales transactions.

We first calculate the percentage of routine vs. opportunistic traders by recordholder status. Table 7 reports the results. Recordholder and non-recordholder executives have similar proportions of routine and opportunistic trades. For our recordholders (non-recordholders), 38% (40%) of traders are routine and 62% (60%) of traders are opportunistic.<sup>22</sup> The proportion of routine trades is similar for both purchases and sales for recordholders and non-recordholders. In sum, the recordholder attribute is not likely a proxy for opportunistic inside traders.

In the next two sections we discuss our findings for the association of trades and future returns of recordholder vs. non-recordholder insiders, as well as examine the link between earnings announcement returns, institutional investor trading and insider trading.

### **6.1. Portfolio Returns**

We analyze the predictive ability of trades by examining the returns to portfolios formed according to the routine and opportunistic trade classification methodology for both recordholder and non-recordholder executives. We denote routine and opportunistic trades for both recordholder and non-recordholder executives in a given month and then construct opportunistic buy, routine buy, opportunistic sell and routine sell portfolios, and examine the returns to these portfolios over the following month. Portfolios are rebalanced each month based on new trades.

Table 8 presents the risk-adjusted portfolio returns for the Fama-French three factor model for all buys, all sells, all (buys-sells), opportunistic buys, routine buys, opportunistic sells, routine sells, opportunistic (buys-sells), and routine (buys-sells) for each executive sub-sample.<sup>23</sup>

We find that a long-short portfolio following buys/sells of opportunistic insiders earns large significant abnormal returns, while a similar portfolio of routine insiders does not. This is true for both recordholder and non-recordholder executives. Specifically, a portfolio that goes long in opportunistic recordholder buys and short opportunistic recordholder sells earns a Fama-French alpha of 230 basis points per month ( $t=2.87$ ) and annualized alpha of 2,760 basis points. The corresponding Fama-French alphas for opportunistic non-recordholder (buys-sells) is 126 basis points monthly ( $t=3.06$ ) and 1,512 basis points annually. The difference in these returns for recordholder and non-recordholders is statistically significant – the portfolio following recordholders earns 104 monthly basis points and 1,248

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<sup>22</sup> Cohen et al. (2012) have a more balanced distribution; for their sample insiders 55% of trades are routine and 45% of trades are opportunistic. One possible reason for this difference is that our estimates are for C-suite (i.e., top 5 paid) executives and they compute estimates for all section 16 insiders. CEOs and senior level executives have different trading behaviors than other insiders. Because we are examining C-suite executives we are also able to categorize a higher percentage of our sample as routine or opportunistic as senior executives (particularly CEOs) also have higher trading frequencies than other insiders.

<sup>23</sup> The results reported are for equal weighted portfolios; results are similar using value weighted portfolios and are available in the Internet Appendix.

annualized basis points more than that following non-recordholders ( $t=2.49$ ). Further, while opportunistic buys for both recordholder and non-recordholders earn significant abnormal returns, only recordholder opportunistic sales earn significant abnormal returns. We find that trades following routine buys for both types of executives earn significant abnormal returns (though the magnitude is marginally larger for recordholders), sales are not significant, and the long-short portfolio following routine trades is not significant for either type of executive. Finally, when ignoring the routine-opportunistic classification, we find that a long-short portfolio following buys-sells earns significant abnormal returns for both types of executives and that these returns are larger for the portfolio of recordholder executives.<sup>24</sup>

In sum, the above results indicate that in addition to the routine-opportunistic classification, splitting on recordholder status can significantly add to the ability of inside trades to predict future returns.

This raises an interesting question of why recordholders earn higher returns vs. non-recordholders, (regardless of whether they are classified as routine or opportunistic), and whether sophisticated market participants recognize this difference. Indeed, one explanation for the former is that recordholders have a higher propensity to exploit inside information, as we find in our earlier tests. If so, we would expect that the trades of recordholders (opportunistic and perhaps routine) are more likely to predict returns around firm-specific news events. We examine this next.

## 6.2. Earnings Announcement Returns and Institutional Investor Trading

We first examine whether trades by recordholder vs. non-recordholder executives predict firms' earnings announcement returns. We estimate the following regression separately for our sample of recordholder and non-recordholder executives:

$$\begin{aligned}
 \text{Earnings Announcement Returns}_{i,q} = & \beta_0 + \beta_1 \text{Lagged \# opportunistic buys}_{i,q-1} \\
 & + \beta_2 \text{Lagged \# opportunistic sells}_{i,q-1} + \beta_3 \text{Lagged \# routine buys}_{i,q-1} + \beta_4 \text{Lagged \#} \\
 & \text{routine sells}_{i,q-1} + \beta_5 \text{Size}_{i,q} + \beta_6 \text{Market-to-book}_{i,q} + \beta_7 \text{Return}_{i,q} + \varepsilon_{i,t}
 \end{aligned} \tag{5}$$

In the above equation, *Earnings Announcement Returns* is the 3-day earnings announcement return for firm  $i$  in quarter  $q$ , and the independent variables are the number of opportunistic/routine buys and sells for the previous 3 months (measured from day  $t-90$  through  $t-1$ , where  $t$  is the day of the earnings announcement), calculated as  $\log(1 + \text{number of trades})$ .<sup>25</sup> We include controls for size, book-to-market, and previous-year returns (measured from month  $m-12$  through  $m-1$ ).

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<sup>24</sup> We re-estimate these portfolio returns classifying executives in real time. Given the nature of this model, classifying in real time simply moves some early recordholder transactions to the non-recordholder column. The results are unchanged and available in the Internet Appendix.

<sup>25</sup> We use the previous 3 months instead of 1 month because in most cases we have only 1 executive present at the firm for a given earnings announcement and a large majority of months have no trade activity. The results are robust to measuring the number of trades in the previous month but the sample variation is considerably lower.

Table 9, columns (1) and (3) present the results for the predictive abilities of recordholder and non-recordholder trades respectively. We find that opportunistic buys by non-recordholders are significantly associated with future earnings announcement returns; none of their other trades are significantly associated. We find the same result for recordholder executives and note the larger statistical and economic significance. In fact, our test of differences indicates that the associations between opportunistic buys and future earnings announcement returns are significantly larger for recordholder executives than non-recordholder executives (at the .05 level). In contrast to Cohen et al. (2012) we also find mild evidence that both opportunistic sells and routine buys of recordholders are associated with future earnings announcement returns (significant at the 0.10 level), and this association for opportunistic sells is significantly greater for recordholder executives as compared to non-recordholder executives (at the .10 level). One key difference in our analysis is that the sample is predominantly CEO (and exclusively of top 5 executive) trades. Nonetheless, the above results provide support that our classification of executives' recordholder status can provide incremental information on future firm-specific events.

Next, we examine the link between institutional holdings and insider trading and test whether institutional holdings change differentially after recordholder and non-recordholder trades.

Following Cohen et al. (2012) we regress the change in institutional ownership of a stock on the log of the number of opportunistic and routine trades in that stock but do so separately for recordholder and non-recordholder executives. For each type of executive, we estimate the following regression:

$$\begin{aligned}
\text{Change in Institutional Holdings}_{i,q} = & \beta_0 + \beta_1 \text{Lagged \# opportunistic buys}_{i,q-2} \\
& + \beta_2 \text{Lagged \# opportunistic sells}_{i,q-2} + \beta_3 \text{Lagged \# routine buys}_{i,q-2} + \beta_4 \text{Lagged \# routine} \\
& \text{sells}_{i,q-2} + \beta_5 \text{Contemporaneous \# opportunistic buys}_{i,q} + \beta_6 \text{Contemporaneous \# opportunistic} \\
& \text{sells}_{i,q} + \beta_7 \text{Contemporaneous \# routine buys}_{i,q} + \beta_8 \text{Contemporaneous \# routine sells}_{i,q} \\
& + \beta_9 \text{Size}_{i,q} + \beta_{10} \text{Market-to-book}_{i,q} + \beta_{11} \text{Return}_{i,q} + \varepsilon_{i,q}
\end{aligned} \tag{6}$$

The dependent variable, *Change in Institutional Holdings* is the change in institutional ownership per quarter. The independent variables include the number of opportunistic/routine trades summed over the prior two quarters and the current quarter (both measured as  $\log(1 + \text{number of trades})$ ). The lagged variables estimate whether institutions appear to alter their holdings following the trades of certain types of insiders and the contemporaneous variables estimate whether institutions provide differential liquidity for some types of inside trades. Our reported results include the same controls used in equation (5), as well as month fixed effects, but our results are robust to specifications without these controls and fixed effects.

Columns (2) and (4) of Table 9 present the results which are highly similar to those we report for estimates of equation (5). We find that institutional holdings are positively associated with opportunistic and routine buys for both recordholder and non-recordholders. We also find that institutional holdings are

negatively associated with opportunistic sells for recordholders. Our results are similar to those in Cohen et al. (2012) who find strong evidence for changes in institutional holdings following opportunistic buys and more mild evidence for changes after routine buys and opportunistic sells. We find that the association with opportunistic sells is due to recordholder trades. We also compare the coefficients on opportunistic and routine trades for our recordholder and non-recordholder executives. We find that the coefficient for both opportunistic buys and sells is statistically larger for recordholder executives (at the .10 and .05 levels respectively); there are no differences between routine trades. Finally, we find no evidence that institutional investors provide liquidity to either category of inside traders.

## **7. Insider Trading and Corporate Bankruptcy**

The above analyses are unable to isolate trades based on *material* non-public information. As a result, we cannot conclude that these trades were illegal or even undesirable. In this section we attempt to examine whether executive type is associated with insider trading based on material non-public information by focusing on a sample of 106 firms that declared bankruptcy between 1996 and 2008. We argue that profitable trading or changes in trading behavior by executives in the period leading up to bankruptcy are more likely based on material non-public information. This sample comprises 22 recordholder CEOs and 88 non-recordholder CEOs (4 firms with multiple CEOs) and as such our results should be interpreted keeping this limited sample in mind.

If executives are prone to exploit material private information to avoid significant capital losses, then we would expect such trading to occur prior to events that are expected to have a significant negative impact on the firm's future stock prices. Consistent with this notion, Bradley and Seyhun (1997) provide evidence that corporate insiders engage in significant sales of their companies' shares years prior to the bankruptcy filing date, and as a result avoid significant capital losses. They also show that these sales are more intense for top executives and increase over time to reach a peak in the filing announcement month.<sup>26</sup> If recordholder CEOs have a higher propensity to trade on material inside information, then we expect recordholder CEOs will be more likely to sell (or reduce net purchases) shares before the significant stock-price declines that occur after filing for bankruptcy.

We perform two sets of tests to examine trading prior to bankruptcy. First, we compare the net purchases of recordholder versus non-recordholder CEOs in the 36 and between 36 and 72 months prior

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<sup>26</sup> Loderer and Sheehan (1989) find evidence contradicting the notion that insiders sell stock prior to filing a bankruptcy petition. However, their methodology and sample selection present some difficulties which potentially prevent them from documenting such insider trading (see Bradley and Seyhun (1997) for a discussion).

to the date when the firm's shares were delisted due to filing for bankruptcy (the event date).<sup>27</sup> Table 10, Panel A presents the results. We find that recordholder CEOs were net sellers of 1,622,263 shares in the 3 years prior to bankruptcy while they were net buyers of 698,866 shares in the previous period. The difference is higher net sales by 2,321,129 shares in the 3 years prior to bankruptcy. Non-recordholder CEOs are net sellers for both periods, but their net sales are significantly lower in the 3 years before bankruptcy. Specifically, their net sales are 329,649 shares in the 4-6 years before and 84,882 shares in the 3 years before bankruptcy. Thus, their net sales decline by 244,767 shares during the 3 years before bankruptcy as compared to the previous few years. The difference in executives' own trading patterns in the periods leading up to bankruptcy is significant (at the .05 level) across recordholder and non-recordholders. This suggests that the increasing rate of insider selling in the years leading up to bankruptcy documented in prior studies could be driven in part by recordholders, thus highlighting the importance of considering the personal characteristics of executives when studying insider trading behavior. We note, however, that some of our CEOs in our sample do not have the full 6 years of data prior to bankruptcy available which could potentially bias the comparison.

Next, we estimate the following model for the abnormal profits made from sales by CEOs of bankrupt firms<sup>28</sup>:

$$\text{Trading Profit}_{i,t} = \beta_0 + \beta_1 \text{Record}_{i,t} + \varepsilon_{i,t} \quad (7)$$

In the above equation (7) the dependent variable is the abnormal trading profits from open market trades made by CEOs. We estimate equation (7) within the 36 months prior, and before the 36 months prior to the event date.

Table 10, Panel B presents the results. The coefficient on *Record* in column (1) is significantly greater than zero (at the .01 level). The coefficient in column (1) indicates that recordholder CEOs earn 0.122% higher risk-adjusted returns per day (incremental returns totaling 21.96% over 180 days within 36 months of bankruptcy) following sales as compared to non-recordholder CEOs. However, the coefficient on *Record* in Column (2) while positive, it is not statistically significant. While the economic magnitudes of these results are relatively large, it is important to note they are driven by a small number of CEO trades (264 trades within 36 months of bankruptcy). Therefore, it appears that while CEOs do engage in inside sales as bankruptcy approaches, these sales are predominantly by recordholders.<sup>29</sup>

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<sup>27</sup> While for several firms the delisting dates coincide with the bankruptcy filing dates, in many cases delisting occurred prior to the bankruptcy filing. We do not have delisting information for 4 firms in our sample. For these firms we use the bankruptcy filing date as the event date.

<sup>28</sup> We only include CEOs in this analysis as we do not have legal infractions data on other senior executives for our sample of bankrupt firms.

<sup>29</sup> We attempted to repeat the analyses in Table 10 for routine and opportunistic CEOs but a large number did not have the requisite trades in 3 consecutive years in order for us to classify them and we were left with too small of a sample to conduct meaningful tests.

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

## **8. Summary and Conclusions**

We study how and why the profitability and timing of insider trades vary across senior executives. We test the hypothesis that senior executives with a legal record have a relatively high propensity to profit from their inside trades. We find that the risk-adjusted stock returns following share purchases and sales by recordholder senior executives are significantly higher than the risk-adjusted returns following purchases and sales by other senior executives at the same firms. Given our controls for firm fixed effects, we interpret these results as support for the hypothesis that recordholder executives have a relatively high propensity to exploit inside information. These results hold when we measure executive type in real time and when we control for the timing of revelation of type. In addition, executives who commit more serious legal infractions have significantly higher trading profits from both purchases and sales. Recordholder executives who commit multiple legal infractions earn significantly higher abnormal profits from purchases.

We also examine the role of firms' information and control environments on the profitability of recordholder vs. non-recordholder executives' trades, and whether recordholders' trades can predict future returns and information events in the firm. Our findings indicate that the profitability of recordholder executives' purchases and sales decreases significantly in firms with stronger information and governance environments. In contrast, trading profits by non-recordholder executives are unrelated to the governance environment for both purchases and sales, and unrelated to the information environment for purchases. These results suggest that inside trading by recordholder executives varies with firms' information and control environments. Finally we document that our classification of executives (recordholder status) can provide information on future firm-specific events, and this explanatory power is incremental to that obtained from the opportunistic-routine trader classification developed in Cohen et al. (2012).

Our paper is among the early research that provides evidence of how insider trading by senior executives varies in an intuitive way with specific individual traits, as proxied by their recordholder

status, and of how executive type tempers the relation between insider trading and firms' information and control environments. This underscores the importance of incorporating executive type in research on the effects of firms' information and control environments on insider trading (and possibly other) activities. Our results also provide evidence about how the trading behavior of certain types of executives influences the information flow in capital markets. Finally, our evidence that even minor breaches (such as traffic violations) by executives are associated with abnormal trading profits implies that corporate boards, investors and regulators may consider paying attention to legal infractions while making hiring decisions and over the tenures of their executives.



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**Table 1****Sample composition**

This table summarizes the types and number of firms and executives included in our sample. In addition to firms involved in fraud, the “Other” firms in our sample include a matched non-fraud sample of firms, firms which declared bankruptcy, and firms randomly chosen. The table also describes the number of executives who file Form 16 contributed by each of the subsamples. We define executive designations based on the Role Codes that Thomson-Reuters uses in its insider trading database. The table also presents the composition of data on executives’ legal infractions for the sample.

<b>Sample</b>	<b>Total</b>	<b>Fraud Firms</b>	<b>Other Firms</b>
Firms in Compustat/CRSP 1988 – 2012	1,050	99	951
Executives:			
CEOs	1,343	99	1,244
Non-CEO Senior Executives	708	31	677
<b>Summary of CEOs’ and Non-CEO Senior Executives’ Prior Legal Records</b>	<b>CEOs (N = 1,343)</b>		<b>Non-CEO Senior Executives (N=708)</b>
Executives with any legal infraction (Traffic violations, domestic violence, reckless behavior, DUI, drug related charges, sexual assault)	246		109
All legal infractions	433		165
Executives with serious legal infractions (Domestic violence, reckless behavior, DUI, drug related charges, sexual assault)	77		40
All serious legal infractions	102		46
<b>Non-CEO Senior Executive Titles</b>			
Chief Operating Officer		Chief Risk Officer	
Chief Financial Officer		President	
Chief Investment Officer		Executive Vice President	
Chief Technology Officer		Senior Vice President	
Chief Marketing Officer		General Counsel	

**Table 2****Summary statistics**

This table presents the mean and median values of key insider trading variables for CEOs and non-CEO senior executives. *Trading profits* for purchases (sales) equals  $\alpha$  ( $-\alpha$ ) from a four factor alpha model, where  $\alpha$  is obtained from estimating transaction-day specific regressions of daily returns over the 180-days following each transaction. *Trade Size* is the number of shares exchanged in the transaction. *Trade Frequency* is the average number of trades an executive engages in per year. *Tenure* is the number of years an executive is in the firm in his/her current office. *Size* is the natural logarithm of the firm's market capitalization. *Wealth* is the natural logarithm of the executive's wealth measured following Dittmann and Maug [2007]. *Market-to-book* is the ratio of the market and book values of the firm's equity. *Return* is the firm's annual return. *Corporate Governance Score* is an index value used as a proxy for the strength of a firm's control environment. *Corporate Accounting Score* is a proxy for the overall information environment. Both measures are obtained from Governance Metrics International. The statistical significance of the difference in the values for recordholders and non-recordholders is denoted next to the corresponding values under recordholders. \*\*\*, \*\*, and \* denote statistical significance at the .01, .05, and .10 levels respectively.

	Recordholder		Non-Recordholder	
	Mean	Median	Mean	Median
<b>CEO Variables</b>				
Trading Profits – Purchases	0.064***	0.051***	0.043	0.037
Trading Profits – Sales	-0.029***	-0.029	-0.036	-0.027
Trade Size – Purchases	76,139	1,000***	119,707	3,000
Trade Size – Sales	72,532***	13,000	157,773	13,867
Trade Frequency – Purchases	0.99**	0.41	0.79	0.45
Trade Frequency – Sales	2.20	1.20	2.10	1.25
Tenure	9	8	9.4	8
Wealth	4.21	4.26	4.52	4.52
<b>Non-CEO Executives' Variables</b>				
Trading Profits – Purchases	0.060***	0.051***	0.044	0.033
Trading Profits – Sales	-0.030*	-0.027	-0.040	-0.030
Trade Size – Purchases	8,318*	189***	76,445	1,278
Trade Size – Sales	37,099	10,000***	34,420	6,000
Trade Frequency – Purchases	0.74	0.35	0.68	0.33
Trade Frequency – Sales	1.58	1	1.52	1
Tenure	4.4	3	4.5	3
Wealth	4.03	3.74	3.72	3.57
<b>Firm-Level Variables</b>				
Size	7.35***	7.37***	7.5	7.46
Market-to-book	2.85	1.99	2.82	2.01
Return	0.18	0.11	0.18	0.12
Corporate Governance Score	1.67	2	1.66	2
Corporate Accounting Score	2.91	3	2.92	3

**Table 3****Intra-firm analysis: abnormal trading profits, trade size, and trade frequency**

This table presents the results of intra-firm regressions of executive type and trading profits, trade size and trade frequency for a subsample of CEOs and non-CEO senior executives. *Trading profits* for purchases (sales) equals  $\alpha$  ( $-\alpha$ ) from a four factor alpha model, where  $\alpha$  is obtained from estimating transaction-day specific regressions of daily returns over the 180-days following each transaction. *Trade Size* is the number of shares exchanged in the transaction. *Trade Frequency* is the average number of trades an executive engages in per year. *Record* is a dummy variable that equals 1 if the CEO or senior executive was convicted of any legal infractions, 0 otherwise. *CEO* is a dummy variable that equals 1 if the executive is a CEO, and equals 0 otherwise. T-statistics appear in parentheses and are based on standard errors clustered by firm and year. \*\*\*, \*\*, and \* denote statistical significance at the .01, .05, and .10 levels respectively.

	Trading Profits		Trade Size		Trade Frequency	
	Purchases	Sales	Purchases	Sales	Purchases	Sales
	(1)	(2)	(3)	(4)	(5)	(6)
Intercept	0.041*** (10.99)	-0.042*** (-16.00)	-7100.614 (-0.22)	29658.6 (1.03)	0.933*** (7.34)	1.278*** (5.24)
Record	0.027*** (3.86)	0.011** (2.08)	34821.78 (0.70)	-5739.039 (-0.09)	0.328 (1.49)	0.388 (0.91)
CEO	0.007 (0.48)	-0.004 (-0.50)	119382.8*** (2.05)	139517.1*** (3.37)	0.02 (0.11)	1.481*** (3.47)
Record * CEO	-0.006 (-0.39)	0.003 (0.55)	-52809.32 (-0.73)	-25014.38 (-0.38)	-0.141 (-0.55)	-0.475 (-0.79)
<i>P-values:</i>						
Record + CEO * Record	0.01***	0.05**	0.56	0.18	0.28	0.81
Firm Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R- squared	0.22	0.20	0.15	0.10	0.54	0.41
Observations	2,698	8,283	2,698	8,283	442	649
Firm-CEO Pairs	142	210	142	210	142	210
Executives	375	486	375	486	375	486

**Table 4****Type and number of criminal violations**

This table presents the results of cross-sectional regressions of trading profits for recordholder CEO and non-CEO senior executives, by considering cases where the recordholder executives committed serious or multiple infractions. *Trading profits* for purchases (sales) equals  $\alpha$  ( $-\alpha$ ) from a four factor alpha model, where  $\alpha$  is obtained from estimating transaction-day specific regressions of daily returns over the 180-days following each transaction. *Serious* is a dummy variable that equals 1 if the executive was convicted of any legal infractions other than traffic violations, 0 if convicted of only traffic violations. *Multiple* is the number of legal infractions for the executive. *Size* is the natural logarithm of the firm's market capitalization. *Market-to-book* is the ratio of the firm's market and book values of equity. *Return* is the firm's annual return. T-statistics are based on standard errors clustered by firm and year. \*\*\*, \*\*, \* denote statistical significance at the .01, .05, and .10 levels respectively.

	Serious Infractions		Multiple Infractions	
	Purchases	Sales	Purchases	Sales
	(1)	(2)	(3)	(4)
Intercept	0.109*	0.012	0.099**	0.019
	(1.85)	(0.30)	(2.25)	(0.47)
Serious	0.034**	0.037**		
	(2.25)	(2.04)		
Multiple			0.013**	0.005
			(2.00)	(1.47)
Size	-0.012*	-0.004	-0.012**	-0.004
	(-1.71)	(-0.84)	(-2.40)	(-0.83)
Market-to-book	0.007***	-0.007***	0.005**	-0.008***
	(2.88)	(-3.39)	(2.06)	(-3.66)
Return	-0.039***	0.017	-0.029**	0.009
	(-2.75)	(1.02)	(-2.23)	(0.53)
Adjusted R-squared	0.03	0.03	0.03	0.03
Observations	1,944	5,840	1,944	5,840

**Table 5****Real time analysis**

This table presents the results of cross-sectional regressions of recordholder status and trading profits for CEO and non-CEO senior executives with recordholder status measured in real time (as of the start of year  $t$ ) (columns (1) and (2)). It also presents the results of the intra-executive regressions of the relation between recordholder status and executives' trading profits before and after the executive revealed his type (columns (3) and (4)). *Trading profits* for purchases (sales) equals  $\alpha$  ( $-\alpha$ ) from a four factor alpha model, where  $\alpha$  is obtained from estimating transaction-day specific regressions of daily returns over the 180-days following each transaction. *Record* is a dummy variable that equals 1 if the executive was convicted of any legal infractions prior to the start of year  $t$ , 0 otherwise. *Size* is the natural logarithm of the firm's market capitalization. *Market-to-book* is the ratio of the firm's market and book values of equity. *Return* is the firm's annual return. T-statistics are based on standard errors clustered by firm and year. \*\*\*, \*\*, \* denote statistical significance at the .01, .05, and .10 levels respectively.

	Cross-Sectional Analysis		Intra-Executive Analysis	
	Purchases	Sales	Purchases	Sales
	(1)	(2)	(3)	(4)
Intercept	0.140*** (6.92)	-0.019 (-1.21)	0.320*** (2.74)	-0.143** (-2.16)
Record	0.033*** (2.78)	0.015** (2.40)	0.045 (1.13)	0.007 (0.46)
Size	-0.015*** (-5.15)	0.001 (0.71)	-0.042** (-2.21)	0.011 (1.33)
Market-to-book	0.008*** (3.26)	-0.006*** (-4.61)	0.012** (2.35)	-0.001 (-0.18)
Return	-0.007 (-0.87)	-0.008 (-1.06)	0.011 (0.42)	-0.010 (-0.64)
Executive Fixed Effects	No	No	Yes	Yes
Adjusted R-squared	0.03	0.03	0.19	0.15
Observations	12,429	39,981	950	3,454



**Table 6, Panel A****Abnormal profits from purchases and the information and control environment**

This table presents the results of models that examine the relation between executives' trading profits from purchases as a function of our measures of firms' information and governance environments and CEO type. *Trading profits* for purchases (sales) equals  $\alpha$  ( $-\alpha$ ) from a four factor alpha model, where  $\alpha$  is obtained from estimating transaction-day specific regressions of daily returns over the 180-days following each transaction. *Record* is a dummy variable that equals 1 if the executive was convicted of any legal infractions prior to the start of year  $t$ , 0 otherwise. *CGS/CAS* is either the Corporate Governance Score or the Corporate Accounting Score. *CGS* is an index value used as a proxy for the strength of a firm's control environment. *CAS* is a proxy for the overall information environment. Both measures are obtained from Governance Metrics International. *Size* is the natural logarithm of the firm's market capitalization. *Market-to-book* is the ratio of the firm's market and book values of equity. *Return* is the firm's annual return. T-statistics are based on standard errors clustered by firm and year. \*\*\*, \*\*, \* denote statistical significance at the .01, .05, and .10 levels respectively.

	Corporate Governance Score		Corporate Accounting Score	
	(1)	(2)	(3)	(4)
Intercept	0.111**	0.095**	0.116**	0.107**
	(2.54)	(2.19)	(2.22)	(2.01)
Record		0.104***		0.059**
		(2.88)		(2.54)
CGS/CAS	-0.005	0.006	0.004	0.007
	(-0.49)	(0.48)	(0.91)	(1.39)
Record * CGS/CAS		-0.067***		-0.017**
		(-2.86)		(-2.49)
Size	-0.008	-0.008	-0.010*	-0.010*
	(-1.37)	(-1.38)	(-1.66)	(-1.70)
Market-to-book	0.003	0.003	0.003	0.003
	(0.68)	(0.66)	(0.60)	(0.60)
Return	0.015	0.014	0.006	0.006
	(1.39)	(1.35)	(0.52)	(0.50)
<i>P-value:</i>				
CGS/CAS + Record * CGS/CAS		0.01***		0.04**
Adjusted R-squared	0.01	0.02	0.01	0.01
Observations	4,006	4,006	4,006	4,006

**Table 6, Panel B****Abnormal profits from sales and the information and control environment**

This table presents the results of models that examine the relation between executives' trading profits from sales as a function of our measures of firms' information and governance environments and CEO type. *Trading profits* for purchases (sales) equals  $\alpha$  ( $-\alpha$ ) from a four factor alpha model, where  $\alpha$  is obtained from estimating transaction-day specific regressions of daily returns over the 180-days following each transaction. *RECORD* is a dummy variable that equals 1 if the executive was convicted of any legal infractions prior to the start of year t, 0 otherwise; *CGS/CAS* is either the Corporate Governance Score or the Corporate Accounting Score. *CGS* is an index value used as a proxy for the strength of a firm's control environment. *CAS* is a proxy for the overall information environment. Both measures are obtained from Governance Metrics International. *Size* is the natural logarithm of the firm's market capitalization. *Market-to-book* is the ratio of the firm's market and book values of equity. *Return* is the firm's annual return. T-statistics are based on standard errors clustered by firm and year. \*\*\*, \*\*, \* denote statistical significance at the .01, .05, and .10 levels respectively.

	Corporate Governance Score		Corporate Accounting Score	
	(1)	(2)	(3)	(4)
Intercept	0.048 (1.18)	0.038 (0.92)	0.101*** (3.46)	0.088*** (3.14)
Record		0.094** (2.37)		0.103** (2.25)
CGS/CAS	-0.010 (-0.87)	-0.003 (-0.22)	-0.014*** (-3.38)	-0.010*** (-2.86)
Record * CGS /CAS		-0.059* (-1.89)		-0.032* (-1.75)
Size	-0.003 (-1.06)	-0.004 (-1.16)	-0.007** (-2.35)	-0.007** (-2.33)
Market-to-book	-0.009*** (-5.99)	-0.009*** (-6.02)	-0.009*** (-5.90)	-0.009*** (-5.92)
Return	-0.017 (-1.60)	-0.017 (-1.58)	-0.018* (-1.79)	-0.019* (-1.82)
<i>P-value:</i> CGS/CAS + Record * CGS/CAS		0.04**		0.03**
Adjusted R-squared	0.06	0.07	0.06	0.08
Observations	16,236	16,236	16,323	16,323

**Table 7****Routine and opportunistic trades**

This table presents the percentage of trades that are classified as routine or opportunistic based on the primary classification method developed by Cohen et al. (2012) for our sample of recordholder and non-recordholder executives. An executive is designated as a *Recordholder* if he was convicted of any legal infractions; otherwise the executive is designated as a *Non-Recordholder*. An executive is considered a routine trader if he trades in the same calendar month for the past three years; insiders trading in three consecutive years but without trades in the same month are classified as opportunistic traders.

	Recordholder	Non-Recordholder
% of all purchases that are routine	42	37
% of all purchases that are opportunistic	58	63
% of all sales that are routine	36	41
% of all sales that are opportunistic	64	59
% of all trades that are routine	38	40
% of all trades that are opportunistic	62	60

**Table 8****Portfolio returns**

This table shows the returns to equal weighted buy and sell portfolios for recordholder and non-recordholder executives that follow all trades, routine trades, and opportunistic trades using the alpha calculated from the Fama-French model. An executive is designated as a *Recordholder* if he was convicted of any legal infractions; otherwise the executive is designated as a *Non-Recordholder*. A firm is included in the buy portfolio, for example, in month  $t + 1$  if any insider for which we have legal infractions data places a buy on the firm in month  $t$ . An insider is deemed a routine trader after trading during the same month in the three consecutive years. An insider is deemed an opportunistic trader after trading in three consecutive years without trading during the same month in each of those years. T-statistics are presented in parentheses. \*\*\*, \*\*, \* denote statistical significance at the .01, .05, and .10 levels respectively.

	Recordholder	Non-Recordholder	Recordholder less Non-Recordholder
All buys	1.86*** (3.61)	0.89*** (3.50)	0.97** (2.52)
All sells	-0.51* (-1.94)	-0.12 (-0.31)	-0.63* (-1.72)
Buys – sells	2.07*** (3.44)	1.01*** (2.91)	1.06** (2.39)
Opportunistic buys	2.29*** (3.03)	1.07*** (3.26)	1.22** (2.48)
Routine buys	1.21** (2.01)	0.64* (1.75)	0.57* (1.83)
Opportunistic sells	-0.87** (-2.20)	-0.19 (-0.44)	-0.68** (-2.02)
Routine sells	-0.38 (-0.64)	0.12 (0.38)	-0.50 (-0.73)
Opportunistic (buys-sells)	2.30*** (2.87)	1.26*** (3.06)	1.04** (2.49)
Routine (buys-sells)	1.19 (1.25)	0.42 (0.52)	0.77 (0.49)

**Table 9****Predictive power of insider trades and mimics of insider trades**

This table presents the analyses of the relation between recordholder/ non-recordholder trades, earnings announcement returns and change in institutional holdings. The dependent variable is either *Earnings Announcement Returns* which are the 3-day market adjusted buy and hold returns centered on the earnings announcement date each quarter, or the *Change in Institutional Holdings* which is the change in institutional ownership of a firm's shares per quarter. An executive is designated as a *Recordholder* if he was convicted of any legal infractions; otherwise the executive is designated as a *Non-Recordholder*. An executive is considered a routine trader if he trades in the same calendar month for the past three years; an insider is deemed an opportunistic trader after trading in three consecutive years without trading during the same month in each of those years. The independent variables include lagged opportunistic/ routine buys and sells (lagged by one quarter for the model with earnings announcement returns, and two quarters for the model with change in institutional holdings), as well as contemporaneous opportunistic / routine buys and sells (included only in the regressions for the change in institutional holdings. The control variables include Size, Market-to-book and Return (see Appendix for their definitions). T-statistics appear in parentheses and are based on standard errors clustered by firm and year. \*\*\*, \*\*, \* denote statistical significance at the .01, .05, and .10 levels respectively.

	Recordholder		Non-Recordholder	
	Earnings Announcement Returns	Change in Institutional Holdings	Earnings Announcement Returns	Change in Institutional Holdings
	(1)	(2)	(3)	(4)
Lagged # opportunistic buys	0.110*** (2.89)	14.901*** (3.57)	0.034** (2.03)	10.447*** (2.64)
Lagged # opportunistic sells	-0.031* (-1.74)	-8.724*** (-2.61)	0.016 (0.31)	-1.984 (-1.54)
Lagged # routine buys	0.034* (1.88)	7.583** (2.07)	0.027 (0.59)	5.991** (2.54)
Lagged # routine sells	0.103 (1.62)	1.552 (0.22)	0.051 (0.26)	-2.613 (-0.41)
Contemporaneous # opportunistic buys		-5.988 (-0.80)		-4.464 (-0.71)
Contemporaneous # opportunistic sells		5.281 (1.03)		5.915 (1.16)
Contemporaneous # routine buys		-2.806 (-0.61)		4.517* (1.95)
Contemporaneous # routine sells		-1.168 (-0.26)		3.254 (0.60)
Controls	Yes	Yes	Yes	Yes
Fixed effects	--	Month	--	Month
<i>P Values:</i>				
Difference between Recordholder and Non-Recordholder:				
Lagged # opportunistic buys	0.03**	0.09*		
Lagged # opportunistic sells	0.08*	0.04**		
Lagged # routine buys	0.64	0.21		
Lagged # routine sells	0.55	0.59		
Adjusted R-squared	0.02	0.03	0.01	0.03
Observations	1,618	1,411	7,842	4,118

**Table 10****Panel A: Bankruptcy analysis - net share purchases by CEOs before bankruptcy**

This table presents the number of net share purchases by recordholder and non-recordholder CEOs during the 36 month and 72-36 month periods prior to bankruptcy. A CEO is designated as a *Recordholder* if he was convicted of any legal infractions; otherwise the CEO is designated as a *Non-Recordholder*. T-statistics of the differences are presented as well. \*\*\*, \*\*, \* denote statistical significance at the .01, .05, and .10 levels respectively.

	36 Months Prior to Bankruptcy	72 Months - 36 Months Prior to Bankruptcy	Difference
Recordholder (N=22)	-1,622,263	698,866	-2,321,129
Non-Recordholder (N=88)	-84,882	-329,649	244,767
<i>T-statistics:</i>			
Difference between Recordholder and Non-Recordholder	2.02**	1.65*	2.06**

**Panel B: Bankruptcy analysis: abnormal profits of CEOs from sales preceding bankruptcy**

This table presents the results of the analysis of abnormal profits from open market sales by CEOs of bankrupt firms. *Trading profits* for purchases (sales) equals  $\alpha$  ( $-\alpha$ ) from a four factor alpha model, where  $\alpha$  is obtained from estimating transaction-day specific regressions of daily returns over the 180-days following each transaction. *Record* is a dummy variable that equals 1 if the executive was convicted of any legal infractions, 0 otherwise. T-statistics appear in parentheses and are based on standard errors clustered by firm and year. \*\*\*, \*\*, \* denote statistical significance at the .01, .05, and .10 levels respectively.

	Sales Within:	
	36 Months Prior to Bankruptcy	Before 36 Months Prior to Bankruptcy
Intercept	0.114*** (4.40)	-0.041*** (-3.93)
Record	0.122*** (4.12)	0.024 (0.91)
Adjusted R-squared	0.06	0.01
Observations	264	721

## Appendix: Definition of Main Variables and Data Sources

Variable	Measurement	Data Source
Size.	The natural logarithm of a firm's market capitalization.	Compustat
Market-to-book.	The ratio of the market and book values of a firm's equity.	Compustat
Return on Assets.	The annual operating income before taxes and depreciation divided by the book value of total assets of a firm.	Compustat
Return.	The annual stock return of a firm.	CRSP
Corporate Accounting Score. ( <i>CAS</i> )	An index measuring the overall quality of a firm's information environment, ranging from 1 through 5 with higher numbers representing better information qualities. This index is created by compiling information on various accounting inputs, including financial statement data, regulatory filings and stock information.	Governance Metrics International (GMI)
Corporate Governance Score. ( <i>CGS</i> )	An index measuring the overall quality of a firm's governance and control environment, which can be either 1 or 2 with the higher number representing better corporate governance quality. This index is created by compiling information on various corporate information, including incidences of accounting fraud, other regulatory violations, restatements, CEO-chairman pairings, officer and director profiles and compensation information.	Governance Metrics International (GMI)
Trading Profits.	Equals $\alpha$ ( $-\alpha$ ) for purchases (sales) made by insiders (who file SEC Form 16), where $\alpha$ is obtained from estimating transaction-day specific regressions of daily returns on common factors over the 180-days following each transaction: $(R_i - R_f) = \alpha + \beta_1 (R_{mkt} - R_f) + \beta_2 SMB + \beta_3 HML + \beta_4 UMD + e$ . $R_i$ is the daily return to firm $i$ 's equity, $R_f$ is the daily risk-free interest rate, $R_{mkt}$ 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
Trade Size and Trade Frequency.	The number of shares exchanged in a transaction and the average number of trades an executive engages in per year (Trade size and frequency respectively).	Thomson Reuters, CRSP and Fama-French data
Legal infractions of an executive. ( <i>Record</i> )	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, sexual assault and traffic violations (including speeding tickets).	Find Out the Truth.com (FOTT)
Serious legal infractions of an executive. ( <i>Serious</i> )	A dummy variable that equals 1 if an executive has any serious legal infractions, and 0 otherwise. Serious legal infractions include driving under the influence of alcohol, other drug-related charges, domestic violence, reckless behavior, and sexual assault.	Find Out the Truth.com (FOTT)

## Appendix: Definition of Main Variables and Data Sources (Contd.)

Variable	Measurement	Data Source
Multiple legal infractions by an executive. ( <i>Multiple</i> )	The number of legal infractions committed by an executive. Legal infractions include driving under the influence of alcohol, other drug-related charges, domestic violence, reckless behavior, sexual assault, and traffic violations (including speeding tickets).	Find Out the Truth.com (FOTT)
CEO of a firm.	A dummy variable that equals 1 if the executive is a CEO, and equals 0 otherwise.	BoardEx, ExecuComp and Thomson Reuters
Tenure.	The number of years an insider has spent in the firm in his or her current office.	Boardex, ExecuComp
Wealth.	The natural logarithm of an insider's wealth measured following Dittmann and Maug (2007). They measure wealth as: Fixed salary (after tax) + Dividend income from shares held in own company (after tax) + Value of restricted stock granted – Personal taxes on restricted stock that vest during the year + Net value realized from exercising options (after tax) – Cash paid for purchasing additional stock. Fixed salary is defined as the sum of the following five ExecuComp data items: Salary, Bonus, Other Annual, All Other Total, and Long-Term Incentive Pay (LTIP).	ExecuComp
Earnings Announcement Returns.	The 3-day market-adjusted buy and hold return centered on the earnings announcement date for each quarter.	Compustat
Change in Institutional Holdings.	The change in institutional ownership of a firm's stock over a quarter.	Thomson Reuters
Lagged opportunistic or routine buys and sells.	The natural log of the number of opportunistic/ routine buys and sells in the previous (or prior two) quarter(s). A trade by an executive (a CEO or a non-CEO senior executive) is considered opportunistic or routine based on the definition in Cohen et al. (2012). A trader who trades in the same calendar month for the past three years is classified as routine traders. Everyone else (who has traded in three consecutive years) is classified as an opportunistic trader.	Thomson Reuters
Contemporaneous opportunistic buys and sells.	The natural log of the number of opportunistic / routine buys and sells in the same quarter. A trade by an executive (a CEO or a non-CEO senior executive) is considered opportunistic or routine based on the definition in Cohen et al. (2012). A trader who trades in the same calendar month for the past three years is classified as routine traders. Everyone else (who has traded in three consecutive years) is classified as an opportunistic trader.	Thomson Reuters