

Corporate Governance and Insider Trading*

Lili Dai, Renhui Fu, Jun-Koo Kang, and Inmoo Lee

May 2012

Abstract

This paper examines the role of corporate governance in limiting insiders' ability to profit from their information advantage. Using the governance score compiled by Institutional Shareholder Services as a measure of the effectiveness of a firm's governance, we find that compared to insiders of poorer-governed firms, those of better-governed firms earn significantly smaller abnormal profits from their sales trades, but not from their purchase trades. Among various governance attributes, board effectiveness and audit quality play the most important role in reducing the profitability of insider sales. We also find that these asymmetric effects of governance on the profitability of insider trading come from two possible channels: better monitoring and more effective compensation structure. Furthermore, good governance restricts insiders' use of private information, but not of public information, and the market interprets insider sales in better-governed firms as containing less private information than those in poorer-governed firms.

JEL Classification: G34, J33, K31, M52.

Keywords: Corporate governance, Insider trading, Insider sales, Insider purchases, Profitability of insider trading

* Lili Dai is from Erasmus School of Economics, Erasmus University, Rotterdam, Netherlands (ldai@ese.eur.nl), Renhui Fu is from Rotterdam School of Management, Erasmus University, Rotterdam, Netherlands (rfu@rsm.nl), Jun-Koo Kang is from Nanyang Business School, Nanyang Technological University, Singapore, (jkkang@ntu.edu.sg), and Inmoo Lee is from KAIST College of Business, KAIST, Seoul, Korea (inmool@kaist.ac.kr). We thank David Veenman and seminar participants at the University of Amsterdam, Erasmus University, KAIST, National Taiwan University, Seoul National University, and Queens University Belfast for their helpful comments. All errors are ours.

Corporate Governance and Insider Trading

Abstract

This paper examines the role of corporate governance in limiting insiders' ability to profit from their information advantage. Using the governance score compiled by Institutional Shareholder Services as a measure of the effectiveness of a firm's governance, we find that compared to insiders of poorer-governed firms, those of better-governed firms earn significantly smaller abnormal profits from their sales trades, but not from their purchase trades. Among various governance attributes, board effectiveness and audit quality play the most important role in reducing the profitability of insider sales. We also find that these asymmetric effects of governance on the profitability of insider trading come from two possible channels: better monitoring and more effective compensation structure. Furthermore, good governance restricts insiders' use of private information, but not of public information, and the market interprets insider sales in better-governed firms as containing less private information than those in poorer-governed firms.

JEL Classification: G34, J33, K31, M52.

Keywords: Corporate governance, Insider trading, Insider sales, Insider purchases, Profitability of insider trading

Although insider trading on material nonpublic information is prohibited by laws (e.g., Rule 10b-5 of the Securities Exchange Act of 1934),¹ previous studies show that insiders exploit their private information and earn significant abnormal profits from their trading (Seyhun (1986), Piotroski and Roulstone (2005), Jagolinzer (2009), Ravina and Sapienza (2010)). The profitability of insider trading, however, is significantly reduced when firms have the policies that restrict insider trading. For example, Bettis, Coles, and Lemmon (2000) find that many firms in the U.S. voluntarily adopt insider trading policies to prohibit insiders from trading their firms' shares during blackout periods and show that insider trading during such periods is less informative. Jagolinzer, Larcker, and Taylor (2011) further find that requiring a general counsel's pre-approval prior to insider trading significantly reduces the profitability of insider trading. Yet, while these studies help us understand how corporate policies on insider trading restrict insiders' use of private information, we still have a limited understanding on other mechanisms designed to prevent informative insider trading within a firm, the asymmetric effects of these mechanisms on insider sales versus inside purchases, and the channels through which these mechanisms reduce the profitability of insider trading.

In this paper we extend the literature on insider trading by examining the role of corporate governance in preventing insiders from exploiting their private information and whether this role differs depending on the nature of inside information (i.e., positive versus negative information). We also examine two channels through which corporate governance limits insiders' ability to take advantage of their information advantages: monitoring and the effectiveness of compensation policies. Specifically, using the governance score compiled by *Institutional Shareholder Services* (ISS score hereafter), we examine whether good governance restricts the

¹ The Insider Trading and Securities Fraud Enforcement Act (ITSFEA) and the Stock Enforcement Remedies and Penny Stock Reform Act (SERPSRA) make both top management and the firm responsible for employees' illegal trading.

information content of insider trading. Unlike Ravina and Sapienza (2010) who use the governance index constructed by Gompers, Ishii, and Metrick (2003, GIM index hereafter), we use the ISS score as our key measure of the effectiveness of a firm's governance because it is a more relevant measure of the quality of internal governance than the GIM index.² The GIM index is constructed mainly using the measures related to anti-takeover provisions and thus primarily captures the effectiveness of a firm's external governance. In contrast, the ISS score is constructed using a firm's internal governance attributes such as board effectiveness and audit quality, although it also considers some external governance attributes such as state regulations on anti-takeover provisions.³ Since informed insider trading tends to occur mainly due to agency problems between shareholders and managers, it can be more effectively controlled by internal governance forces than by external governance mechanisms. Supporting this view, Acharya, Myers, and Rajan (2008) show that internal governance systems effectively mitigate potential agency conflicts between managers and shareholders even without any external governance mechanisms.

Using a large sample of insider trading on firms' stocks listed on the NYSE, AMEX, or NASDAQ from 2001 to 2007, we find that after controlling for the potential endogeneity bias caused by omitted unobservable firm characteristics, better governance significantly reduces the six-month profitability of insider sales but not that of insider purchases.⁴

² In a recent study, Ravina and Sapienza (2010) investigate whether independent directors have as much access to private information as executives by comparing the profitability of independent director trading and that of executive trading. The authors find that executives and independent directors of firms with poorer governance, as measured by the GIM index, earn significantly higher (lower) abnormal returns from their *purchases (sales)* than executives and independent directors of firms with better governance, albeit executives of these firms earn more profits than the firms' independent directors.

³ See Brown and Caylor (2006) for a discussion about the differences between external and internal governance measures. Cremers and Nair (2005) show that external governance mechanisms may not serve as substitutes for internal governance mechanisms, but rather as complements.

⁴ We focus on six-month profitability because of the "short swing" rule (Section 16(b) of the Securities Exchange Act of 1934) that prohibits insiders from earning profits from a round-trip transaction within a six-month interval, which is likely to force insiders not to reverse their position for at least six months.

We also examine whether the restrictive effect of governance on the informativeness of insider trading is simply due to well-governed firms being more likely to adopt policies that discourage informed insider trading. For example, well-governed firms may adopt voluntary corporate policies of restricting insider trading to defend against legal risk (Bettis, Coles, and Lemmon (2000)). These policies often specify the windows that insiders are allowed to trade. Similarly, well-governed firms may require insiders to obtain pre-approval from general counsel prior to trading as a way to reduce legal risk (Jagolinzer, Larcker, and Taylor (2011)). Thus, it is possible that firms with better governance are more likely to adopt voluntary insider trading policies or to require pre-approval from general counsel for insider trading. We find, however, that even after controlling for firms' insider trading policies and general counsel pre-approval requirements in the regressions, the ISS scores are still negatively and significantly related to the profitability of insider sales. These results suggest that corporate governance plays an important role in restricting informed insider sales and has an effect that is above and beyond the effects of voluntary insider trading policies and general counsel pre-approval requirements on the profitability of insider sales.⁵

We find qualitatively similar results when we restrict the sample to insider transactions made by insiders of firms with low transparency and those occurred after the enactment of the Sarbanes-Oxley Act of 2002. The results are also robust to a variety of regression model specifications and alternative measures of the profitability of insider trading. Overall, these

⁵ Other typical mechanisms that restrict insider trading include: oral or written warning, suspension, removal of job duties/responsibilities, demotion, reduction in compensation, and/or termination of employment. While these disciplinary actions are based on ex-post violations of the company's insider trading policy, well-established governance systems (e.g., monitoring by independent directors (Hermalin and Weisbach (1998)) or by large shareholders (Shleifer and Vishny (1986))) can not only impose these disciplinary actions against insiders' ex-post violations of insider trading policies, but also exert ex-ante preventive influence over insiders who are likely to exploit private information, thus playing an important role in limiting the profitability of insider trading beyond the effects of insider trading policies.

results consistently suggest that better governance discourages insiders from exploiting negative private information, but not from exploiting positive private information.

To identify the channels through which governance asymmetrically affects the profitability of insider trading, we next examine the cross-sectional heterogeneity in our results by dividing our sample firms according to several firm and insider trading characteristics. We focus on two possible channels: monitoring and the effectiveness of compensation policies.

We examine the monitoring role of governance by dividing our sample according to firms' ex-ante litigation risks and whether insiders engage in opportunistic or routine sales. Insiders of firms with high ex-ante litigation risk are likely to significantly increase firms' legal risk when they attempt to exploit their private information, especially negative private information. To protect shareholders against this legal risk, better-governed firms are more likely to impose restrictions on informative insider trading that will increase legal risk than poorer-governed firms. Thus, if our results are due to the monitoring role of governance, the impact of the effectiveness of a firm's governance on the informativeness of insider trading should be more pronounced for firms with greater ex-ante litigation risk, and this effect should be more pronounced for insider sales than insider purchases since legal risks are higher for insider trading that uses negative private information than for insider trading that uses positive private information (Cheng and Lo (2006)).⁶

Similarly, Cohen, Malloy, and Pomorski (2011) show that opportunistic traders in poorly governed firms are the most informed traders and opportunistic insider sales are the most informative transactions. They further show that opportunistic sales increase the likelihood of

⁶ The "disclose or abstain" rule requires that anyone in possession of material nonpublic information either disclose this information to the investing public before trading or abstain from trading. Insider sales that are not accompanied by disclosures can result in litigation if there is a significant price drop after the sales since investors who suffer losses can allege that insiders have violated the "disclose or abstain" rule. However, insider purchases not accompanied by disclosures are unlikely to invite litigation since investors face only opportunity losses in the event of a price increase.

Securities and Exchange Commission (SEC) enforcement against insiders. To the extent that firms' monitoring needs are particularly strong for insiders who engage in opportunistic trading, we expect our results to be more pronounced for opportunistic sales than routine sales. Consistent with these arguments, we find that the effects of governance on the profitability of insider sales are indeed evident only for firms with high litigation risk and for opportunistic insider sales.

As a test of the role of compensation policies, we divide our sample according to the identity of insiders (officers and directors) who engage in trading. If insider trading is an effective way to compensate managers (Manne (1966), Roulstone (2003)) and if good governance helps firms optimally design compensation structures (Core, Holthausen, and Larcker (1999)), well-governed firms should have few incentives to restrict profitable insider purchases because these transactions can compensate successful managers, providing positive incentive effects on innovation. In contrast, well-governed firms are likely to have strong incentives to restrict profitable insider sales because such sales allow managers to benefit from their failures.

This compensation-based explanation therefore suggests that our results should be more pronounced for trades by officers than by directors because the incentive effects of insider trading on innovation are likely to be more important for officers than for directors. We find that when we add an indicator for transactions made by officers and its interaction with the ISS score in the regressions, the ISS score is insignificant but the interaction term is significantly positively related to abnormal returns from insider sales and the sum of the coefficient estimates on these two variables is significantly positive, suggesting that corporate governance significantly restricts the profitability of insider sales made by officers but not the profitability of insider sales made by directors. We do not find such results for insider purchases.

Overall, our results suggest that the asymmetric effects of governance on the profitability of insider trading come from two possible channels: better monitoring and a more effective compensation structure.

We next examine the types of inside information that a firm's governance restricts (i.e., private and public information). We find that better governance restricts insiders' use of private information but not their use of public information, although insiders use both private and public information in their trades.

Finally, we examine whether our results are robust to alternative approaches to measuring the informativeness of insider trading. Given that we use insiders' abnormal returns to capture the informativeness of insider trading but there is no consensus about how to measure abnormal returns, we expect this test to provide additional evidence on the role of corporate governance in restricting the informativeness of insider trading. Specifically, using bid-ask spreads and idiosyncratic risk as proxies for a firm's information environment, we examine whether the effectiveness of a firm's governance affects the market's perception about the informativeness of insider trading. If insider trading is informative and the market correctly assesses it, then bid-ask spreads will be higher when insider trading is more intensive (Bettis, Coles, and Lemmon (2000)). However, if better governance restricts the informativeness of insider trading, the positive effect of trading intensity on bid-ask spreads will be less pronounced for firms with stronger governance than for those with poorer governance. Consistent with this view, we find that bid-ask spreads increase with insider trading intensity and that better governance significantly reduces the positive impact of trading intensity on bid-ask spreads for insider sales. Thus, the market interprets insider sales in better-governed firms as sales that contain less private information. We do not find such results for insider purchases.

Similarly, if insider trading is informative, then idiosyncratic risk is expected to be higher when insider trading is more intensive since as more firm-specific information is incorporated into stock prices, a firm's idiosyncratic risk increases (Roll (1988), Morck, Yeung, and Yu (2000)). However, if better governance limits the informativeness of insider trading, it will moderate the positive effect of trading intensity on idiosyncratic risk. Supporting this argument, we find that insider sales increase idiosyncratic risk but that this effect is attenuated if the firm has high quality governance. Overall, these results suggest that the market interprets the informativeness of insider trading differently depending on the effectiveness of a firm's governance.

Our paper contributes to prior literature in at least two ways. First, it contributes to the literature on insider trading by documenting that corporate governance matters for the informativeness of insider sales, but not for the informativeness of insider purchases. This asymmetric effect of corporate governance on the informativeness of insider trading is particularly pronounced for transactions made by insiders of firms with higher litigation risk, opportunistic transactions, and transactions made by officers. We also find that corporate governance significantly affects the informativeness of insider sales above and beyond the previously documented effects of voluntary corporate insider trading policies and general counsel pre-approval requirements on insider trading.

Second, our paper contributes to the literature on corporate governance by shedding additional light on the role of corporate governance in preventing insiders from exploiting private information. Prior literature shows that corporate governance affects a firm's idiosyncratic risk, cost of capital, and value (Ferreira and Laux (2007), Skaife, Collins, and LaFond (2004), Aggarwal, Erel, Stulz, and Williamson (2010)). Our paper further demonstrates that better

governance can benefit shareholders by discouraging insiders from taking advantage of private information.

The remainder of the paper is organized as follows. In Section II, we discuss the construction of our key variables, namely, the effectiveness of corporate governance and the profitability of insider trading, and describe the data and sample characteristics. Section III outlines our empirical methodology. Section IV presents the empirical results. In Section V, we provide the results from our additional tests. We present summary and concluding remarks in Section VI.

II. Variable Construction and Sample Description

A. Variable Construction

A.1 Measure of the Effectiveness of Firm Governance

Following Aggarwal et al. (2010), we use the Corporate Governance Quotient (CGQ) constructed by *Institutional Shareholder Services* from 2001 to 2007 to measure the effectiveness of a firm's governance mechanisms. Starting from 2001, *Institutional Shareholder Services* covers a large set of U.S. firms included in the Standard and Poor's (S&P) 500 index, the S&P SmallCap 600 index, or the Russell 3000 index to measure the CGQ. If firms are required to file various documents and forms with the SEC through the Electronic Data Gathering, Analysis, and Retrieval system (EDGAR), they are also covered by *Institutional Shareholder Services*.⁷

Institutional Shareholder Services evaluates the effectiveness of a firm's governance along eight major dimensions, including board, audit, charter, state, compensation, progressive practices, ownership, and education, which are further disaggregated into 64 governance

⁷ For a detailed description of CGQ for U.S. firms covered by *Institutional Shareholder Services*, see Aggarwal and Williamson (2006) and Aggarwal et al. (2010).

attributes. *Institutional Shareholder Services* also sets minimally acceptable governance standards for these 64 attributes. The ISS score is the number of minimally acceptable governance attributes met by a firm, with higher ISS scores indicating better governance.⁸

Board attributes capture the aspects of governance that are mainly related to board characteristics such as its structure, committees, meetings, elections, and voting processes; audit attributes are related to audit committee structures, audit versus non-audit fees, ratification by auditors at the annual meetings, and auditor rotations; charter attributes refer to anti-takeover provisions and dual classes of stock; state attributes are associated with the regulations of the state of incorporation;⁹ compensation attributes cover compensation structures of executives and directors, practices regarding option repricing and loans to executives, requirements related to shareholder approval for executive compensation, etc.; progressive practices attributes correspond to CEO succession plans, the use of external advisors by the board, performance review processes, resignation processes, and the mandatory retirement of directors; ownership attributes capture shareholder proposals and stock ownership of officers and directors; and the education attribute measures whether the majority of directors have participated in a director education program.

These characteristics of different governance attributes covered in the ISS scoring system suggest that the ISS score measures the effectiveness of a firm's internal governance better than

⁸ Appendix I provides these 64 minimally acceptable governance standards set by *Institutional Shareholder Services* and the proportion of firms that meet these standards over our sample period. If a firm meets the minimally acceptable standard in one governance attribute, then we assign a value of one to this attribute and zero otherwise. The ISS score equals to the sum of these assigned values. For example, an ISS score of 34 means that out of 64 standards, 34 are met. Since the number of governance attributes covered by *Institutional Shareholder Services* has increased over time and some governance attributes are not available during our full sample period, we replace missing values of governance attributes in a particular year by the values available in prior or later years. Our results remain similar when we use the ISS score based on governance attributes available during our full sample period.

⁹ Charter and state attributes are the two categories in the ISS scoring system, which are more closely related to the effectiveness of external governance rather than that of internal governance. To check the robustness of our results, we reestimate all analyses in the paper after excluding these two attributes from the construction of the ISS score and find qualitatively similar results.

the GIM index and thus is well-suited to our investigation of the role of internal governance in restricting the information content of insider trading. In particular, we expect that a subset of governance attributes, namely, board attributes, serves as a key internal governance system that affects the informativeness of insider trading, as previous studies show that board characteristics such as board structures and committee memberships play an important role in protecting shareholders' interests in the presence of agency problems between managers and shareholders (Hermalin and Weisbach (2003)).

A.2 Measure of the Profitability of Insider Trading

We measure the profitability of insider trading by estimating abnormal returns over the 180 calendar days following the transaction date. We use two approaches to calculate abnormal returns. First, similar to Ravina and Sapienza (2010), we define the abnormal return as the difference between a firm's buy-and-hold return over the 180 calendar days following the transaction date and the corresponding buy-and-hold return for the market (*BHAR6m*).

Second, following Jagolinzer, Larcker, and Taylor (2011), we define the abnormal return as an intercept from the Carhart (1997) four-factor model estimated over the 180 calendar days subsequent to the transaction date (*Alpha6m*). Specifically, we estimate the following regression model and use the intercept, α , as our measure of abnormal returns from insider trading:

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

where R_i is the daily stock return of firm i , 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, respectively (Fama and French (1993), Carhart (1997)).¹⁰

B. Sample and Descriptive Statistics

Our initial sample includes insider transactions of firms listed on the NYSE, AMEX, or NASDAQ covered in Thomson Financial Insiders Data Feed over the period 2001 to 2007. Thomson Financial Insiders Data Feed contains trade information on directors, officers, and large stockholders with holdings greater than 10 percent of a firm's stock, all subject to disclosure requirements as defined in Section 16 of the Securities Exchange Act of 1934. Since our main hypothesis regarding the role of governance in preventing insiders from exploiting private information is relevant only for officers and directors, we exclude transactions made by large shareholders from the sample and use only those transactions made by officers and directors in the analyses. We focus on only valid transactions of share purchases and sales.¹¹ To be included in our sample, we also require that firms be covered by *Institutional Shareholder Services* and their stock return and financial data be available in CRSP and Compustat, respectively. Following previous studies, we further limit the sample by requiring that share codes in CRSP be 10 or 11 and we exclude the following transactions: (1) transactions with less than 100 shares or those with trading prices less than \$2; (2) transactions with traded prices outside the range between the daily low and high prices reported in CRSP; (3) transactions with the number of shares exceeding the total number of shares outstanding in CRSP; (4) transactions

¹⁰ To check the robustness of the results, in untabulated tests we also use the market-adjusted buy-and-hold abnormal returns over the 1, 3, and 12 months following the transaction date, and the alphas from the Carhart (1997) four-factor model estimated over the same time periods. We find that our results are robust to using these alternative measures of the profitability of insider trading.

¹¹ A valid transaction is one without a cleanse code of "A" or "S."

with the number of shares traded exceeding total daily trading volume in CRSP; and (5) firms in the financial or utilities industries (firms with SIC codes between 6000 and 6999 or between 4900 and 4999). These restrictions result in a final sample of 8,482 firm-year observations and 474,153 insider transactions.¹² We obtain data on analyst forecasts from I/B/E/S and data on litigation from Stanford Securities Class Action Clearinghouse. Because the data requirements differ across tests, the sample size for each test varies depending on its data requirements.

Table I reports descriptive statistics for the sample of 474,153 insider transactions. The mean *BHAR6m*, *Alpha6m*, and cumulative market-adjusted excess return over the 180 calendar days prior to the insider trading date (*CAR_6m*) are 0.76%, 1.16 basis points, and 17.44%, respectively, and the mean (median) ISS score is 34.23 (35.00). The mean and median market values of equity (*Size*) are \$5.53 billion and \$1.17 billion, respectively, and the mean and median market-to-book equity ratios (*MB*) are 4.26 and 3.08, respectively. The mean ratio of the number of shares purchased and sold by insiders on the transaction date to the total number of shares outstanding (*TradeSize*) and the mean ratio of the number of shares traded by all insiders of the same firm during the ten days prior to the transaction date to the total number of shares outstanding (*RecentTrades*) are 0.21% and 0.53%, respectively. We also find that 59.3% and 18.0% of our sample transactions are made by insiders of firms reporting non-zero R&D expenditures (*RND*) and by insiders of firms with negative net income before extraordinary items during the most recent fiscal year (*Loss*), respectively. Finally, the mean fraction of transactions

¹² Our results are similar when we exclude observations in which insider purchases and sales are made on the same date.

made by insiders of firms with insider trading policies (general counsel pre-approval requirements) is 77.7% (3.5%).¹³

III. Empirical Methodology

To examine whether corporate governance plays a role in limiting the profitability of insider trading, we estimate the following regression:

$$\begin{aligned} BHAR_{6m} (\text{Alpha}_{6m}) = & \alpha + \beta_1 \log(ISS) + \beta_2 \log(\text{Size}) + \beta_3 MB + \beta_4 CAR_{6m} + \beta_5 \\ & TradeSize + \beta_6 RecentTrades + \beta_7 RND + \beta_8 Loss + \beta_9 ITP + \beta_{10} GC + \beta_{11} FixedEffects + \varepsilon, \quad (2) \end{aligned}$$

where

BHAR_{6m} (Alpha_{6m}) = Market-adjusted buy-and-hold returns over the 180 calendar days following the transaction date (intercept from the Carhart (1997) four-factor model estimated over the 180 calendar days subsequent to the transaction date),

ISS = Corporate governance score estimated using the Corporate Governance Quotient constructed by *Institutional Shareholder Services*,

Size = Inflation-adjusted market capitalization at the end of the most recent fiscal quarter (based on 2001 dollars),

MB = Ratio of the market value of equity to the book value of equity at the end of the most recent fiscal quarter,

CAR_{6m} = Cumulative market-adjusted abnormal returns over the 180 calendar days prior to the insider trading date,

¹³ Following Jagolinzer, Larcker, and Taylor (2011), we collect the data on insider trading policies and general counsel pre-approval requirements by manually searching firms' websites. We find that out of 2,225 sample firms, 1,378 adopt insider trading policies and 233 require the approval of general counsel prior to insider trading.

RND = Indicator that takes the value of one if the firm reports non-zero research and development expenditures in the most recent fiscal year and zero otherwise,

TradeSize = Number of shares purchased and sold by insiders on the transaction date divided by the total number of shares outstanding,

RecentTrades = Number of shares purchased and sold by all insiders of the same firm during the ten days prior to the transaction date, scaled by the total number of shares outstanding,

Loss = Indicator that takes the value of one if the firm reports negative net income before extraordinary items for the most recent fiscal year and zero otherwise,

IIP = Indicator that takes the value of one if the firm has insider trading policies and zero otherwise, and

GC = Indicator that takes the value of one if the firm has a general counsel pre-approval requirement and zero otherwise.¹⁴

Following Lakonishok and Lee (2001), we include *Size* and *MB* to control for size and book-to-market effects (Fama and French (1997)). In addition, following Brochet (2010), we control for *CAR_6m*, *RND*, *TradeSize*, *RecentTrades*, and *Loss*. We include *CAR_6m* to control for insiders' contrarian behavior. *RND* is included since insider sales and purchases are likely to be more informative in firms with higher R&D intensity, for which information asymmetry problems are perceived to be greater than those with lower R&D intensity (Aboody and Lev (2000)). We further include *TradeSize* to control for the possible link between the importance of private information and trade size and *RecentTrades* to control for either preemptions of a trade's

¹⁴ In untabulated tests, we additionally control for insider ownership in the regressions and find the results that are quantitatively similar to those reported in the paper. We do not report these results in the paper since the sample size used in the analysis is reduced by almost 40% due to missing insider ownership information.

information content or reinforcements of prior signals. We also include *Loss* to control for the potential reversal of poor accounting performance. Finally, since better-governed firms are more likely to adopt policies such as insider trading policies (*ITP*) and general counsel pre-approval requirements (*GC*) that limit insiders' ability to engage in profitable trading, and hence our results may simply reflect previously documented effects of these corporate policies on the profitability of insider trading rather than the restriction effects of governance, we control for these effects by including *ITP* and *GC* in the regression.

Our main variable of interest is *ISS*. If corporate governance reduces the profitability of insider trading, we expect abnormal returns following insider purchases (sales) to be lower (higher) for better-governed firms than for poorer-governed firms and thus the coefficient estimate on $\log(ISS)$ for insider purchases (sales) to be negative (positive).

We mitigate the potential endogeneity bias caused by omitted unobservable firm characteristics by including firm fixed effects in the regressions. We also include year fixed effects to control for potential time trend effects. To incorporate the guidance suggested by Petersen (2009) regarding the use of panel data sets, we also use clustered standard errors at the individual insider level to calculate *t*-statistics. As robustness tests, we reestimate all regressions in the paper using clustered standard errors at the firm level and find qualitatively similar results.

IV. Empirical Results

A. Corporate Governance and Profitability of Insider Trading

To examine whether the profitability of insider trading is related to the effectiveness of a firm's governance, we divide the sample of insider purchases (sales) into high and low *ISS* groups according to the sample median of firms' *ISS* scores and examine whether *BHAR6m* is

different between these two groups. The results are reported in Panel A of Table II. We find that, for insider purchases, the average *BHAR6m* for trades in firms with high ISS scores is 4.82% while that for trades in firms with low ISS scores is 11.94%, both of which are significant at the 1% level. The test of the difference in mean *BHAR6m* between the two groups rejects the null hypothesis of equal *BHAR6ms*. The median shows a similar pattern. For insider sales, the mean (median) *BHAR6m* is 0.58% (-0.89%) for trades in firms with high ISS scores and 0.14% (-2.24%) for trades in firms with low ISS scores, both of which are significant at the 5% level or lower. The *BHAR6m* difference between these two subgroups is significant at the 1% level. Thus, for both insider purchases and insider sales, insiders in better-governed firms earn significantly less than those in poorer-governed firms. The results using *Alpha6m* are similar and hence are not reported for brevity.

The results above do not control for other determinants of insider trading profitability. To obtain cleaner evidence regarding the effects of ISS scores on the profitability of insider trading, we estimate equation (2) using ordinary least squares (OLS) regressions in which the dependent variable is *BHAR6m* and the independent variables include other known determinants besides ISS scores. The results are presented in Panel B of Table II. To examine the differential effects of ISS scores on insider purchases and sales, we estimate the regressions separately for these two types of insider trades. The first three regressions are estimated using a sample of insider purchases and the following three regressions are estimated using a sample of insider sales.

In regressions (1) and (4), we include $\log(ISS)$, $\log(Size)$, MB , and firm and year fixed effects as the explanatory variables. We find that the coefficient estimate on $\log(ISS)$ in regression (1) is negative and insignificant while that on $\log(ISS)$ in regression (4) is positive and significant at the 1% level, suggesting that stronger governance significantly reduces the profitability of

insider sales but not that of insider purchases. Thus, corporate governance discourages insiders from exploiting negative private information, but not from exploiting positive private information. As expected, $\log(\text{Size})$ and MB are negatively and significantly related to $BHAR6m$ in both regressions.

In regressions (2) and (5), we add CAR_6m , $TradeSize$, $RecentTrades$, RND , and $Loss$ as additional control variables. We again find that the coefficient estimate on $\log(ISS)$ is insignificant for insider purchases but positive and significant for insider sales.

Finally, to mitigate the concern that the results in the previous regressions are simply due to our governance measure serving as a proxy for whether firms have insider trading policies or general counsel pre-approval requirements, in regressions (3) and (6) we add ITP and GC as additional control variables. We obtain similar results as in the previous regressions even after controlling for these two additional variables, indicating that corporate governance matters for the informativeness of insider sales above and beyond the effects that insider trading policies and general counsel pre-approval requirements have on insider trading.

B. Robustness Tests

To check the robustness of the above results, we perform several additional tests. First, we examine whether our results are driven by the fact that better-governed firms have a higher level of transparency and therefore, insiders of these firms enjoy fewer information advantages compared to poorer-governed firms. For example, Frankel and Li (2004) show that the timely disclosure of value-relevant information limits insiders' ability to exploit private information. To address this issue, we limit our attention to the firms with low transparency in which insiders are likely to have more profitable trading opportunities, and examine whether our previous results

still hold for this subsample. To measure differences in transparency, we use the absolute value of discretionary accruals estimated using the modified Jones model suggested by Dechow, Sloan, and Sweeney (1995) and define firms with discretionary accruals higher than the sample median as those with low transparency.¹⁵ The results are presented in the first two columns (1) and (2) of Table III. We find that for insider sales, the coefficient estimate on $\log(ISS)$ is positive and significant, suggesting that firm-level differences in governance quality still affect the profitability of insider sales for the subsample of firms with low transparency. For insider purchases, the coefficient estimate on $\log(ISS)$ is not significant.

Second, we examine whether our results still hold for the subsample of insider trading that took place after the 2002 enactment of the Sarbanes-Oxley Act (SOX). It is possible that our results do not hold after the enactment of SOX since the requirements for corporate governance practices as well as insider trading regulations were strengthened significantly after the adoption of SOX, which might reduce variation in governance quality and profitable insider trading opportunities.¹⁶ To address this issue, we reestimate the regressions using only observations in the post-SOX (2003 to 2007) period. The results are presented in columns (3) and (4) of Table III. We find that for insider sales, the coefficient estimate on $\log(ISS)$ remains positive and significant, suggesting that firm-level differences in governance quality affect the profitability of insider sales even after the change in regulatory environment. For insider purchases, the coefficient estimate on $\log(ISS)$ is not significant as before.¹⁷

Third, we examine whether our results are robust to controlling for potential industry effects by replacing firm fixed effects in regressions (3) and (6) of Table II with industry fixed effects

¹⁵ Lang and Maffet (2011) also use earnings quality to measure the level of a firm's transparency.

¹⁶ Section 403 of the Sarbanes-Oxley Act specifies an amendment to Section 16 of the Securities Exchange Act of 1934, effective as of August 29, 2002. Insiders are required to report their transactions to the SEC within two business days (rather than within ten days following the trading month, which used to be the case prior to the amendment).

¹⁷ The results for the pre-SOX period are similar to those for the post-SOX period.

(Fama-French (1997) 48 industry indicators). The results are reported in regressions (5) and (6) of Table III. We find that our results do not change with this approach.

Fourth, we examine whether the cross-sectional dependence problem that arises when several insiders of a firm simultaneously purchase (sell) stocks several times on the same trading date and these trades are counted as separate observations in the regression leads to biased estimation of t -statistics. To do so, we aggregate the trades made on the same date by all insiders of the same firm and then reestimate regressions (3) and (6) of Table II.¹⁸ The results are presented in regressions (7) and (8) of Table III. We find that the results are qualitatively similar to those in regressions (3) and (6) of Table II.

Fifth, we examine whether our results are robust to alternative measures of abnormal returns by using the intercept from the Carhart (1997) four-factor model (*Alpha6m*) as the dependent variable and reestimate regressions (3) and (6) of Table II. The results are reported in regressions (9) and (10) of Table III. The results echo those of previous regressions.

Finally, since our corporate governance measure, ISS score, is constructed based on eight subcategories of governance attributes, we are able to construct eight ISS subscores and separately examine their impacts on the profitability of insider trading. The results are reported in Table IV. Because the effect of ISS scores on the profitability of insider trading is significant only for insider sales, the regressions in Table IV are estimated using only the sample of insider sales. We find that the coefficient estimates on ISS subscores are positive and significant only for two subcategories, board and audit attributes, suggesting that board effectiveness and audit quality are the two most important internal governance attributes that help restrict insiders from taking advantage of private information. In untabulated tests, we find that the proportion of

¹⁸ If the number of shares purchased (sold) during the day is greater than the number of shares sold (purchased) during the same day in a given firm, we define the aggregate transaction as an insider purchase (sale) for this firm.

independent directors on the board (ISS item 22) has particularly significant restriction effects on the profitability of insider sales. These results are consistent with those of previous studies that show outside directors on the board play an instrumental role in internal governance (e.g., Brickley and James (1987), Weisbach (1988), Byrd and Hickman (1992)).

In sum, we find that better governance prevents insiders from exploiting negative private information and that this result is robust to limiting the sample to insider trading of firms with low transparency or insider trading made during the stricter regulatory environment, a variety of model specifications, and alternative measures of the profitability of insider trading. We also find that among various governance attributes, board effectiveness and audit quality are the two most important governance mechanisms restricting the informativeness of insider trading.

C. GIM Index as an Alternative Measure of Governance

As discussed in the introduction section, Ravina and Sapienza (2010) use the GIM index as a measure of the effectiveness of a firm's governance and find that unlike our results, stock purchases by independent directors are more profitable for firms with a higher GIM index (i.e., poorer corporate governance) than for those with a lower GIM index, while stock sales by independent directors are less profitable for the former firms than for the latter firms. To provide insight into what drives the differences between these two sets of results, using the subperiod common to the two studies (2001 to 2003), we estimate the regressions similar to their models, separately using the GIM index and $\log(ISS)$. We use $BHAR6m$ as the dependent variable.

The results using the 2001-2003 period are shown in Table V. Consistent with the results of Ravina and Sapienza (2010), we find that insider purchases (sales) are more (less) profitable for poorer-governed firms than for better-governed firms when we use the GIM index to capture the

effectiveness of governance (regressions (1) and (4)).¹⁹ However, when we use the ISS score as the governance measure, the profitability of insider sales is smaller for better-governed firms than for poorer-governed firms, while the profitability of insider purchases is statistically indistinguishable between better- and poorer- governed firms (regressions (2) and (5)). Including both GIM index indicator variables and ISS scores in the same regressions does not change the results (regressions (3) and (6)). These results suggest that the role of internal governance in limiting insiders' ability to exploit private information is different from that of external governance. We believe ISS scores fit better in addressing our main issue regarding insider trading given that informed insider trading generally reflects an agency problem between shareholders and managers, which can be better handled by internal governance than by external governance.²⁰

D. How Does Corporate Governance Asymmetrically Affect the Informativeness of Insider Trading?

To understand the channels through which governance asymmetrically affects the profitability of insider trading, in this subsection we examine whether our results vary across firm and insider trading characteristics. We focus on two different channels, monitoring and compensation, through which corporate governance may asymmetrically affect the profitability of insider

¹⁹ Following Gompers, Ishii, and Metrick (2003), we assign firms into ten groups according to their GIM index levels. GIM6 through GIM13 are indicator variables for firms with a GIM index of 6 through 13, respectively. GIM14 is an indicator variable for firms with a GIM index greater than or equal to 14. We omit the indicator for firms with a GIM index less than or equal to 5, so that the intercept captures abnormal returns for firms with GIM index ≤ 5 .

²⁰ The correlation between ISS score and GIM index in our sample is -0.061. As an alternative measure of the effectiveness of corporate governance, we also experiment with Bebchuk, Cohen, and Ferrell's (2009) E-index that is based on 6 out of the 24 governance attributes used in the GIM index. We find that the correlations between ISS score and E-index and between GIM index and E-index in our sample are -0.030 and 0.720, respectively. When we reestimate equation (2) after adding $\log(E\text{-index})$, we find that the coefficient estimate on $\log(ISS)$ remains statistically significant for insider sales, suggesting that internal governance plays an important role in limiting the profitability of insider sales even after controlling for an alternative measure of the effectiveness of external governance.

trading. We investigate whether the asymmetric effects of corporate governance on the profitability of insider trading are due to the effectiveness of a firm's monitoring mechanisms or compensation policies.

First, we examine whether our results are due to the disciplinary role of governance. To the extent that firms' monitoring needs are particularly strong when they face high litigation risk or when their insiders have high agency problems, the disciplinary effect of governance on insider trading is expected to be particularly strong under these circumstances. To measure the difference in firms' monitoring needs, we use an indicator that takes the value of one if the probability of a firm's litigation risk is greater than the sample median and zero otherwise²¹ and an indicator that takes the value of one for opportunistic trades and zero for routine trades.²² We then include an indicator for high ex-ante litigation risk (opportunistic trades) and its interaction with $\log(ISS)$ in the regression. To the extent that firms with high ex-ante litigation risk face high legal risk and firms whose insiders engage in opportunistic trades have high agency problems, the impact of the effectiveness of a firm's governance on the informativeness of insider trading will be more pronounced for these firms if our results are due to the disciplinary role of governance.

The results are reported in regressions (1) through (4) of Table VI. We find that for insider purchases, the coefficient estimates on $\log(ISS)$ and its interaction with an indicator for higher ex-ante litigation risk (opportunistic trades) are not significant, suggesting that governance does not matter regardless of the level of a firm's litigation risk or whether insiders engage in opportunistic or routine trades. For insider sales, the coefficient estimate on $\log(ISS)$ is not

²¹ We estimate the probability of a firm's litigation risk by using a probit model as in Francis, Philbrick, and Schipper (1994), Johnson, Kasznik, and Nelson (2001), and Rogers and Stoken (2005) for a sample of 226,553 firm-quarter observations over the 2001 to 2007 period. A more detailed description of the model is provided in Appendix II.

²² We define routine trades as transactions by insiders who trade stocks consistently in the same calendar month during the past three years, and opportunistic trades as all other transactions.

significant, but the coefficient estimates on its interactions with indicators for high litigation risk and opportunistic trades are positive and significant. Moreover, the sum of the coefficient estimates on $\log(ISS)$ and the interaction term is significantly different from zero at the 5% level in both regressions (2) and (4), indicating that corporate governance matters for the profitability of insider sales made by insiders of firms with high litigation risk or the profitability of opportunistic insider sales. These results suggest that the disciplinary role of governance at least partially drives our results on the asymmetric effects of governance on the profitability of insider trading.

Second, we examine the possibility that better-governed firms design their compensation structures more effectively, so that their compensation structures allow insiders to earn abnormal profits from purchase trades but not from sale trades. This explanation suggests that our findings for the asymmetric effects of the effectiveness of governance on insider trading are not necessarily driven by the disciplinary role of a firm's governance, but rather by the effectiveness of its compensation policy. We examine this possibility by including an indicator for officer trades and its interaction with $\log(ISS)$ in the regression. Since the compensation explanation is more relevant for officer trades than for director trades, we expect the asymmetric effects to be more pronounced for officer trades.

The results are presented in regressions (5) and (6) of Table VI. We find that for insider purchases, none of the coefficient estimates on $\log(ISS)$, an indicator for officer trades, and the interaction term between these two variables is significant. However, for insider sales, the coefficient estimate on the interaction term is positive and significant at the 5% level. Thus, relative to directors, the officers of firms with better governance realize higher abnormal returns from their sales, implying less profitable trading. Furthermore, the sum of the coefficient

estimates on $\log(ISS)$ and its interaction with an indicator variable for officer trades is positive and significant at the 5% level, suggesting that governance plays an important role in limiting the profitability of insider sales made by officers. These results are consistent with the view that the effectiveness of compensation policy is a potential channel through which governance asymmetrically affects the informativeness of insider trading.

In untabulated tests we repeat the above analyses using only officer (director) transactions. We find that the relation between the effectiveness of governance and the profitability of officer sales (purchases) is significantly (insignificantly) negative when a firm's litigation risk is high or when insiders engage in opportunistic trades, while this relation is insignificant when a firm's litigation risk is low or when insiders engage in routine trades. All these results, however, are not significant for director sales (purchases). These results further suggest that monitoring and compensation policies jointly serve as channels through which asymmetric effects occur.

V. Additional Tests

A. Time-Series Portfolio Analysis

To check whether our results are robust to using an alternative measure of the profitability of insider trading, we use a time-series portfolio approach in measuring abnormal returns. Specifically, in each month between January 2001 and December 2007, we count the number of shares purchased (sold) by insiders of each sample firm during the month, and then assign a sample firm into a net purchase (net sale) group if the number of shares purchased (sold) by insiders of the firm is greater than the number of shares sold (purchased). In each month starting from July 2001, we then form net purchase (sale) portfolios using all firms classified in the net purchase (sale) group at least once over the past six-month period. We also separately construct

two portfolios according to the sample median of firms' ISS scores: portfolio of firms with high ISS scores and portfolio of firms with low ISS scores. We calculate both value- and equally-weighted returns on each portfolio during the month of portfolio formation. Next, using net purchase (sale) portfolios, we form a zero-cost investment (i.e., hedge portfolio) strategy that is long in the portfolio of firms with high ISS scores and short in the portfolio of firms with low ISS scores and compute the average return on this hedge portfolio. Finally, using these monthly hedge portfolio returns (78 observations), we run time-series regressions of the Carhart (1997) four-factor model as described in equation (1).

The results using value-weighted hedge portfolio returns are reported in Panel A of Table VII. Consistent with the results in Table II, we find that the coefficient estimate on the intercept is positive and significant at the 10% level for insider sales but insignificant for insider purchases. Specifically, better-governed firms whose insiders engage in stock sales realize significantly higher returns, 0.21% per month, than the corresponding poorer-governed firms after controlling for the four factors used in the model. The results based on equally-weighted hedge portfolios (Panel B) are similar.

B. Short-Term Announcement Return

Thus far, we have shown that the effectiveness of governance measured by ISS scores restricts the long-term profitability of insider trading. In this subsection we use the event study methodology to investigate whether the stock market reacts to filings of insider trading differently depending on the effectiveness of a firm's governance. We focus on the three-day window starting from the filing date to estimate the short-term profitability. We use the CRSP

value-weighted index as the proxy for the market portfolio and subtract its buy-and-hold return from a firm's buy-and-hold return to calculate three-day abnormal returns (*BHAR3d*).²³

Following Brochet (2010), we use *Size*, *MB*, *CAR_6m*, *TradeSize*, *RecentTrades*, *RND*, *Loss*, *ITP*, *GC*, *BHAR6m*, and the number of trading days between the first insider transaction date reported on the filing date and the filing date (*Rlag*) as control variables. Our dependent variable is *BHAR3d* and the main explanatory variable of interest is *log (ISS)*.

Results are reported in Table VIII. We find that ISS scores are significantly positively related to *BHAR3d* for insider sales but are insignificantly related to *BHAR3d* for insider purchases. The results are consistent with those using the long-term profitability of insider trading to capture the informativeness of insider trading and suggest that the market interprets announcements of insider sales differently depending on the quality of a firm's governance.

C. Sources of Abnormal Returns: Private Information or Public Information?

Piotroski and Roulstone (2005) show that insiders earn significant abnormal returns from trading for two potential reasons: they may have private information that they can take advantage of, or they may be contrarian traders and have superior ability to process public information and identify market pricing errors. If insiders use private information in their trading, internal governance systems that are designed to mitigate agency problems between managers and shareholders will discourage insiders from engaging in trading activity that exploits shareholders. However, if insiders engage in trading activity simply because they have superior ability to process public information, such contrarian trading activity may not be a concern for shareholders and therefore would not need to be prevented by internal governance systems.

²³ Our results are similar when we use 5x5 size and book-to-market portfolio adjustments to calculate short-term abnormal returns.

To take these differences in the sources of insider profits into account, we follow Piotroski and Roulstone (2005) and examine whether insider trading is related to insiders' private or public information. We use market-adjusted buy-and-hold abnormal returns in year $t+1$ ($MARET_{t+1}$), and changes in operating performance in year $t+1$ (ΔROA_{t+1}) and in year t (ΔROA_t) as proxies for insiders' private information, and four indicators for the ranking of book-to-market ratios in year t ($BMI-BM4$) and indicators for high (above the 67th percentile) and mid (between 33rd and 67th percentiles) market-adjusted buy-and-hold abnormal returns in year t ($HRET$ and $MRET$, respectively) as proxies for publicly available information.

We next regress the proportion of insider purchases (the ratio of the number of shares purchased by insiders to the number of shares both purchased and sold by insiders in year t) on the information variables, $\log(ISS)$, and their interaction terms to examine whether governance affects the profitability of insider trading by discouraging insiders from exploiting private information but not from exploiting public information. We include as control variables the log of one plus the percentage ratio of the equivalent number of shares given to executives and directors through options and restricted stock grants during fiscal year t to the number of total shares outstanding at the end of the year t ($GRANTS$), the log of one plus the percentage ratio of the number of shares acquired through the exercise of options by executives and directors during fiscal year t to the number of total shares outstanding at the end of the year t ($OPTN_EXRC$), and firm and year fixed effects.

The results are shown in Table IX. We find that the coefficient estimates on $MARET_{t+1}$ and ΔROA_{t+1} are significantly positive, and the coefficient estimates on BMI , $BM2$, $BM3$, $BM4$, $HRET_t$, and $MRET_t$ are significantly negative in regression (2), suggesting that both private information and public information can motivate insider trading, consistent with Piotroski and

Roulstone (2005). Moreover, we find that the coefficient estimate on the interaction between $\log(ISS)$ and $MARET_{t+1}$ is negative and significant in regressions (3) and (4), suggesting that insiders of firms with better governance are less likely to exploit their private information. In contrast, none of the coefficient estimates on the interactions between $\log(ISS)$ and the proxies for publicly available information is significant, suggesting that firms with better governance do not discourage insiders from using their public information in trading.

D. Does Corporate Governance Affect the Market's Perception of the Informativeness of Insider Trading?

In this subsection we examine whether the market interprets the informativeness of insider trading differently depending on the effectiveness of a firm's governance using the impact of insider trading intensity on bid-ask spreads and idiosyncratic risk as alternative measures of the informativeness of insider trading. If a firm's governance limits insiders' ability to exploit private information and the market interprets insider trading in better-governed firms as containing less private information than insider trading in poorer-governed firms, we expect the effect of insider trading intensity on bid-ask spreads (idiosyncratic risk) to be smaller for firms with better governance.

Previous studies show that the expected loss to insiders is greater for smaller firms, which are known to have greater informational asymmetry and larger bid-ask spreads (Seyhun (1986)). If bid-ask spreads are higher to protect market makers against possible losses from trading against insiders and if better governance limits insiders' ability to exploit private information, then the effect of insider trading intensity on bid-ask spreads is likely to be smaller for better-governed firms. Similarly, Roll (1988) and Morck, Yeung, and Yu (2000) show that as more firm-specific

information is incorporated into stock prices through insider trading, a firm's idiosyncratic risk increases. Thus, if a firm's governance limits insiders' ability to exploit private information, the increase in idiosyncratic risk due to insider trading is likely to be smaller for better-governed firms.

The regression results using the bid-ask spread as the dependent variable are presented in Table X.²⁴ We find that after controlling for firm size, trading volume ($\log(Vol)$), the inverse of average intraday trade price ($1/Price$), the standard deviation of intraday prices ($StdPrc$), and firm and year fixed effects, the bid-ask spread increases with insider trading intensity and decreases with the effectiveness of governance (regression (6)). More importantly, we find that the coefficient estimate on the interaction between the intensity of insider sales and $\log(ISS)$ is negative and significant at the 1% level, but the coefficient estimate on the interaction between the intensity of insider purchases and $\log(ISS)$ is insignificant. Thus, the effectiveness of governance significantly reduces the impact of trading intensity on bid-ask spreads for insider sales, whereas such moderation effects do not exist for insider purchases. These results suggest that the stock market is less concerned about share sales by informed insiders of better-governed firms than those by informed insiders of poorer-governed firms, thus distinguishing insider sales in better-governed firms from those in poorer-governed firms.

The results using idiosyncratic risk as the dependent variable are reported in Table XI.²⁵ Consistent with the results in Table X, we find that the intensity of insider sales significantly increases idiosyncratic risk. However, the intensity of insider purchases is not significantly associated with idiosyncratic risk. In addition, we find that the coefficient estimate on the

²⁴ The bid-ask spread is the average daily proportional bid-ask spread in quarter t . Using the last trade in each trading day, we calculate a firm's daily proportional bid-ask spread as $(\text{offer price} - \text{bid price}) / ((\text{offer price} + \text{bid price})/2)$.

²⁵ Idiosyncratic risk is the logistic transformation of $(1-R^2)$ over R^2 , where R^2 is estimated from regressions of daily stock returns on daily market and industry returns in quarter t .

interaction between the intensity of insider sales and $\log(ISS)$ is negative and significant at the 1% level, suggesting that better governance significantly reduces the impact of trading intensity on idiosyncratic risk for insider sales. Such a moderation effect, however, does not exist for insider purchases.

E. Endogeneity Bias

It is possible that ISS , ITP , and GC are endogenously and simultaneously determined, which could result in inconsistent coefficient estimates on $\log(ISS)$. To address this concern, we use the three-stage least squares (3SLS) regression method. We use industry-median $\log(ISS)$, industry-median ITP , and industry-median GC as the instrumental variables for ISS , ITP , and GC , respectively. To the extent that firms in the same industry follow similar industry practices in establishing internal governance systems, insider trading policies, and general counsel pre-approval requirement policies, we expect these industry variables to be positively related to ISS , ITP , and GC , respectively, thus satisfying the relevance requirement of an instrumental variable. On the other hand, these industry variables are not likely to have any direct effects on the profitability of a firm's insider trading, and thus our instrumental variables are highly likely to affect the profitability of insider trading only through their correlation with the endogenous variables (i.e., ISS , ITP , and GC), satisfying the exclusion restriction of an instrumental variable.

The results are presented in Table XII. The first two columns report the results of regressing $\log(ISS)$ on its instrument (industry-median $\log(ISS)$) and control variables for insider purchases and sales, respectively. As we can see, the instrumental variable is positively related to $\log(ISS)$, significant at the 1% level. Similarly, in regressions (3) and (4) ((5) and (6)), we find that industry-median ITP (industry-median GC) is significantly positively related to ITP (GC).

Regressions (7) and (8) present estimates from our main regression in which the dependent variable is *BHAR6m* and the explanatory variables are the predicted values of *log(ISS)*, *ITP*, and *GC* as well as the other control variables used in Table II. We find that the coefficient estimate on the predicted values of *log(ISS)* is positive and significant at the 5% level for insider sales but insignificant for insider purchases. Thus, our finding regarding the effectiveness of governance in preventing insiders from exploiting only negative private information appears to be robust to controlling for endogeneity concerns.²⁶

VI. Summary and Conclusion

Using ISS scores to measure the effectiveness of a firm's governance, in this paper we examine the role of governance quality in preventing insiders from exploiting inside information. We find that compared to insiders of poorer-governed firms, those of better-governed firms profit significantly less from their sale trades, but not from their purchase trades. This result suggests that insider sales in better-governed firms are less informative than those in poorer-governed firms. More specifically, we find that the average abnormal return over the 180 calendar days following the sale transaction date is significantly higher for insiders of better-governed firms than for insiders of poorer-governed firms (0.58% compared with 0.14%), suggesting that insiders of better-governed firms profit significantly less from their sale transactions than those of poorer-governed firms. The results continue to hold even after controlling for firms' insider trading policies and general counsel pre-approval requirements. We find similar results when we limit the sample to insider trading of firms with low transparency or

²⁶ Since *ITP* and *GC* can be affected by the quality of a firm's governance, in untabulated tests we also estimate regression models in which *log(ISS)* is included as an additional independent variable in regressions (3) through (6) and obtain similar results as those reported in Table XII. Our results are also similar when we use industry-average *log(ISS)*, industry-average *ITP*, and industry-average *GC* as instrumental variables.

insider trading made during the stricter regulatory environment. The results are also robust to a variety of model specifications and alternative methods to estimate abnormal returns.

We also find that lower profits for insider sales in better-governed firms come from better monitoring and more effective compensation policies: the restriction effects of governance on the profitability of insider trading are particularly strong for sales made by insiders of a firm with high litigation risk, opportunistic sales, and officer sales.

Moreover, we find that among various governance attributes, board effectiveness and audit quality play the most important roles in limiting the informativeness of insider trading. These results suggest that the effectiveness of internal governance is the driving force behind the restrictive effect of governance on the profitability of insider trading.

When we examine the source of abnormal returns from insider trading, we find that corporate governance discourages insiders from exploiting their private information but not from using their public information in making transaction decisions.

Finally, we find that for insider sales, corporate governance significantly reduces the positive impact of trading intensity on the information environment as measured by bid-ask spreads and idiosyncratic risk, indicating that the market interprets insider sales in better-governed firms as containing less private information than insider sales in poorer-governed firms. We do not find such results for insider purchases.

Overall, our results show that the effectiveness of a firm's governance is closely related to the informativeness of insider sales but not to that of insider purchases. This asymmetric effect of governance on the informativeness of insider trading suggests that good governance prevents insiders from exploiting negative private information but not from exploiting positive private information. Our findings have important implications for investors, regulators, and corporate

managers and suggest that future research on insider trading and insider trading regulation should consider the asymmetric role of governance in insider trading.

Reference

- Aboody, David, and Baruch Lev, 2000, Information asymmetry, R&D and insider gains, *Journal of Finance* 55, 2747–2766.
- Acharya, Viral, Stewart Myers, and Raghuram Rajan, 2008, The internal governance of firms, Working paper, University of Chicago.
- Aggarwal, Reena, Isil Erel, René Stulz, and Rohan Williamson, 2010, Differences in governance practices between U.S. and foreign firms: Measurement, causes, and consequences, *Review of Financial Studies* 23, 3131–3169.
- Aggarwal, Reena, and Rohan Williamson, 2006, Did new regulations target the relevant corporate governance attributes? Working Paper, Georgetown University.
- Bebchuk, Lucian, Alma Cohen and Allen Ferrell, 2009, What matters in corporate governance? *Review of Financial Studies* 22, 783-827.
- Bettis, Carr, Jeffrey Coles, and Michael Lemmon, 2000, Corporate policies restricting trades by insiders, *Journal of Financial Economics* 57, 191–220.
- Brickley, James, and Christopher James, 1987, The takeover market, corporate board composition, and ownership structure: The case of banking, *Journal of Law and Economics* 30, 161–80.
- Brochet, Francois, 2010, Information content of insider trades before and after the Sarbanes-Oxley act, *The Accounting Review* 85, 419–446.
- Brown, Lawrence, and Marcus Caylor, 2006, Corporate governance and firm valuation, *Journal of Accounting and Public Policy* 25, 409–434.
- Byrd, John, and Kent Hickman, 1992, Do outside directors monitor managers? Evidence from tender offer bids, *Journal of Financial Economics* 32, 195–222.
- Carhart, Mark, 1997, On persistency in mutual fund performance, *Journal of Finance* 52, 57–82.
- Cheng, Qiang, and Kin Lo, 2006, Insider trading and voluntary disclosures, *Journal of Accounting Research* 44, 815–848.
- Cohen, Lauren, Christopher J. Malloy, and Lukasz Pomorski, 2012, Decoding inside information, *Journal of Finance*, forthcoming.
- Core, John, Robert Holthausen, and David Larcker, 1999, Corporate governance, chief executive officer compensation, and firm performance, *Journal of Financial Economics* 51, 371–406.

- Cremers, Martijn, and Vinay Nair, 2005, Governance mechanisms and equity prices, *Journal of Finance* 60, 2859–2894.
- Dechow, Patricia, Richard Sloan, and Amy Sweeney, 1995, Detecting earnings management, *The Accounting Review* 70, 193–225.
- Fama, Eugene, and Kenneth French, 1993, Common risk factors in the returns on stocks and bonds, *Journal of Financial Economics* 33, 3–56.
- Fama, Eugene, and Kenneth French, 1997, Industry costs of equity, *Journal of Financial Economics* 43, 153–193.
- Ferreira, Miguel, and Paul Laux, 2007, Corporate governance, idiosyncratic risk, and information flow, *Journal of Finance* 62, 951–990.
- Francis, Jennifer, Donna Philbrick, and Katherine Schipper, 1994, Shareholder litigation and corporate disclosures, *Journal of Accounting Research* 32, 137–164.
- Frankel, Richard, and Xu Li, 2004, Characteristics of a firm’s information environment and the information asymmetry between insiders and outsiders, *Journal of Accounting and Economics* 37, 229–259.
- Gompers, Paul, Joy Ishi, and Andrew Metrick, 2003, Corporate governance and equity prices, *Quarterly Journal of Economics* 118, 107–55.
- Hermalin, Benjamin, and Michael Weisbach, 2003, Boards of directors as an endogenously determined institution: A survey of economic literature, *Economic Policy Review* 9, 7–20.
- Jagolinzer, Alan, 2009, SEC Rule 10b5-1 and insiders’ strategic trade, *Management Science* 55, 224–239.
- Jagolinzer, Alan, David Larcker, and Daniel Taylor, 2011, Corporate governance and the information content of insider trades, *Journal of Accounting Research* 49, 1249–1274.
- Johnson, Marilyn, Ron Kasznik, and Karen Nelson, 2001, The impact of securities litigation reform on the disclosure of forward-looking information by high technology firms, *Journal of Accounting Research* 39, 297–327.
- Lakonishok, Josef, and Inmoo Lee, 2001, Are insider trades informative? *Review of Financial Studies* 14, 79–111.
- Lang, Mark, and Mark Maffett, 2011, Transparency and liquidity uncertainty in crisis periods, *Journal of Accounting and Economics* 52, 101–125.
- Manne, Henry, 1966, *Insider trading and the stock market*, The Free Press, New York.

- Morck, Randall, Bernard Yeung, and Wayne Yu, 2000, The information content of stock markets: Why do emerging markets have synchronous price movements? *Journal of Financial Economics* 25, 215–260.
- Petersen, Mitchell A., 2009, Estimating standard errors in finance panel data sets: Comparing approaches, *Review of Financial Studies* 22, 435–480.
- Piotroski, Joseph, and Darren Roulstone, 2005, Do insider trades reflect both contrarian beliefs and superior knowledge about future cash flow realizations? *Journal of Accounting and Economics* 39, 55–81.
- Ravina, Enrichetta, and Paola Sapienza, 2010, What do independent directors know? Evidence from their trading, *Review of Financial Studies* 23, 962–1003.
- Rogers, Jonathan, and Phillip Stocken, 2005, Credibility of management forecasts, *The Accounting Review* 80, 1233–1260.
- Roll, Richard, 1988, R^2 , *Journal of Finance* 25, 541–566.
- Roulstone, Darren, 2003, The relation between insider-trades restrictions and executive compensation, *Journal of Accounting Research* 41, 525–551.
- Seyhun, Nejat, 1986, Insiders' profits, costs of trading, and market efficiency, *Journal of Financial Economics* 16, 189–212.
- Shleifer, Andrei, and Robert Vishny, 1986, Large shareholders and corporate control, *Journal of Political Economy* 94, 461–488.
- Skaife, Hollis, Daniel Collins, and Ryan LaFond, 2004, Corporate governance and the cost of equity capital, Working paper, University of Wisconsin, Madison.
- Weisbach, Michael, 1988, Outside directors and CEO turnover, *Journal of Financial Economics* 20, 431–460.

Table I
Descriptive Statistics

This table reports descriptive statistics for a sample of 474,153 insider transactions made by officers and directors between 2001 and 2007. *BHAR6m* is the market-adjusted abnormal buy-and-hold return over 180 calendar days subsequent to the insider trading date. *Alpha6m* is the average daily abnormal return estimated using Carhart's (1997) four-factor model over 180 calendar days subsequent to the insider trading date. *ISS* is a firm's governance score constructed by *Institutional Shareholder Services*, with a higher ISS score indicating better governance. A detailed description of the governance attributes used in the calculation of ISS is included in Appendix I. *Size* is the inflation-adjusted market value of equity at the end of the most recent fiscal quarter (based on 2001 dollars). *MB* is the ratio of the market value of equity to the book value of equity in the most recent fiscal quarter. *CAR_6m* is the cumulative market-adjusted excess return over 180 calendar days prior to the insider trading date. *TradeSize* is the number of shares purchased/sold by insiders on the transaction date divided by the total number of shares outstanding. *RecentTrades* is the number of shares purchased/sold by all insiders of the firm during ten days prior to the transaction date, scaled by the total number of shares outstanding. *RND* is an indicator variable that takes the value of one if a firm reports non-zero R&D expenditures in the most recent fiscal year and zero otherwise. *Loss* is an indicator variable that takes the value of one if net income before extraordinary items in the most recent fiscal year is strictly negative and zero otherwise. *ITP* is an indicator variable that takes the value of one for firms with an insider trading policy and zero otherwise. *GC* is an indicator variable that takes the value of one for firms with a general counsel pre-approval requirement and zero otherwise.

Variable	Mean	Q1	Median	Q3	Standard deviation
BHAR6m (%)	0.76	-16.10	-1.36	14.43	27.60
Alpha6m (basis points)	1.16	-10.09	1.28	12.69	20.46
ISS	34.23	30.00	35.00	39.00	5.92
Size (\$ millions)	5,526.6	460.4	1,169.4	3,304.4	1,6070.8
MB	4.26	2.02	3.08	4.78	4.48
CAR_6m (%)	17.44	-4.02	10.45	29.65	38.64
TradeSize (%)	0.21	0.03	0.09	0.22	0.35
RecentTrades (%)	0.53	0.00	0.11	0.51	1.17
RND (indicator)	0.59	0.00	1.00	1.00	0.49
Loss (indicator)	0.18	0.00	0.00	0.00	0.38
ITP (indicator)	0.78	1.00	1.00	1.00	0.42
GC (indicator)	0.04	0.00	0.00	0.00	0.18

Table II
Effects of Governance (ISS Score) on Abnormal Returns (*BHAR6m*) of Insider Trades

This table presents mean and median abnormal returns (*BHAR6m*) earned by insiders from their trading (Panel A) and the results of regressions of these abnormal returns on the effectiveness of governance (ISS scores) and other control variables (Panel B). The sample consists of 474,153 insider trades made by officers and directors between 2001 and 2007. *BHAR6m* is the market-adjusted abnormal buy-and-hold return over 180 calendar days subsequent to the insider trading date. *ISS* is a firm's governance score constructed by *Institutional Shareholder Services*, with a higher *ISS* score indicating better governance. A detailed description of the governance attributes used in the calculation of *ISS* is included in Appendix I. *Size* is the inflation-adjusted market value of equity at the end of the most recent fiscal quarter (based on 2001 dollars). *MB* is the ratio of the market value of equity to the book value of equity in the most recent fiscal quarter. *CAR_6m* is the cumulative market-adjusted excess return over 180 calendar days prior to the insider trading date. *TradeSize* is the number of shares purchased/sold by insiders on the transaction date divided by the total number of shares outstanding. *RecentTrades* is the number of shares purchased/sold by all insiders of the firm during ten days prior to the transaction date, scaled by the total number of shares outstanding. *RND* is an indicator variable that takes the value of one if a firm reports non-zero R&D expenditures in the most recent fiscal year and zero otherwise. *Loss* is an indicator variable that takes the value of one if net income before extraordinary items in the most recent fiscal year is strictly negative and zero otherwise. *ITP* is an indicator variable that takes the value of one for firms with an insider trading policy and zero otherwise. *GC* is an indicator variable that takes the value of one for firms with a general counsel pre-approval requirement and zero otherwise. *t*-statistics are in parentheses and standard errors are corrected for the dependence of observations for the same insider. ***, **, and * stand for statistical significance based on two-sided tests at the 1%, 5%, and 10% levels, respectively.

Panel A: Mean and Median <i>BHAR6m</i>						
Transaction type	Mean			Median		
	High ISS	Low ISS	Test of Difference	High ISS	Low ISS	Test of Difference
Purchases	4.824***	11.936***	-7.112***	1.589***	6.272***	-4.683***
Sales	0.578***	0.142**	0.436***	-0.887***	-2.239***	1.352***

Panel B: OLS Regression (Dependent Variable = <i>BHAR6m</i>)						
Variable	Purchases			Sales		
	(1)	(2)	(3)	(4)	(5)	(6)
Log (ISS)	-0.792 (-0.24)	-1.663 (-0.18)	-1.664 (-0.18)	3.003*** (2.69)	2.883*** (2.67)	2.872** (2.28)
Log (Size)	-26.208*** (-14.45)	-25.651*** (-14.11)	-25.632*** (-14.08)	-28.325*** (-32.03)	-28.598*** (-31.34)	-28.610*** (-19.39)
MB	-0.809* (-1.65)	-0.818* (-1.66)	-0.817* (-1.66)	-0.200** (-2.47)	-0.126 (-1.57)	-0.125 (-0.93)
CAR_6m		-0.019 (-0.84)	-0.019 (-0.82)		-0.061*** (-5.68)	-0.061*** (-3.87)
TradeSize		0.517*** (2.24)	0.518** (2.25)		-0.056 (-0.78)	-0.056 (-0.51)
RecentTrades		0.037 (0.67)	0.037 (0.68)		-0.042** (-2.24)	-0.042*** (-1.41)
RND (indicator)		9.037*** (2.63)	9.022*** (2.62)		-5.002 (-1.60)	-5.006 (-0.77)
Loss (indicator)		3.359 (1.29)	3.322 (1.28)		1.516 (1.09)	1.515 (0.73)
ITP (indicator)			1.038 (0.42)			-0.007 (-0.04)
GC (indicator)			-3.541 (-0.62)			-1.313 (-0.29)
Intercept	191.190*** (5.96)	183.447*** (5.63)	183.433*** (5.64)	201.300*** (12.19)	207.207*** (12.39)	201.006*** (13.28)
Fixed effects	Firm/Year	Firm/Year	Firm/Year	Firm/Year	Firm/Year	Firm/Year
Adjusted R^2	60.49%	60.64%	60.65%	41.95%	42.17%	42.45%
<i>F</i> -statistic	18.44***	18.78***	18.48***	151.99***	152.32***	154.60***
Sample Size	22,138	22,138	22,138	452,015	452,015	452,015

Table III

Robustness Tests: Effect of Governance (ISS Score) on Abnormal Returns (BHAR6m and Alpha6m) of Insider Trades

This table presents the results of regressions of abnormal returns (*BHAR6m* and *Alpha6m*) earned by insiders from their trading on the effectiveness of governance (ISS scores) and other control variables. The sample consists of 474,153 insider trades made by officers and directors between 2001 and 2007. In columns (1) and (2), the regressions are estimated for the firms with low transparency and in columns (3) and (4), the regressions are estimated for the post-SOX period (2003-2007). In columns (5) and (6), industry and year fixed effects are controlled for. In columns (7) and (8), the trades made on the same date by insiders of the same firm are aggregated. In columns (1) through (8), *BHAR6m* is the market-adjusted abnormal buy-and-hold return over the 180 calendar days subsequent to the insider trading date. *Alpha6m* is the average daily abnormal return estimated using the Carhart's (1997) four-factor model over 180 calendar days subsequent to the insider trading date. *ISS* is a firm's governance score constructed by *Institutional Shareholder Services*, with a higher ISS score indicating better governance. A detailed description of the governance attributes used in the calculation of ISS is included in Appendix I. *Size* is the inflation-adjusted market value of equity at the end of the most recent fiscal quarter (based on 2001 dollars). *MB* is the ratio of the market value of equity to the book value of equity in the most recent fiscal quarter. *CAR_6m* is the cumulative market-adjusted excess return over 180 calendar days prior to the insider trading date. *TradeSize* is the number of shares purchased/sold by insiders on the transaction date divided by the total number of shares outstanding. *RecentTrades* is the number of shares purchased/sold by all insiders of the firm during ten days prior to the transaction date, scaled by the total number of shares outstanding. *RND* is an indicator variable that takes the value of one if a firm reports non-zero R&D expenditures in the most recent fiscal year and zero otherwise. *Loss* is an indicator variable that takes the value of one if net income before extraordinary items in the most recent fiscal year is strictly negative and zero otherwise. *ITP* is an indicator variable that takes the value of one for firms with an insider trading policy and zero otherwise. *GC* is an indicator variable that takes the value of one for firms with a general counsel pre-approval requirement and zero otherwise. *t*-statistics are in parentheses and standard errors are corrected for the dependence of observations for the same insider. ***, **, and * stand for statistical significance based on two-sided tests at the 1%, 5%, and 10% levels, respectively.

Variable	Dependent Variable = <i>BHAR6m</i>								Dependent Variable = <i>Alpha6m</i>	
	Low Transparency		Post-SOX Period		Industry Fixed Effects		Aggregate-Level Observations		Purchases (9)	Sales (10)
	Purchases (1)	Sales (2)	Purchases (3)	Sales (4)	Purchases (5)	Sales (6)	Purchases (7)	Sales (8)		
Log (ISS)	1.168 (0.07)	4.164*** (2.68)	1.317 (0.90)	1.380** (1.91)	7.606 (1.02)	10.090*** (3.46)	1.762 (0.43)	4.954** (2.49)	-0.948 (-0.16)	5.616*** (3.80)
Log (Size)	-29.767*** (-8.37)	-32.230*** (-26.19)	-27.388*** (-9.65)	-35.082*** (-28.37)	-2.494*** (-5.56)	-0.798*** (-3.65)	-2.577*** (-7.40)	-1.267*** (-7.11)	-14.057*** (-11.98)	-16.883*** (-24.64)
MB	-1.864** (-2.06)	0.043 (0.45)	-1.090* (-1.68)	-0.071 (-0.90)	-0.482*** (-3.11)	-0.159* (-1.86)	-0.342** (-1.96)	-0.221*** (-3.10)	-0.371 (-1.11)	0.061 (0.99)
CAR_6m	-0.036 (-0.90)	-0.087*** (-4.55)	-0.034 (-1.11)	-0.065*** (-6.70)	0.051* (1.93)	0.017 (1.50)	0.065*** (2.77)	0.038*** (3.92)	-0.012 (-0.73)	-0.016** (-2.37)
TradeSize	0.568** (2.24)	0.022 (0.22)	-0.006 (-0.02)	-0.087 (-1.09)	0.386 (0.91)	0.015 (0.14)	0.469 (1.02)	-0.047 (-0.52)	0.479** (2.52)	-0.068 (-1.35)
RecentTrades	0.089** (2.22)	-0.080*** (-3.05)	-0.088 (-1.64)	-0.032 (-1.61)	-0.034 (-0.41)	-0.012 (-0.43)	-0.022 (-0.19)	-0.078*** (-2.78)	0.023 (0.61)	-0.018 (-1.24)
RND (indicator)	9.737 (1.26)	-3.301 (-0.97)	11.435** (2.40)	-9.323** (-2.22)	1.143 (0.63)	-2.848*** (-3.26)	2.355 (1.62)	-2.196*** (-2.66)	3.927 (1.09)	-1.762 (-0.80)
Loss (indicator)	6.314 (1.56)	-0.203 (-0.09)	6.485* (1.80)	3.497** (2.13)	1.142 (0.65)	-2.578* (-1.88)	0.826 (0.61)	-5.460*** (-6.18)	1.206 (0.69)	-0.020 (-0.17)
ITP (indicator)	1.012 (0.17)	-6.887*** (-3.50)	-0.705 (-0.23)	-0.093 (-0.06)	-0.130 (-0.07)	0.893 (0.94)	-1.462 (-1.19)	0.657 (1.29)	1.124 (0.57)	0.765 (0.71)
GC (indicator)	3.365 (0.41)	9.970** (2.25)	0.943 (0.15)	2.082 (0.71)	-6.639 (-1.15)	-1.678 (-1.03)	5.819*** (2.82)	-1.719* (-1.90)	-3.013 (-0.63)	-0.358 (-0.20)
Intercept	188.245*** (2.98)	239.594*** (11.66)	138.520*** (2.60)	253.762*** (14.38)	-25.034 (-1.20)	-28.970*** (-2.75)	7.069 (0.48)	-6.160 (-0.89)	101.063*** (4.83)	105.898*** (9.85)
Fixed effects	Firm/Year	Firm/Year	Firm/Year	Firm/Year	Industry/Year	Industry/Year	Industry/Year	Industry/Year	Firm/Year	Firm/Year
Adjusted R ²	64.73%	52.88%	63.57%	44.76%	15.90%	6.56%	12.60%	5.71%	56.34%	38.00%
F-statistic	19.37***	86.42***	18.57***	154.87***	60.24***	9.88***	74.33***	16.45***	15.47***	128.50***
Sample Size	8,767	174,061	15,730	387,796	22,138	452,015	10,014	104,285	22,138	452,015

Table IV
Effects of ISS Subscores on Abnormal Returns (*BHAR6m*) of Insider Trades

This table presents the results of regressions of abnormal returns (*BHAR6m*) earned from insider sales on the effectiveness of governance attributes (ISS subscores) and other control variables. The sample consists of 452,015 insider sales transactions made by officers and directors between 2001 and 2007. *BHAR6m* is the market-adjusted abnormal buy-and-hold return over 180 calendar days subsequent to the insider trading date and *Sub-ISS* is a firm's governance subscore constructed by *Institutional Shareholder Services* for eight different governance attributes (BOARD, AUDIT, CHARTER, STATE, COMPENSATION, PROGRESSIVE, OWNERSHIP, and EDUCATION), with a higher ISS subscore indicating better governance. The detailed description of these governance attributes is included in Appendix I. *Size* is the inflation-adjusted market value of equity at the end of the most recent fiscal quarter (based on 2001 dollars). *MB* is the ratio of the market value of equity to the book value of equity in the most recent fiscal quarter. *CAR_6m* is the cumulative market-adjusted excess return over 180 calendar days prior to the insider trading date. *TradeSize* is the number of shares purchased/sold by insiders on the transaction date divided by the total number of shares outstanding. *RecentTrades* is the number of shares purchased/sold by all insiders of the firm during ten days prior to the transaction date, scaled by the total number of shares outstanding. *RND* is an indicator variable that takes the value of one if a firm reports non-zero R&D expenditures in the most recent fiscal year and zero otherwise. *Loss* is an indicator variable that takes the value of one if net income before extraordinary items in the most recent fiscal year is strictly negative and zero otherwise. *ITP* is an indicator variable that takes the value of one for firms with an insider trading policy and zero otherwise. *GC* is an indicator variable that takes the value of one for firms with a general counsel pre-approval requirement and zero otherwise. *t*-statistics are in parentheses and standard errors are corrected for the dependence of observations for the same insider. ***, **, and * stand for statistical significance based on two-sided tests at the 1%, 5%, and 10% levels, respectively.

	BOARD (1)	AUDIT (2)	CHARTER (3)	STATE (4)	COMPEN- SATION (5)	PROGRE- SSIVE (6)	OWNER- SHIP (7)	EDUCA- TION (8)
Log (Sub-ISS)	4.990*** (2.84)	4.781** (2.26)	0.183 (0.12)	5.530 (1.56)	0.896 (0.24)	-2.100 (-1.52)	-2.098 (-0.85)	0.227 (0.10)
Log (Size)	-28.595*** (-31.41)	-28.608*** (-31.18)	-28.594*** (-31.33)	-26.482*** (-31.40)	-28.601*** (-31.44)	-28.521*** (-31.04)	-28.552*** (-31.28)	-28.596*** (-31.32)
MB	-0.127 (-1.61)	-0.131 (-1.59)	-0.124 (-1.53)	-0.118 (-1.48)	-0.124 (-1.54)	-0.116 (-1.38)	-0.127 (-1.55)	-0.124 (-1.53)
CAR_6m	-0.061*** (-5.69)	-0.061*** (-5.67)	-0.061*** (-5.68)	-0.062*** (-5.69)	-0.061*** (-5.69)	-0.062*** (-5.75)	-0.061*** (-5.63)	-0.061*** (-5.68)
TradeSize	-0.053 (-0.73)	-0.054 (-0.74)	-0.056 (-0.77)	-0.058 (-0.80)	-0.056 (-0.76)	-0.056 (-0.76)	-0.056 (-0.76)	-0.056 (-0.77)
RecentTrades	-0.042** (-2.23)	-0.043** (-2.27)	-0.042** (-2.24)	-0.042** (-2.21)	-0.042** (-2.24)	-0.043** (-2.31)	-0.042** (-2.26)	-0.042** (-2.24)
RND (indicator)	-5.010 (-1.59)	-4.977 (-1.58)	-4.929 (-1.59)	-4.951 (-1.60)	-4.987 (-1.60)	-4.565 (-1.52)	-4.985 (-1.62)	-4.931 (-1.59)
Loss (indicator)	1.558 (1.12)	1.434 (1.04)	1.512 (1.08)	1.470 (1.05)	1.499 (1.10)	1.481 (1.07)	1.483 (1.06)	1.512 (1.08)
ITP (indicator)	-0.052 (-0.04)	-0.146 (-0.11)	0.015 (0.08)	-0.052 (-0.04)	0.013 (0.01)	0.021 (0.02)	0.029 (0.02)	0.014 (0.01)
GC (indicator)	-1.258 (-0.50)	-1.049 (-0.41)	-1.351 (-0.53)	-1.526 (-0.60)	-1.333 (-0.53)	-1.321 (-0.52)	-1.464 (-0.58)	-1.336 (-0.53)
Intercept	199.536*** (23.29)	204.703*** (29.68)	210.111*** (29.82)	198.531*** (26.95)	208.726*** (21.02)	220.332*** (32.01)	212.770*** (29.99)	210.384*** (32.52)
Fixed effects	Firm /Year	Firm /Year	Firm /Year	Firm /Year	Firm /Year	Firm /Year	Firm /Year	Firm /Year
Adjusted R^2	42.47%	42.48%	42.44%	42.54%	42.43%	42.47%	42.46%	42.41%
<i>F</i> -statistic	154.78***	154.81***	154.58***	143.81***	143.73***	143.76***	143.76***	143.73***
Sample size	452,015	452,015	452,015	452,015	452,015	452,015	452,015	452,015

Table V
Effects of Governance (GIM Index and ISS Score) on Abnormal Returns (*BHAR6m*) of Insider Trades

This table presents the results of regressions of abnormal returns (*BHAR6m*) earned by insiders from their trading on the effectiveness of governance (GIM index and ISS scores). The sample consists of 474,153 insider trades made by officers and directors between 2001 and 2007. *BHAR6m* is the market-adjusted abnormal buy-and-hold return over 180 calendar days subsequent to the insider trading date. GIM index is the governance index constructed by Gompers, Ishii, and Metrick (2003), with a higher index indicating poorer governance. Following Gompers, Ishii, and Metrick (2003), we assign firms into ten groups according to their GIM index values: firms with GIM index ≤ 5 to those with GIM index = 14. GIM6 to GIM13 are indicator variables for firms with a GIM index of 6 to a GIM index of 13, respectively. GIM14 is an indicator variable for firms with a GIM index greater than or equal to 14. We omit the indicator for firms with a GIM index less than or equal to 5, so that the intercept captures abnormal returns for firms with GIM index ≤ 5 . ISS is a firm's governance score constructed by *Institutional Shareholder Services*, with a higher ISS score indicating better governance. A detailed description of the governance attributes used in the calculation of ISS score is included in Appendix I. *t*-statistics are in parentheses and standard errors are corrected for the dependence of observations for the same insider. ***, **, and * stand for statistical significance based on two-sided tests at the 1%, 5%, and 10% levels, respectively.

Variable	Purchases			Sales		
	GIM (1)	ISS (2)	GIM + ISS (3)	GIM (4)	ISS (5)	GIM + ISS (6)
Log (ISS)		-28.134 (-1.50)	-29.567 (-1.63)		12.037** (2.05)	13.028** (2.24)
GIM6 (indicator)	3.308 (0.27)		1.826 (0.14)	-0.396 (-0.10)		-0.186 (-0.05)
GIM7 (indicator)	14.452 (1.41)		14.910 (1.43)	6.335* (1.79)		6.660* (1.89)
GIM8 (indicator)	22.827** (2.36)		23.451** (2.40)	4.852 (0.95)		5.420 (1.06)
GIM9 (indicator)	10.346 (1.01)		10.238 (1.01)	10.442*** (2.81)		10.396*** (2.80)
GIM10 (indicator)	14.323 (0.93)		14.212 (0.94)	7.118* (1.95)		7.463** (2.03)
GIM11 (indicator)	10.137 (0.97)		9.843 (0.96)	8.291** (1.98)		8.846** (2.07)
GIM12 (indicator)	8.329 (0.58)		6.333 (0.45)	-0.499 (-0.09)		1.118 (0.20)
GIM13 (indicator)	30.827* (1.95)		28.362* (1.82)	12.426** (2.37)		13.727*** (2.60)
GIM14 (indicator)	11.490 (0.54)		11.339 (0.54)	17.925** (2.39)		20.593*** (2.71)
Intercept	20.007*** (4.15)	123.836* (1.90)	121.952* (1.93)	-6.788*** (-3.46)	-42.426** (-2.19)	-50.422*** (-2.61)
Fixed effects	Firm/Year	Firm/Year	Firm/Year	Firm/Year	Firm/Year	Firm/Year
Adjusted R^2	65.69%	65.58%	65.76%	48.28%	48.20%	48.31%
<i>F</i> -statistic	14.56***	14.60***	14.59***	72.19***	72.31***	72.23***
Sample size	10,120	10,120	10,120	129,726	129,726	129,726

Table VI
Tests of Alternative Explanations for the Effects of Governance (ISS Score) on Abnormal Returns (*BHAR6m*) of Insider Trades: Monitoring and Compensation-based Explanations

This table presents the results of regressions of abnormal returns (*BHAR6m*) earned by insiders from their trading on the effectiveness of governance (ISS scores) and other control variables by subsamples. The sample consists of 474,153 insider trades made by officers and directors between 2001 and 2007. *High Regal Risk* is an indicator variable that takes the value of one if the ex-ante litigation risk estimated using the procedures described in Appendix II is higher than the sample median and zero otherwise. *Opportunistic Trades* is an indicator variable that takes the value of one for transactions by insiders who do not trade stocks in the same calendar month in the past three years and zero otherwise. *Trades by Officers* is an indicator variable that takes the value of one if the trades are made by executive officers and zero otherwise. *BHAR6m* is the market-adjusted abnormal buy-and-hold return over 180 calendar days subsequent to the insider trading date. *ISS* is a firm's governance score constructed by *Institutional Shareholder Services*, with a higher ISS score indicating better governance. A detailed description of the governance attributes used in the calculation of ISS is included in Appendix I. *Size* is the inflation-adjusted market value of equity at the end of the most recent fiscal quarter (based on 2001 dollars). *MB* is the ratio of the market value of equity to the book value of equity in the most recent fiscal quarter. *CAR 6m* is the cumulative market-adjusted excess return over 180 calendar days prior to the insider trading date. *TradeSize* is the number of shares purchased/sold by insiders on the transaction date divided by the total number of shares outstanding. *RecentTrades* is the number of shares purchased/sold by all insiders of the firm during ten days prior to the transaction date, scaled by the total number of shares outstanding. *RND* is an indicator variable that takes the value of one if a firm reports non-zero R&D expenditures in the most recent fiscal year and zero otherwise. *Loss* is an indicator variable that takes the value of one if net income before extraordinary items in the most recent fiscal year is strictly negative and zero otherwise. *ITP* is an indicator variable that takes the value of one for firms with an insider trading policy and zero otherwise. *GC* is an indicator variable that takes the value of one for firms with a general counsel pre-approval requirement and zero otherwise. *t*-statistics are in parentheses and standard errors are corrected for the dependence of observations for the same insider. ***, **, and * stand for statistical significance based on two-sided tests at the 1%, 5%, and 10% levels, respectively.

Variable	Monitoring Effects				Compensation Effects	
	(Characteristic Indicator: High Legal Risk)		(Characteristic Indicator: Opportunistic Trades)		(Characteristic Indicator: Trades by Officers)	
	Purchases (1)	Sales (2)	Purchases (3)	Sales (4)	Purchases (5)	Sales (6)
Log (ISS): (1)	-1.328 (-0.14)	0.389 (1.27)	9.201 (0.68)	1.360 (0.23)	1.292 (0.38)	2.840 (0.64)
Log (Size)	-26.833*** (-15.54)	-26.800*** (-27.29)	-25.641*** (-14.14)	-28.623*** (-31.27)	-25.520*** (-13.98)	-28.604*** (-31.36)
MB	-0.794* (-1.68)	-0.105 (-1.28)	-0.811* (-1.65)	-0.129 (-1.63)	-0.800 (-1.63)	-0.125 (-1.56)
CAR_6m	-0.014 (-0.58)	-0.063*** (-5.97)	-0.019 (-0.84)	-0.061*** (-5.67)	-0.017 (-0.75)	-0.061*** (-5.68)
TradeSize	0.504** (2.24)	-0.050 (-0.69)	0.519** (2.25)	-0.055 (-0.76)	0.542** (2.35)	-0.055 (-0.76)
RecentTrades	0.038 (0.71)	-0.045** (-2.39)	0.037 (0.68)	-0.042** (-2.22)	0.048 (0.89)	-0.042** (-2.25)
RND (indicator)	9.081*** (2.65)	-4.237 (-1.38)	9.107*** (2.65)	-5.013 (-1.60)	8.613*** (2.58)	-4.973 (-1.59)
Loss (indicator)	3.314 (1.29)	1.850 (1.35)	3.272 (1.27)	1.536 (1.11)	3.124 (1.21)	1.502 (1.08)
ITP (indicator)	0.936 (0.37)	0.074 (0.06)	1.005 (0.40)	0.008 (0.01)	0.715 (0.60)	-0.019 (-0.10)
GC (indicator)	-3.388 (-0.60)	-1.485 (-0.59)	-3.531 (-0.62)	-1.298 (-0.51)	-2.948 (-0.52)	-1.294 (-0.51)
Characteristic (indicator)	1.527 (0.06)	-22.694** (-2.26)	38.202 (0.84)	-6.490 (-0.35)	28.342 (1.60)	-0.442 (-0.28)
Log (ISS)*	0.628 (0.09)	5.071* (1.76)	-11.049 (-0.86)	1.579** (2.01)	-7.196 (-1.43)	0.035** (2.08)
Characteristic: (2)	187.887*** (5.57)	199.202*** (12.54)	145.851*** (2.91)	207.333*** (9.40)	170.789*** (5.16)	201.278*** (12.56)
Intercept						
Fixed effects	Firm/Year	Firm/Year	Firm/Year	Firm/Year	Firm/Year	Firm/Year
Adjusted R ²	60.71%	42.71%	60.65%	42.45%	60.76%	42.45%
F-statistic	18.51***	156.11***	18.46***	154.49***	18.55***	154.47***
Sample size	22,138	452,015	22,138	452,015	22,138	452,015
Test: (1) + (2) = 0	0.943	0.031	0.842	0.027	0.534	0.041

Table VII
Monthly Time-Series Portfolio Analysis of the Carhart (1997) Four-Factor Model

This table provides the results of monthly time-series portfolio analyses of the Carhart (1997) four-factor model. Specifically, in each month between January 2001 and December 2007, we count the number of shares purchased (sold) by insiders of each sample firm during the month, and then assign a sample firm into a net purchase (net sales) group if the number of shares purchased (sold) by firm insiders is greater than the number of shares sold (purchased). In each month starting from July 2001, we then form net purchase (sales) portfolios using all firms classified in the net purchase (sales) group at least once over the past six-month period. We also separately construct two portfolios according to the sample median of firms' ISS scores: portfolio of firms with high ISS scores and portfolio of firms with low ISS scores. We calculate both value- and equally-weighted returns on each portfolio during the month of portfolio formation. Next, using net purchase (sales) portfolios, we form a zero-cost investment (i.e., hedge portfolio) strategy that is long in the portfolio of firms with high ISS scores and short in the portfolio of firms with low ISS scores and compute the average return on this hedge portfolio. Finally, using these monthly hedge portfolio returns (78 observations), we run time-series regressions of the Carhart (1997) four-factor model as described in equation (1). t -statistics are based on heteroskedasticity-adjusted standard errors. RM is the *CRSP* value-weighted market return, RF is the daily risk-free interest rate, and SMB , HML , and UMD are the size, book-to-market, and momentum factors, respectively. All coefficient estimates are multiplied by 100 for exposition purposes. ***, **, and * stand for statistical significance based on two-sided tests at the 1%, 5%, and 10% levels, respectively.

Panel A: Value-Weighted Portfolio Returns						
	α	RM-RF	SMB	HML	UMD	Adjusted R^2
Insider Purchases:						
High ISS – Low ISS (t -statistics)	0.042 (0.14)	12.360 (1.14)	-21.164 (-1.54)	19.879 (1.46)	15.179* (1.78)	4.52%
Insider Sales:						
High ISS – Low ISS (t -statistics)	0.213* (1.77)	1.202 (0.22)	-28.600*** (-5.53)	-11.079* (-1.72)	-0.1149 (-0.03)	29.74%
Panel B: Equally-Weighted Portfolio Returns						
	α	RM-RF	SMB	HML	MOM	Adjusted R^2
Insider Purchases:						
High ISS – Low ISS (t -statistics)	0.141 (1.14)	10.646** (2.21)	-4.433 (-0.77)	7.675 (1.32)	-0.800 (-0.27)	5.92%
Insider Sales:						
High ISS – Low ISS (t -statistics)	0.125** (2.19)	2.416 (1.04)	-11.642*** (-4.21)	0.525 (0.19)	0.376 (0.24)	20.18%

Table VIII

Effects of Governance (ISS Score) on Short-term Abnormal Returns (*BHAR3d*) of Insider Trades

This table presents the results of regressions of short-term abnormal returns (*BHAR3d*) around the filing date of insider trading on the effectiveness of governance (ISS scores) and other control variables. The sample consists of 85,091 insider trading filings between 2001 and 2007. *BHAR3d* is the three-day market-adjusted buy-and-hold abnormal return starting from the filing date. *ISS* is a firm's governance score constructed by *Institutional Shareholder Services*, with a higher ISS score indicating better governance. A detailed description of the governance attributes used in the calculation of ISS is included in Appendix I. *Size* is the inflation-adjusted market value of equity in \$ millions at the end of the most recent fiscal quarter (based on 2001 dollars). *MB* is the ratio of the market value of equity to the book value of equity in the most recent fiscal quarter. *CAR_6m* is the cumulative market-adjusted abnormal return in percentage over 180 calendar days prior to the filing date. *TradeSize* is the number of shares purchased/sold by insiders as reported in the filings divided by the total number of shares outstanding. *RecentTrades* is the number of shares purchased/sold by all insiders of the firm during ten days prior to the filing date, scaled by the total number of shares outstanding. *RND* is an indicator variable that takes the value of one if a firm reports non-zero R&D expenditures in the most recent fiscal year and zero otherwise. *Loss* is an indicator variable that takes the value of one if net income before extraordinary items in the most recent fiscal year is strictly negative and zero otherwise. *ITP* is an indicator variable that takes the value of one for firms with an insider trading policy and zero otherwise. *GC* is an indicator variable that takes the value of one for firms with a general counsel's pre-approval requirement and zero otherwise. *BHAR6m* is the market-adjusted buy-and-hold abnormal return over 180 calendar days subsequent to the filing date. *RLag* is the number of trading days between the first insider transaction date reported on the filing date and the filing date. *t*-statistics are in parentheses and standard errors are corrected for firm-level clustering. ***, **, and * stand for statistical significance based on two-sided tests at the 1%, 5%, and 10% levels, respectively.

Variable	Purchases	Sales
Log (ISS)	-2.108 (-1.60)	0.577** (2.27)
Log (Size)	-0.531* (-1.81)	-0.357*** (-4.24)
MB	0.169 (0.55)	0.117 (1.53)
CAR_6m	-0.012*** (-3.63)	-0.001* (-1.89)
TradeSize	0.493* (1.69)	0.069 (1.44)
RecentTrades	0.489* (1.75)	-0.098** (-2.16)
RND (indicator)	-0.179 (-0.27)	0.063 (0.29)
Loss (indicator)	-0.091 (-0.32)	-0.006 (-0.07)
ITP (indicator)	0.899** (2.05)	-0.001 (-0.01)
GC (indicator)	-1.873** (-2.52)	0.111 (0.55)
BHAR6m	0.016*** (4.37)	0.018*** (21.85)
Log (Rlag)	-0.144 (-1.33)	-0.111*** (-4.14)
Intercept	12.008 (1.10)	0.741 (0.75)
Fixed effects	Firm/Year	Firm/Year
Adjusted R^2	27.75%	5.64%
<i>F</i> -statistic	1.50***	2.10***
Sample size	8,007	77,084

Table IX

Regressions of Insider Purchase Ratios on the Effectiveness of Governance (ISS Score), Proxies for Private and Public Information (Contrarian Beliefs), and Their Interaction Terms

This table presents the results of regressions of the proportion of insider purchases on the effectiveness of governance (ISS scores), proxies for private and public information (contrarian beliefs), and their interactions terms. The sample consists of 10,021 firm-year observations between 2001 and 2007. Proportion of insider purchases is the ratio of the number of shares purchased by insiders to the sum of the number of shares purchased and sold by insiders in year t . *ISS* is a firm's governance score constructed by *Institutional Shareholder Services*, with a higher ISS score indicating better governance. A detailed description of the governance attributes used in the calculation of ISS is included in Appendix I. $MARET_{t+1}$ is the buy-and-hold market-adjusted returns in year $t + 1$. ΔROA_t (ΔROA_{t+1}) is the change in return on assets in year t (year $t + 1$). *BM* is the ratio of the book value of equity to the market value of equity in year t . *BMI* is an indicator variable that takes the value of one if the firm is in the lowest BM quintile of the sample in year t while *BM5* is an indicator variable that takes the value of one if the firm is in the highest BM quintile of the sample in year t . *HRET* (*MRET*) is an indicator variable that takes the value of one if a firm's buy-and-hold market-adjusted return is above the 67th percentile (between 33rd and 67th percentiles) of the sample. *GRANTS* is the log of one plus the percentage ratio of the equivalent number of shares given to executives and directors through options and restricted stock grants during fiscal year t to the number of total shares outstanding at the end of the year t . *OPTN_EXRC* is the log of one plus the percentage ratio of the number of shares acquired through the exercise of options by executives and directors during fiscal year t to the number of total shares outstanding at the end of the year t . t -statistics are in parentheses and standard errors are corrected for firm-level clustering. ***, **, and * stand for statistical significance based on two-sided tests at the 1%, 5%, and 10% levels, respectively.

Variable	(1)	(2)	(3)	(4)
$MARET_{t+1} * \log(ISS)$			-0.177***	-0.114*
$\Delta ROA_{t+1} * \log(ISS)$			(-3.31)	(-1.83)
$\Delta ROA_t * \log(ISS)$			-0.153	-0.270
			(-0.62)	(-0.85)
<i>BM1</i> * $\log(ISS)$			-0.662**	-0.659
			(-2.28)	(-1.48)
<i>BM2</i> * $\log(ISS)$			0.079	0.083
			(0.91)	(0.83)
<i>BM3</i> * $\log(ISS)$			0.019	0.010
			(0.24)	(0.11)
<i>BM4</i> * $\log(ISS)$			-0.042	-0.000
			(-0.55)	(-0.00)
<i>HRET</i> * $\log(ISS)$			-0.037	-0.067
			(-0.47)	(-0.73)
<i>MRET</i> * $\log(ISS)$			-0.078	-0.048
			(-1.51)	(-0.78)
<i>GRANTS</i> * $\log(ISS)$			-0.070	0.008
			(-1.34)	(0.13)
<i>OPTN_EXRC</i> * $\log(ISS)$				0.952
				(0.25)
$\log(ISS)$			0.048	-0.020
			(0.58)	(-0.19)
$MARET_{t+1}$	0.053***	0.027**	0.668***	0.431**
	(5.08)	(2.12)	(3.60)	(1.97)
ΔROA_{t+1}	0.065	0.126*	0.595	1.064
	(1.37)	(1.91)	(0.69)	(0.96)
ΔROA_t	-0.022	-0.106	2.264**	2.187
	(-0.44)	(-1.52)	(2.26)	(1.40)
<i>BM1</i> (indicator)	-0.208***	-0.210***	-0.473	-0.491
	(-8.62)	(-7.18)	(-1.56)	(-1.39)
<i>BM2</i> (indicator)	-0.185***	-0.198***	-0.241	-0.223
	(-8.99)	(-7.56)	(-0.88)	(-0.69)
<i>BM3</i> (indicator)	-0.144***	-0.165***	0.011	-0.156
	(-8.19)	(-7.47)	(0.04)	(-0.47)
<i>BM4</i> (indicator)	-0.082***	-0.088***	0.051	0.154
	(-5.36)	(-4.61)	(0.19)	(0.48)
<i>HRET</i> (indicator)	-0.040***	-0.029***	0.232	0.139
	(-4.11)	(-2.57)	(1.27)	(0.64)
<i>MRET</i> (indicator)	-0.043***	-0.028***	0.204	-0.056
	(-4.75)	(-2.81)	(1.09)	(-0.26)
<i>GRANTS</i>		1.970**		-1.348
		(2.46)		(-0.10)
<i>OPTN_EXRC</i>		-5.204***		-33.170**
		(-6.57)		(-2.46)
Intercept	0.343***	0.285***	0.271	0.367
	(22.50)	(13.91)	(0.75)	(0.95)
Fixed effects	Firm/Year	Firm/Year	Firm/Year	Firm/Year
Adjusted R^2	52.29%	50.17%	52.55%	50.46%
F-statistic	4.08***	4.10***	4.10***	4.09***
Sample size	10,021	5,787	10,021	5,787

Table X
Regressions of Bid-Ask Spreads on Insider Trading Intensity and the Effectiveness of Governance (ISS Score)

This table presents the results of regressions of the bid-ask spread on insider trading intensity and the effectiveness of governance (ISS scores). The sample comprises 47,546 firm-quarter observations between 2001 and 2007. The bid-ask spread is the average daily proportional bid-ask spread in quarter t . Using the last trade in each trading day, we calculate a firm's daily proportional bid-ask spread as (offer price – bid price) / ((offer price + bid price)/2). *ISS* is a firm's governance score constructed by *Institutional Shareholder Services*, with a higher ISS score indicating better governance. A detailed description of the governance attributes used in the calculation of ISS is included in Appendix I. *Intensity of insider purchase (Intensity of insider sales)* is the ratio of the number of shares purchased (sold) by all insiders to total trading volume in quarter t . It is set to zero if there is no purchase (sales) in quarter t . *Size* is the inflation-adjusted market value of equity in \$ millions at the end of the most recent fiscal quarter (based on 2001 dollars). *Vol* is the daily trading volume. *1/Price* is the inverse of average intraday trade price. *StdPrc* is the standard deviation of intraday prices. t -statistics are in parentheses and standard errors are corrected for firm-level clustering. ***, **, and * stand for statistical significance based on two-sided tests at the 1%, 5%, and 10% levels, respectively.

Variable	(1)	(2)	(3)	(4)	(5)	(6)
Intensity of insider purchase* log (ISS)				-5.715 (-1.64)		-6.054 (-1.65)
Intensity of insider sale * log (ISS)					-1.597*** (-3.71)	-1.603*** (-3.72)
Intensity of insider purchase	1.404** (2.43)		1.354** (2.34)	17.986 (1.59)		19.198* (1.70)
Intensity of insider sale		0.411*** (4.34)	0.408*** (4.31)		5.825*** (3.91)	5.843*** (3.92)
Log (ISS)				-4.129*** (-3.52)	-3.554*** (-3.00)	-3.385*** (-2.86)
Log (Size)	-0.610** (-2.29)	-0.594** (-2.23)	-0.614** (-2.31)	-0.584*** (-2.19)	-0.548** (-2.06)	-0.573** (-2.15)
Log (Vol)	-0.144 (-0.79)	-0.107 (-0.59)	-0.117 (-0.65)	-0.129 (-0.71)	-0.097 (-0.54)	-0.104 (-0.58)
1/Price	3.746*** (3.14)	4.140*** (3.46)	4.079*** (3.41)	3.730*** (3.12)	4.210*** (3.52)	4.143*** (3.46)
StdPrc	0.073 (1.26)	0.062 (1.07)	0.063 (1.08)	0.070 (1.20)	0.062 (1.07)	0.063 (1.09)
Intercept	12.679*** (4.04)	11.726*** (3.75)	12.065*** (3.85)	25.744*** (5.20)	22.775*** (4.57)	22.519*** (4.52)
Fixed effects	Firm/Year	Firm/Year	Firm/Year	Firm/Year	Firm/Year	Firm/Year
Adjusted R^2	35.83%	35.88%	35.89%	35.88%	35.95%	35.98%
F -statistic	9.78***	9.80***	9.80***	9.80***	9.83***	9.83***
Sample size	47,546	47,546	47,546	47,546	47,546	47,546

Table XI

Regressions of Idiosyncratic Risk on Insider Trading Intensity and the Effectiveness of Governance (ISS Score)

This table presents the results of regressions of idiosyncratic risk on insider trading intensity and the effectiveness of governance (ISS scores). The sample consists of 47,546 firm-quarter observations between 2001 and 2007. Idiosyncratic risk is the logistic transformation of $(1-R^2)$ over R^2 , where R^2 is estimated from regressions of daily stock returns on daily market and industry returns in quarter t . *ISS* is a firm's governance score constructed by *Institutional Shareholder Services*, with a higher ISS score indicating better governance. A detailed description of the governance attributes used in the calculation of ISS is included in Appendix I. *Intensity of insider purchase (Intensity of insider sales)* is the ratio of the number of shares purchased (sold) by all insiders to total trading volume in quarter t . It is set to zero if there is no purchase (sales) in quarter t . *Size* is the inflation-adjusted market value of equity in \$ millions at the end of the most recent fiscal quarter (based on 2001 dollars). *Vol* is the daily trading volume. *AGE* is the number of years from the time the firm first appears in CRSP to the most recent fiscal quarter. *MB* is the ratio of the market value of equity to the book equity value in the most recent fiscal quarter. *LEV* is the ratio of the book value of long-term debt to the book value of total assets in the most recent fiscal quarter. *ROE* is the ratio of income before extraordinary items to the book value of equity in the most recent fiscal quarter. *VROE* is the volatility of return on equity in the past 12 fiscal quarters. *DD* is an indicator variable that takes the value of one if dividends are paid in the most recent fiscal quarter and zero otherwise. *DIVER* is an indicator variable that takes the value of one if the number of segments is greater than one in the most recent fiscal year and zero otherwise. *INST* is the change in aggregated institutional ownership over annual total trading volume in the most recent fiscal quarter. *FOLLOWING* is the number of analysts following. *t*-statistics are in parentheses and standard errors are corrected for firm-level clustering. ***, **, and * stand for statistical significance based on two-sided tests at the 1%, 5%, and 10% levels, respectively.

Variable	(1)	(2)	(3)	(4)	(5)	(6)
Intensity of insider purchase*				-0.091		-0.115
log (ISS)				(-0.39)		(-0.50)
Intensity of insider sale *					-0.130***	-0.130***
log (ISS)					(-4.49)	(-4.50)
Intensity of insider purchase	0.029		0.032	0.337		0.424
	(0.64)		(0.70)	(0.43)		(0.54)
Intensity of insider sale		0.026***	0.026***		0.467***	0.468***
		(4.56)	(4.58)		(4.74)	(4.75)
Log (ISS)				-0.139	-0.083	-0.080
				(-1.63)	(-0.97)	(-0.93)
Log (Size)	-0.585***	-0.588***	-0.587***	-0.583***	-0.586***	-0.585***
	(-31.23)	(-31.36)	(-31.36)	(-31.09)	(-31.24)	(-31.25)
MB	-0.167***	-0.166***	-0.166**	-0.166***	-0.162***	-0.161***
	(-3.57)	(-3.55)	(-3.54)	(-5.80)	(-3.45)	(-3.43)
Log (AGE)	0.007**	0.007**	0.007**	0.007**	0.007**	0.007**
	(2.13)	(2.09)	(2.09)	(2.08)	(1.98)	(2.00)
LEV	0.075	0.075	0.075	0.078	0.076	0.076
	(0.82)	(0.82)	(0.82)	(1.20)	(0.84)	(0.84)
ROE	-0.106	-0.113*	-0.113*	-0.107	-0.116*	-0.115*
	(-1.60)	(-1.72)	(-1.72)	(-1.62)	(-1.75)	(-1.75)
VROE	-0.075*	-0.076*	-0.076*	-0.074*	-0.076*	-0.076*
	(-1.73)	(-1.75)	(-1.75)	(-1.70)	(-1.73)	(-1.73)
DD (indicator)	0.099**	0.100**	0.100**	0.100***	0.102**	0.102**
	(2.28)	(2.29)	(2.29)	(2.30)	(3.52)	(2.35)
DIVER (indicator)	-0.055	-0.056	-0.056	-0.055	-0.055**	-0.055
	(-1.56)	(-1.59)	(-1.59)	(-1.54)	(-2.35)	(-1.56)
INST	0.003**	0.003**	0.003**	0.003**	0.003**	0.003**
	(2.20)	(2.13)	(2.13)	(2.18)	(2.12)	(2.12)
Log (Following)	-0.084***	-0.081***	-0.081***	-0.083***	-0.079***	-0.079***
	(-4.21)	(-4.06)	(-4.06)	(-4.17)	(-3.95)	(-3.96)
Intercept	5.890*****	5.892***	5.888*****	6.331*****	6.130***	6.114***
	(38.08)	(38.12)	(38.07)	(20.52)	(19.50)	(19.52)
Fixed effects	Firm/Year	Firm/Year	Firm/Year	Firm/Year	Firm/Year	Firm/Year
Adjusted R^2	59.58%	59.61%	59.61%	59.59%	59.63%	59.63%
<i>F</i> -statistic	25.77***	25.79***	25.78***	25.75***	25.80***	25.78***
Sample size	47,546	47,546	47,546	47,546	47,546	47,546

Table XII
Effects of Governance (ISS Score) on Abnormal Return (BHAR6m) of Insider Trades: 3SLS Regressions

This table presents the results of regressions of abnormal returns earned by insiders from their trading on explanatory variables. We correct for potential endogeneity and simultaneous determination of *ISS*, *ITP*, and *GC* using 3SLS regressions in which industry median *ISS*, industry median *ITP*, and industry median *GC* are used as the instrumental variables for *ISS*, *ITP*, and *GC*, respectively. Industry is defined based on Fama-French (1997) 48 industries. The sample consists of 474,153 insider trades made by officers and directors between 2001 and 2007. *BHAR6m* is the market-adjusted abnormal buy-and-hold return over 180 calendar days subsequent to the insider filing date and *ISS* is a firm's governance score constructed by *Institutional Shareholder Services*, with a higher *ISS* score indicating better governance. A detailed description of the governance attributes used in the calculation of *ISS* is included in Appendix I. *Size* is the inflation-adjusted market value of equity at the end of the most recent fiscal quarter (based on 2001 dollars). *MB* is the ratio of the market value of equity to the book value of equity in the most recent fiscal quarter. *CAR_6m* is the cumulative market-adjusted excess return over 180 calendar days prior to the insider trading date. *TradeSize* is the number of shares purchased/sold by insiders on the transaction date divided by the total number of shares outstanding. *RecentTrades* is the number of shares purchased/sold by all insiders of the firm during ten days prior to the transaction date, scaled by the total number of shares outstanding. *RND* is an indicator variable that takes the value of one if a firm reports non-zero R&D expenditures in the most recent fiscal year and zero otherwise. *Loss* is an indicator variable that takes the value of one if net income before extraordinary items in the most recent fiscal year is strictly negative and zero otherwise. *ITP* is an indicator variable that takes the value of one for firms with an insider trading policy and zero otherwise. *GC* is an indicator variable that takes the value of one for firms with a general counsel pre-approval requirement and zero otherwise. *t*-statistics are in parentheses and standard errors are corrected for the dependence of observations for the same insider. ***, **, and * stand for statistical significance based on two-sided tests at the 1%, 5%, and 10% levels, respectively.

Variable	Dependent Variable = <i>log(ISS)</i>		Dependent Variable = <i>ITP</i>		Dependent Variable = <i>GC</i>		Dependent Variable = <i>BHAR6m</i>	
	Instrumental Variable = Industry Median <i>log(ISS)</i>		Instrumental Variable = Industry Median <i>ITP</i>		Instrumental Variable = Industry Median <i>GC</i>		Purchases (7)	Sales (8)
	Purchases (1)	Sales (2)	Purchases (3)	Sales (4)	Purchases (5)	Sales (6)		
Log (ISS)							-3.606 (-0.24)	28.966** (2.57)
Log (SIZE)	0.029** (5.19)	0.034*** (6.77)	0.001** (2.41)	0.031*** (7.01)	0.009** (2.11)	0.007*** (3.51)	-2.553** (-2.38)	-0.074** (-2.59)
MB	-0.003* (-1.92)	-0.002*** (-5.86)	0.001 (0.18)	-0.007*** (-4.97)	0.001 (0.40)	-0.001** (-2.30)	-0.314 (-0.38)	-0.188** (-2.03)
CAR_6m	-0.000 (-0.37)	-0.000** (-2.52)	-0.001* (1.82)	0.000 (1.56)	-0.000 (-0.58)	0.000** (2.17)	0.063 (0.66)	0.025** (2.24)
TradeSize	-0.003 (-1.51)	-0.001* (-1.68)	0.007 (0.62)	0.007*** (3.69)	-0.001 (-0.15)	0.000 (0.47)	0.436 (0.29)	0.117 (1.24)
RecentTrades	0.000 (0.44)	-0.000* (-1.85)	-0.001 (-0.40)	0.001** (2.18)	-0.000 (-0.13)	-0.000* (-1.85)	0.009 (0.19)	-0.005 (-0.14)
RND (indicator)	0.005 (0.26)	0.006** (2.17)	0.022 (0.40)	0.031** (2.38)	0.022 (0.76)	-0.006* (-1.76)	1.026 (0.14)	-4.896*** (-5.76)
Loss (indicator)	0.007 (0.38)	0.009** (2.17)	-0.037 (-0.61)	-0.024* (-1.87)	-0.029 (-0.90)	-0.002 (-0.31)	1.242 (0.58)	-2.653** (-2.27)
ITP (indicator)							-19.57 (-0.58)	0.590** (2.05)
GC (indicator)							-12.364 (-1.52)	0.325** (2.06)
Intercept	1.490** (2.37)	1.383*** (4.65)	0.507*** (2.89)	-0.089** (-2.20)	0.037 (0.41)	-0.014 (-1.42)	-12.417 (-0.41)	-95.219** (-2.37)
Instrumental variable	0.562*** (3.17)	0.487*** (13.30)	0.746*** (3.34)	0.760*** (3.86)	0.194** (2.11)	0.204*** (2.71)		
Fixed effects	Year	Year	Year	Year	Year	Year	Year	Year
Adjusted R ²	56.15%	57.08%	6.73%	9.32%	3.43%	1.35%	5.62%	3.05%
F-statistic	2025.92***	42943.7***	123.87***	3575.76***	57.22***	442.76***	88.87***	949.86***
Sample size	22,138	452,015	22,138	452,015	22,138	452,015	22,138	452,015

Appendix I
Governance Attributes Used to Estimate the Effectiveness of Governance (ISS Scores) and Proportion of Firms That Meet Minimally Acceptable Governance Standards set by Institutional Shareholder Services over the sample period

ISS item	2001	2002	2003	2004	2005	2006	2007
<u>BOARD</u>							
1. All directors attended 75% of board meetings or had a valid excuse	99.5%	99.5%	99.1%	99.8%	99.9%	100.0%	100.0%
2. CEO serves on the boards of two or fewer public companies	91.5%	93.7%	95.9%	97.9%	98.3%	99.0%	98.7%
3. Board is controlled by more than 50% independent outside directors	73.5%	74.6%	77.6%	86.2%	90.1%	91.6%	92.1%
4. Board size is at greater than five but less than 16	89.2%	89.2%	80.8%	81.4%	82.2%	82.7%	82.2%
5. CEO is not listed as having a related-party transaction	77.4%	78.3%	76.0%	83.0%	81.6%	83.2%	93.9%
6. No former CEO on the board	80.4%	81.2%	80.8%	78.7%	78.4%	80.0%	87.0%
7. Compensation committee comprised solely of independent outsiders	68.4%	69.9%	66.9%	72.1%	77.0%	80.4%	82.5%
8. Chairman and CEO are separated or there is a lead director	44.6%	48.5%	56.7%	70.9%	48.5%	49.6%	51.7%
9. Nominating committee comprised solely of independent outsiders	24.8%	29.5%	34.6%	57.3%	65.0%	69.3%	71.7%
10. Outsider controlled board or board controlled by 50% to 75% of independent outsiders with officer and director ownership between 5% to 30%	16.3%	37.2%	42.6%	47.0%	19.5%	22.2%	22.1%
11. Governance committee exists and met in the past year	17.5%	26.2%	36.6%	62.0%	68.0%	71.3%	72.5%
12. Shareholders vote on directors selected to fill vacancies	46.4%	46.5%	52.3%	55.5%	57.4%	58.7%	60.3%
13. Governance guidelines are publicly disclosed	1.9%	5.1%	19.4%	45.0%	49.9%	46.6%	48.7%
14. Annually elected board (no staggered board)	41.8%	39.2%	45.4%	46.5%	48.1%	48.8%	50.2%
15. Directors are subject to stock ownership requirements	3.2%	6.2%	7.6%	13.4%	15.1%	19.2%	23.7%
16. Executives are subject to stock ownership guidelines	6.3%	10.9%	8.9%	11.5%	12.8%	16.0%	21.5%
17. Policy exists on outside directorships (four or fewer boards is the limit)	4.6%	5.3%	2.7%	7.3%	9.1%	12.2%	13.5%
18. Shareholders have cumulative voting rights	8.4%	7.7%	8.1%	7.9%	7.5%	7.3%	7.1%
19. Shareholder approval is required to increase/decrease board size	14.2%	13.8%	14.0%	7.7%	8.7%	5.3%	5.0%
20. Qualifies for proxy contest defenses combination points	0.7%	0.6%	1.1%	1.3%	10.0%	11.3%	11.2%
21. Director term limits exist	0.1%	0.0%	1.3%	1.8%	2.0%	2.0%	2.0%
22. Board controlled by 50% or more independent outsiders and all committees are comprised solely of independent outsiders	19.9%	23.4%	19.3%	20.9%	59.6%	65.3%	67.9%
BOARD subtotal	8.35	8.91	9.42	10.51	11.13	11.53	12.02
<u>AUDIT</u>							
23. Consulting fees paid to auditors are less than audit fees paid to auditors	87.6%	87.5%	89.3%	96.8%	98.6%	99.0%	99.1%
24. Audit committee comprised solely of independent outsiders	72.5%	73.7%	77.4%	82.5%	88.1%	90.4%	91.2%
25. Auditors ratified at most recent annual meeting	62.0%	62.4%	60.5%	63.2%	66.0%	70.2%	73.0%
26. Policy disclosed regarding auditor rotation	21.1%	21.7%	15.9%	38.4%	38.6%	38.7%	38.7%
AUDIT subtotal	2.43	2.45	2.44	2.82	2.93	3	3.03

CHARTER

27. Single class, common	88.7%	89.3%	92.3%	94.1%	94.4%	94.4%	94.3%
28. Majority vote requirement to approve mergers (not supermajority)	60.4%	63.1%	72.7%	73.1%	74.2%	74.3%	75.0%
29. Shareholders may call special meetings	41.6%	40.1%	48.2%	49.3%	48.9%	49.9%	49.6%
30. Majority vote requirement to amend charter/bylaws (not supermajority)	56.8%	47.0%	51.7%	49.2%	49.7%	47.1%	47.4%
31. Poison pill with a trigger \geq 20%	11.1%	11.8%	9.1%	9.0%	8.0%	7.1%	6.7%
32. Shareholder may act by written consent	42.3%	20.5%	56.7%	56.2%	56.0%	55.1%	54.3%
33. Company is not authorized to issue blank check preferred and either has no poison pill or a pill that was shareholder approved.	7.7%	6.4%	11.0%	10.8%	10.8%	11.4%	11.0%
34. Poison pill with a qualified offer clause	2.2%	1.5%	1.5%	2.5%	3.1%	3.5%	3.3%
35. Poison pill with TIDE provision	1.7%	0.8%	0.9%	1.3%	1.7%	2.1%	2.2%
36. Board cannot amend bylaws without shareholder approval or can only do so under limited circumstances	11.3%	12.6%	6.9%	5.6%	4.8%	4.3%	4.2%
37. Poison pill with sunset provision	0.1%	0.1%	0.9%	0.5%	1.1%	0.3%	0.5%
CHARTER subtotal	3.24	2.93	3.45	3.45	3.46	3.43	3.43

STATE

38. Incorporation in state w/o a control share cash-out statute, or with a control share cash-out statute but company has opted out	97.0%	97.7%	97.8%	98.1%	98.2%	98.3%	98.2%
39. Company has no pill or state does not endorse poison pills	85.5%	84.8%	89.1%	88.9%	89.7%	91.1%	92.1%
40. Incorporation in a state without stakeholder laws, or independent directors comprise 75% or more of the board	79.1%	72.1%	69.3%	72.9%	73.3%	73.1%	73.0%
41. Incorporation in state w/o a control share acquisition statute, or with a control share acquisition statute but company has opted out	74.6%	79.9%	77.8%	78.5%	78.9%	79.5%	79.4%
42. Incorporation in state with a fair price provision	68.8%	69.7%	68.8%	68.5%	68.4%	68.4%	68.6%
43. Incorporation in state w/o a freezeout provision, or with a freezeout but company has opted out	9.6%	13.6%	15.5%	15.6%	16.8%	16.8%	17.4%
44. Incorporation in state without any state anti-takeover provisions	0.8%	3.3%	4.2%	3.9%	3.8%	3.7%	3.6%
STATE subtotal	4.15	4.21	4.22	4.26	4.29	4.31	4.32

COMPENSATION

45. Interlocks among compensation committee members	97.5%	98.1%	99.3%	99.9%	99.9%	100.0%	99.9%
46. Non-employee directors participate in pension plan	5.4%	5.0%	3.0%	2.2%	2.2%	2.3%	2.3%
47. No option repricing within last three years	97.5%	95.3%	93.0%	93.0%	93.0%	93.2%	93.4%
48. Directors receive all or a portion of their fees in stock	91.5%	90.7%	84.3%	84.2%	84.7%	85.3%	81.2%
49. All stock-incentive plans adopted with shareholder approval	90.7%	91.6%	87.3%	81.3%	86.3%	89.0%	83.6%

50. The last time shareholders voted on an option plan, ISS deemed the cost reasonable	94.7%	45.6%	67.1%	70.5%	72.4%	74.4%	72.6%
51. Company does not provide any loans to executives for exercising options	86.5%	86.9%	85.8%	64.5%	64.9%	65.2%	65.5%
52. Repricing prohibited	8.8%	21.0%	20.0%	29.2%	90.0%	93.0%	94.3%
53. Options grants align with company performance and reasonable burn rate	17.8%	17.5%	19.7%	21.3%	84.4%	85.0%	81.3%
54. Company expenses stock options	7.8%	8.5%	5.1%	7.6%	19.0%	19.1%	19.1%
COMPENSATION subtotal	5.98	5.6	5.66	5.55	6.99	7.1	6.97
<u>PROGRESSIVE PRACTICES</u>							
55. Board has the express authority to hire its own advisors	0.3%	3.3%	17.1%	88.0%	93.6%	95.3%	95.2%
56. Performance of the board is reviewed regularly	4.2%	6.2%	17.5%	53.5%	57.7%	67.7%	68.9%
57. Board approved succession plan in place for the CEO	1.0%	4.4%	14.3%	34.8%	40.1%	53.6%	56.7%
58. Outside directors meet without CEO and disclose number of times met	0.9%	5.7%	16.7%	48.2%	57.7%	61.4%	62.4%
59. Directors are required to submit resignation upon a change in job	1.6%	3.3%	9.4%	19.4%	21.8%	23.6%	26.5%
60. Mandatory retirement age for directors	2.5%	8.9%	13.7%	20.5%	21.3%	21.8%	22.2%
PROGRESSIVE PRACTICES subtotal	0.1	0.32	0.89	2.64	2.96	3.29	3.38
<u>OWNERSHIP</u>							
61. Does not ignore shareholder proposal	99.3%	99.2%	99.4%	99.2%	100.0%	99.7%	99.8%
62. All directors with more than one year of service own stock	85.4%	93.4%	89.0%	87.3%	87.0%	89.3%	91.0%
63. Officers' and directors' stock ownership is at least 1% but not over 30% of total shares outstanding	77.0%	78.5%	69.0%	71.8%	71.4%	73.5%	72.9%
OWNERSHIP subtotal	2.62	2.71	2.57	2.58	2.58	2.62	2.64
<u>EDUCATION</u>							
64. Majority of directors have participated in a director education program.	0.1%	0.0%	0.5%	1.9%	2.8%	3.4%	4.5%
EDUCATION subtotal	0	0	0.01	0.02	0.03	0.03	0.05
Number of observations	2,283	2,616	5,500	5,259	5,296	5,249	4,989
TOTAL number of items that meet minimally acceptable governance standard	26.87	27.16	29.18	32.57	35.05	36.01	36.58

Appendix II Likelihood Analysis of Litigation

This table presents the results of a regression estimating the probability of litigation. The sample consists of 226,553 firm-quarter observations from 2001 to 2007. Following Francis, Philbrick, and Schipper (1994), Johnson, Kasznik, and Nelson (2001), and Rogers and Stoken (2005), we estimate the probability of litigation using the following probit model:

$$Prob(Lawsuit=1) = G(\alpha + \beta_1 Size + \beta_2 Turn + \beta_3 Beta + \beta_4 Returns + \beta_5 Std_Ret + \beta_6 Skewness + \beta_7 Min_Ret + \Sigma High\ Risk\ Industries + \varepsilon_i),$$

Lawsuit takes the value of one if a securities class action lawsuit was recorded by Stanford Law School's *Securities Class Action Clearinghouse* during a calendar quarter and zero otherwise. To incorporate the findings in Grundfest and Perino (1997) that lawsuits are filed on average 79 days after a triggering event, we adjust filing dates by 79 days when matching a lawsuit to a calendar quarter. *Size* is the inflation-adjusted average market value of equity (based on 2001 dollars). *Turn* is the average daily share volume divided by the average shares outstanding. *Beta* is estimated by regressing daily returns on the CRSP equally-weighted index returns. *Returns* is quarterly buy-and-hold returns. *Std_Ret* is the standard deviation of daily returns. *Skewness* is the skewness of daily returns. *Min_Ret* is the minimum daily returns during the quarter. *BioT* is an indicator for bio-technology industries (SIC 2833 to 2836), *ComH* is an indicator for computer hardware industries (SIC 3570 to 3577), *Elec* is an indicator for electronics industries (SIC 3600 to 3674), and *ComS* is an indicator for computer software industries (SIC 7371 to 7379), all of which represent high risk industries. We define firms as those having high legal risk if the ex-ante litigation risk estimated using the above approach is higher than the sample median. All explanatory variables are measured over the calendar quarter. *z*-statistics are reported in parentheses and standard errors are corrected for firm-level clustering. ***, **, and * stand for statistical significance based on two-sided tests at the 1%, 5%, and 10% levels, respectively.

Variable	Predicted Sign	Coefficient (z-statistic)
Log (Size)	+	0.116*** (9.64)
Turn	+	0.064*** (4.70)
Beta	+	0.038*** (4.50)
Returns	+	-0.078 (-0.65)
Std_Ret	+	-0.903 (-1.04)
Skewness	-	0.003 (0.10)
Min_Ret	-	-2.535*** (8.01)
BioT (indicator)	+	0.348* (1.87)
ComH (indicator)	+	1.191 (0.87)
Elec (indicator)	+	0.590*** (6.16)
ComS (indicator)	+	0.180 (0.86)
Intercept		-5.109*** (-29.14)
Pseudo R^2		10.69%
Sample size		226,553