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Institutional Investors and Insider Trading Profitability

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ABSTRACT This study examines the relationship between institutional ownership and the profitability of insider trading. A priori the relationship is not clear. On the one hand, institutions possess superior information that erodes insider advantages and are also active in monitoring. On the other hand, institutions could treat insider trading as an incentivizing mechanism to induce manager effort, leading to improved aggregate shareholder welfare. The results indicate that, on average, institutional ownership is negatively related to the profitability of insider trading, and this relationship derives from both direct monitoring and trading/pricing. Further analysis indicates that this relationship is concentrated for insider sales. In contrast, the findings reveal a positive relationship between institutions and the profitability of insider purchases, indicating an incentivizing role.

> If the benefit of being first goes to the errant insider rather than to the corporation or its shareholders, then they have been robbed of a significant asset.
> (Elaine Sternberg, *Just business: Business ethics in action*)

1. Introduction

Despite the scandals and resultant publicity, insider trading and its often malicious illegal aspect remain a mainstream facet of modern capital markets, and research continues to investigate its mechanisms and sometimes pernicious effects. This study examines the relationship between institutional investors and the profitability of insider trading. Prior research has demonstrated that both managers and institutional investors are informed owners. However, research has not addressed their inter-relationships.

Examining the interplay between these classes of owners is pertinent, given that insiders, as documented by researchers as early as Jaffe (1974, p. 428), possess information superiority and 'actually do violate securities regulations' (see Baesel & Stein, 1979; Finnerty, 1976). Fried (1998) argues that managers enjoy profits of $5 billion a year due to insider trading, largely

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at the expense of shareholders on the other end of the transaction (Sternberg, 2000). In the same vein, the role of institutions in relation to insider trading is particularly important because institutions are among the largest and most active class of shareholders in the USA and other countries (Bricker & Chandar, 2000; Gompers & Metrick, 2001) and play an important role in security analysis and pricing and in corporate monitoring.

Specifically, does institutional ownership affect insider trading profits earned by managers, and if so, why and how? A priori, the relationship is not clear. On the one hand, institutions possess superior information to other market participants, including insiders themselves, because they understand industry trends and macroeconomic movements (Ke & Ramalingegowda, 2005; Piotroski & Roulstone, 2005; Wermers, 2000), hence can have a trading/pricing effect that erodes the information advantage of insiders. Additionally, institutions can also monitor management through direct channels (Coffee, 1991; Hartzell & Starks, 2003; Seyhun, 1992). On the other hand, institutions could treat insider trading as an incentivizing mechanism to induce manager effort, leading to improved aggregate shareholder welfare (Carlton & Fischel, 1983; Leland, 1992). Insider trading aligns CEO–shareholder interests by allowing managers to profit from increases in firm value achieved through their efforts (Macey, 1991). In this vein, institutions have incentives to curtail opportunistic insider sales, but not insider purchases.

The above discussion suggests a nuanced relation between institutional ownership and the profitability of insider trading. Therefore, we hypothesize as to whether institutional ownership is related to the profitability of insider trading. Moreover, we also hypothesize as to whether institutions perform an incentivization function when it comes to insider purchases.

We conduct several analyses to examine our hypothesized relations. Specifically, we conduct multivariate analysis on a 20-year panel data set, in which we use an interaction effect involving institutional ownership and insider trading activity, to assess its impact on insider trading profits. We find that higher levels of institutional ownership interact negatively with insider trading, resulting in lower one-year-ahead size/book-to-market/momentum-adjusted returns (see Fama and French (1993), and Carhart (1997)). Our results are robust to including a large number of covariates, such as firm-level governance, bid–ask spreads, idiosyncratic volatility, and alternative statistical methodologies. Furthermore, these findings are robust to insider trades conducted by both high- and low-ranking insiders.

After documenting a negative relationship between institutional ownership and the profitability of insider trading, we proceed to examine the nature of the relationship. As discussed previously, both an explicit monitoring role and a trading/pricing effect could be at play. Employing a measure of institutional trading, as a proxy for institutions' trading/pricing effects, we show that institutional trading is significantly and negatively related to the profitability of insider trading. Classifying our institutional ownership variable according to Bushee's (1998) methodology, we find that the main effect on the profitability of insider trading comes from the role of dedicated and indexing institutions, which suggests a direct monitoring role by the former, and a trading/pricing effect by the latter. We do not find any relation between the presence of transient institutional investors and the profitability of insider trades, indicating that the negative relation between institutional ownership and the profitability of insider trading is not through an explicit trading channel, but through a passive role exerted by indexing institutions. Moreover, conducting tests based on the passage of the Sarbanes–Oxley Act, which should be a substitute for institutional monitoring, we find that it is negatively related to institutions' effect on the profitability of insider trades.

To further examine the monitoring versus trading/pricing channel, we also examine the relationship between the profitability of insider trading and institutional ownership using daily insider trading data. We analyze the profitability of approximately 1.3 million individual

insider trades, and find that institutional ownership is negatively (positively) related to the profitability of insider sales (purchases), suggesting an incentivization role. These results are further confirmed when we split the daily trade data into opportunistic sales/purchases and routine transactions according to the methodology devised by Cohen, Malloy, and Pomorski (2012). Finally, we examine the frequency of trades, and find that institutional owernship is positively related to the frequency of opportunistic insider purchases, but not sales. The latter two sets of results provide further evidence supporting the incentivization role of institutions.

Our principal contribution is to show a negative relation between the interaction of institutional ownership and insider trading activity and insider trading profits. In particular, we find that this negative relationship exists for insider sales. Moreover, we find the opposite relationship for insider purchases. We build on Sias and Whidbee (2010), who show that insiders trade on the liquidity provided by institutions, and Fidrmuc, Goergen, and Renneboog (2006), who show that the short-term market reaction to insider trades is reduced in the presence of monitoring institutions. We extend these studies by showing that institutional owernship has both a positive and a negative effect on the profitability of insider trading

Huddart and Ke (2007) examine the relation between insider trading and various measures of information asymmetry, including institutional ownership. We build on their study by showing that, in addition to an information asymmetry effect, institutional investors perform a monitoring role. If only trading/pricing were at play, institutions would affect both insider purchases and sales equally. In our results, we find differential results when it comes to insider sales as compared to purchases, and opportunistic trades as compared to routine ones. This suggests an incentivization role, in accordance with the arguments of Bebchuk (1994) and Easterbrook (1985). These results are useful in extending our thinking about institutional ownership and insider trading profitability in general and are instructive in policy considerations that encourage both monitoring and trading activities by institutional investors.

The remainder of this article proceeds as follows: Section 2 reviews prior literature and develops the hypotheses. Section 3 describes the data, variables, and method. Section 4 presents and describes the main results. Section 5 examines the monitoring versus trading/pricing channels. Section 6 concludes.

2. Hypotheses

This research addresses the relationship between institutional investors and insider trading profitability. Several studies have shown that insiders (managers and others) possess special, firm-related information and exploit information asymmetries. It is well known that insiders profit from trading on their private information, and as such, US legislation has attempted to address insider trading by restricting it and providing timely disclosures. This informational advantage stems from sources of information about firm-specific events that outsiders are not privy to, such as M&A activity, equity offerings, debt defaults, R&D success, earnings quality and its persistence, and bankruptcies (Aboody & Lev, 2000; Akbulut, 2005; Beneish, Press, & Vargus, 2004; Keown & Pinkerton, 1981; Piotroski & Roulstone, 2005).

Our study contributes to prior studies that examine the factors that could limit the profitability of insider trading. In doing so, we examine the effect of one market participant, institutional investors, and their role on insider trading. Institutions can possess superior information compared to other market participants, including insiders themselves (e.g. industry trends, macroeconomic movements) and can also monitor through direct channels. Conversely, institutions could treat insider trading as an incentivizing mechanism to induce greater managerial effort.

Institutional investors could negatively affect the profitability of insider trades through a trading/pricing channel. Studies suggest that these investors share many attributes with insiders.

For example, they are sophisticated gatherers and users of company information for investment purposes (Aggarwal & Rao, 1990; Ajinkya, Bhojraj, & Sengupta, 2003) and are active in analyzing the attributes of reported numbers (Jiambalvo, Rajgopal, & Venkatachalam, 2002; Ke & Ramalingegowda, 2005; Rajgopal & Shevlin, 2002). Research has shown that institutional investors possess price-relevant future-oriented information (Aggarwal & Rao, 1990; Wermers, 2000). As such, trading/pricing by one class of informed investors (i.e. institutions) could crowd out the profitability of the trades by another class of informed investors (i.e. insiders).

Institutional investors could also negatively affect the profitability of insider trades through explicit or indirect monitoring. While studies such as Gompers and Metrick's (2001) focus on the relationship between institutional ownership and returns, Coffee (1991), Gillan and Starks (2000), Hartzell and Starks (2003), and Smith (1996) document the role of institutions as corporate monitors. Hartzell and Starks (2003), for example, show that institutional ownership concentration affects executive compensation contracts and conclude that institutions provide a monitoring mechanism. With respect to the monitoring role of institutions on insider trading specifically, Seyhun (1988) suggests that institutions monitor insider trading as a supplement to regulation, consistent with societal pressures to limit insider trading. In this vein, institutional investors have issued a variety of codes for 'best practices' regarding corporate governance, including insider trading, to improve the quality of the internal mechanisms of control and protect investors (see Hebb & Wójcik, 2005). Finally, from an indirect monitoring perspective, institutions could 'vote with their feet' to affect the behavior of management, effectively providing for an 'indirect' monitoring role over managerial behavior (see Parrino, Sias, & Starks, 2003). These studies suggest that institutional investors provide monitoring functions in companies, including over insider trading.

On the basis of these arguments, we conjecture that institutional owners have an effect on managers' insider trading profits through trading/pricing or monitoring. We test the following general hypothesis, stated in alternate form:

> H1: Institutional ownership level is negatively associated with the returns managers earn on insider trading.

H1 addresses the basic relationship between institutional ownership and insider trading returns. However, as our arguments suggest, this relationship is a priori unclear. A contrasting view to insider trading, from an incentivization perspective, predicts a positive relationship between institutional ownership and insider trading. For example, from a long-term monitoring institution viewpoint, allowing insider trading could lead to improvements in long-term firm performance (Carlton & Fischel, 1983; Dye, 1984; Leland, 1992). Bebchuk (1994) argues that insider trading better incentivizes managers (see also Easterbrook, 1985), increases firm output (Hu & Noe, 1997), and improves CEO selection (Carlton & Fischel, 1983). Research also argues that insider trading aligns CEO–shareholder interests, by allowing managers to profit from increases in firm value achieved through their efforts (Macey, 1991). From this latter perspective, institutions have incentives to limit the incidence of opportunistic insider sales, but not purchases. Indeed, institutions gain from incentivizing managers to benefit from insider purchases. Therefore, we test the following general hypothesis, stated in alternate form:

> H2: Institutional ownership level is positively associated with the returns managers earn on insider purchases.

3. Data, Main Variable Definitions, and Method Overview

3.1. Data

Our sample varies according to our choice of variables and research methodology. The time period is from 1989 to 2012, with 9907 unique firms. The start date is 1989, because significant insider trading data became available during this year. Our data come from the following sources: COMPUSTAT for financial statement data, Thomson Financial for insider trading and institutional ownership, and CRSP to calculate returns and share price volatility. For multivariate cross-sectional tests, we have a maximum of 50,000 observations with full available data for our main tests. For tests using daily insider trading data, the number of observations is a little more than one million.

3.2. Variables

Our principal variables of interest are insider trading (PR), firm stock returns (Return), and institutional ownership (Institution). We define insider trading, PR, as the ratio of insider shares purchases to total insider purchases and sales:

$$\mathrm{PR} = \frac{\mathrm{Purchases}}{\mathrm{Purchases} + \mathrm{Sales}}, \tag{1}$$

where Purchases are the number of shares purchased by insiders in open market transactions, Sales are the shares they sell, and PR proxies for the consensus of insider beliefs. This measure is similar to the one Rozeff and Zaman (1998) and Piotroski and Roulstone (2005) use. PR is measured during a calendar year and includes open market sale and purchase transactions by the firm insiders.[1] Our results are also robust to other measures of insider trading, as discussed in the robustness analyses.

Similar to Piotroski and Roulstone (2005), we use future firm performance (Return) as a proxy for insider trading profitability. Return is calculated as the compounded 12-month-ahead Fama and French (1992) and Carhart (1997) portfolio adjusted returns, in the calendar year subsequent to the year when we measure insider trading. We use a one-year horizon to measure returns because (1) the market takes a gradual and prolonged time to react to the private information contained in insider trades, (2) insiders trade on long horizon news to avoid litigation (Beneish et al., 2004; Jaffe, 1974; Noe, 1999), and (3) insider trading profits earned on trades within six-month periods are subject to disgorgement and enforcement by the SEC. Nevertheless, all results are replicated if we use a shorter period of three or six months to calculate returns. Institutional ownership (Institution) refers to the percentage of shares held by institutional owners measured on the last calendar quarter of the year. In our conjectures, we do not require that all institutions participate in pricing and monitoring activities; rather, the presence of one efficient trader, or one effective monitor, can curtail the profits of insiders. From this perspective, the likelihood of pricing and monitoring effects is proportional to Institution.

We employ several other measures to examine institutional monitoring versus trading/pricing effects. We use the Bushee (1998) classification, which splits institutions according to trading and ownership style. We calculate Dedicated institutions as those holding a relatively larger proportion of shares for the long term; we expect this type of institutional investor to monitor. Indexer institutions are those that hold diversified portfolios of longer duration, and Transient institutions are traders motivated by profiting from short-term price changes. We expect the

[1]Conducting our tests based on fiscal years rather than calendar years leaves the results unchanged.

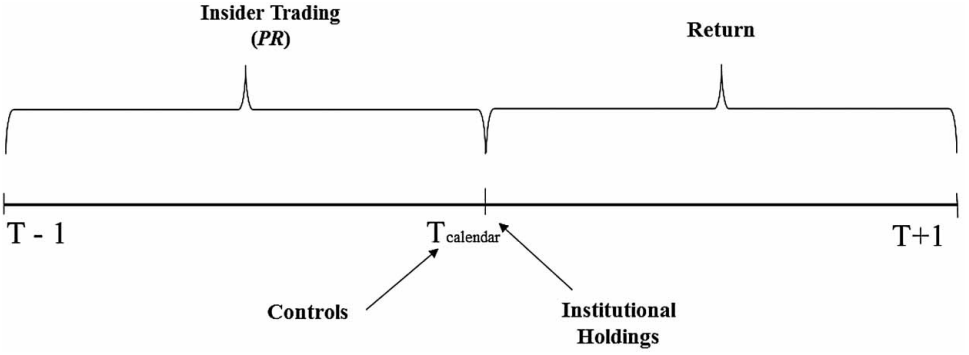

Figure 1. Timeline of variables

latter two types of institutions to have trading/pricing effects, though indexing institutions could have an indirect monitoring role, given their ability to 'vote with their feet'.

We also calculate a measure of institutional trading as a proxy for institutional pricing effects. Given that daily institutional trading data are not widely available, we proxy for institutional trading using the methodology devised by Ferreira and Laux (2007). We calculate the absolute value of the quarterly change in institutional holdings, aggregated yearly over all institutions trading shares in the firm, divided by the total shares traded during the year. Control variables used in our multivariate analysis include firm size, profitability, leverage, and the market-to-book ratio, all calculated at fiscal year-end. Appendix A provides a definition of the variables used, including the control variables, which we do not include here for the sake of brevity.

3.3. Research Design

We conduct a multivariate analysis to examine the interplay between insider trading and institutional ownership with respect to future returns. In our model, future returns are a function of insider trading, institutional ownership level (plus control variables), and an interaction variable between insider trading and institutional ownership level that assesses any moderating effect of institutional ownership level on insider trading profitability. Figure 1 depicts the timeline of our variables.

We replicate our results using a firm fixed-effects procedure, ordinary least squares (OLS), and a Fama and MacBeth (1973) regression methodology. We also conduct robustness tests with respect to the statistical model, including controls for governance, bid–ask spread, and stock price volatility.

To distinguish between competing possibilities that can explain our main results (i.e. monitoring vs. trading/pricing), we use variants of our multivariate model to examine the role of institutional trading, and we conduct tests based on proxies for institutional investor monitoring/trading, in line with Bushee (1998). Moreover, we examine trading by various insiders, such as the CEO and other high-level insiders, given that institutions are more likely to monitor high-ranking insiders than other executives. Finally, we conduct tests based on the passage of Sarbanes–Oxley, which likely shifted institutions' monitoring incentives.

Next, we use daily data to conduct a finer analysis of our relationships. Using the universe of insider trades, we examine the moderating role of institutions on insider trading profits, for both insider purchases and insider sales. In addition, we categorize our daily trades into opportunistic

Table 1. Descriptive statistics for select variables

Variable	Mean	Median	SD	P25	P75
PR	0.398	0.102	0.446	0	1
MB	2.81	1.89	3.86	1.20	3.21
Size ($M)	1913	261	5512	66	1066
Return	0.039	−0.06	0.57	−0.29	0.22
ROA	−0.012	0.028	0.21	0	0.07
Leverage	0.17	0.11	0.19	0.008	0.28
Institution	40.64	38.24	28.65	14.67	64.58

Notes: This table reports descriptive statistics for the variables included in model (1) of Table 3. PR: insiders' purchase ratio, defined as the number of shares purchased during the calendar year, divided by the total insider transactions, Purchases/(Purchases + Sales). MB: the market value of equity divided by its book value. Size: the market value of equity of the firm. Return: returns adjusted for Fama and French (1993) and Carhart (1997) portfolio returns over the calendar year subsequent to the measurement of insider trading. ROA: return on assets, calculated as net income before extraordinary items divided by total assets. Leverage: the long-term debt of the firm divided by the book value of assets. Institution: the percentage of shares held by institutional owners. All variables are winsorized at 1% and 99%. The sample period is 1989–2012.

versus routine trades using the methodology devised by Cohen et al. (2012), where a routine trade is a trade in the same calendar month as a trade in the prior year, while an opportunistic trade is all other trades without obvious discernible patterns or timings: institutions are more likely to monitor the former than the latter. Finally, and also using daily data, we examine the frequency of trading to distinguish between monitoring and trading/pricing, in which we observe the frequency of opportunistic purchases and sales versus routine ones, under the expectation that the frequency of opportunistic trades will be curtailed in the presence of institutional owners.

4. Analysis and Results

4.1. Descriptive Statistics

Table 1 reports the descriptive statistics of our sample. Mean (median) for PR is 0.4 (0.10), indicating, as expected, that there is a higher number of sale transactions than purchases. These numbers are comparable to Piotroski and Roulstone's (2005, Table I Panel B, p. 62) 0.40 (0.14). The average size of our sample firms is $1.9 billion (median is approximately $261 million), larger than the sample average of Piotroski and Roulstone, which is from an earlier period. Return has a mean (median) of 0.04 (−0.06); these numbers are relatively small given that they are already adjusted for size, book-to-market, and momentum effects. Return on assets (ROA) of our sample firms is −0.012 (median = 0.028). The rest of the variables show standard distributions. In unreported results, our descriptive statistics for the 1992–1999 period mimic those in Piotroski and Roulstone's (2005) sample.

4.2. Correlations

Table 2 presents the pairwise correlation analysis among the main variables. Institutions are negatively related to insider purchasing; moreover, they are negatively related to future stock price returns. In contrast, insider purchasing is positively related to future returns, though the correlations are weak ($\rho = 0.039$, $p < .01$). Insider purchases are negatively related to firm size and growth, and they are negatively related to current profitability, which indicates that insiders sell (buy) shares after positive (negative) contemporaneous performance.

Table 2. Correlation table for select variables

	Institution	PR	Return	MB	logSize	ROA
PR	−0.27***					
Return	−0.042***	0.039***				
MB	0.021***	−0.142***	−0.010**			
logSize	0.593***	−0.349***	−0.068***	−0.186***		
ROA	0.232***	−0.165***	−0.043***	−0.055***	0.310***	
Leverage	0.0575***	0.087***	−0.015***	−0.084***	0.080***	0.009***

Notes: This table reports correlations for the variables included in model (1) of Table 3. Institution: the percentage of shares held by institutional owners. PR: insiders' purchase ratio, defined as the number of shares purchased during the period, divided by the total insider transactions. Return: returns adjusted for Fama and French (1993) and Carhart (1997) portfolio returns. MB: the market value of equity divided by its book value. logSize: the market value of equity of the firm. ROA: return on assets, calculated as net income before extraordinary items divided by total assets. Leverage: the long-term debt of the firm divided by the book value of assets. All variables are winsorized at 1% and 99%. The sample period is 1989–2012.
***Significant at the 1% level.

4.3. H1: Relationship Between Institutional Ownership and Insider Trading Profits

We next assess the relationship between insider trading and returns, PR and Return, in a multivariate regression setting. We use an interactive variable of institutional ownership and insider trading and estimate the following base-level panel data econometric model:

$$\begin{aligned}\text{Return}_{i,t+1} = {} & b_0 + b_1\text{PR}_{i,t} + b_2\text{Institution}_{i,t} + b_{3t}\text{Institution}_{i,t} * \text{PR}_{i,t} + b_4\text{logSize}_{i,t} \\ & + b_5\text{ROA}_{i,t} + b_6\text{MB}_{i,t} + b_7\text{Leverage}_{i,t} + b_8\text{Return}_{i,t} + \text{Industry} + \text{Year} + u_{\text{it}}. \end{aligned} \quad (2)$$

In Equation (2), one-year-ahead returns are regressed on insider trading, institutional ownership level, and other control variables. The variables are defined as previously, where PR denotes insider trading and Institution denotes the percentage of shares held by institutional investors. We employ a regression model controlling for industry and time effects; we correct the standard errors for correlation across observations of a given firm and across observations of a given year by clustering on both firm and year, following Thompson's (2009) and Cameron, Gelbach, and Miller's (2011) suggested methodology.[2]

As in prior research, we expect PR to be positively related to the dependent variable, Return, given that insider trading can predict future returns. We offer no predictions about the relationship between Institution and Return, as this study is not designed to examine the performance of institutional holdings.[3] The key term in Equation (2) is our interaction variable Institution*PR. We use this interaction variable to interpret the relationship between insider trading and future

[2]In robustness tests, we also estimate Equation (2) by using a firm fixed-effects procedure and the Fama–MacBeth procedure, with similar results. In unreported tests, we also replicate our main results using rank and median regressions. In addition, using firm fixed effects and dummies for regulatory regimes that affected insider trading (e.g. the passage of the Private Securities Litigation Reform Act of 1995) yields statistically similar results.

[3]First, because institutional trades are measured at discrete quarterly intervals, the performance of intra-quarter trades is not observed. Second, our methodology only examines firm-years when insider trading occurs; thus, there is a restricted setting that prevents proper examination of institutional performance. Nevertheless, ex ante there are conflicting expectations between institutional ownership level and future firm performance. Institutional ownership level creates price pressures and herding behavior in the short-term (Chan & Lakonishok, 1993), but long-term effects are not clear, as Bushee (1998) and Trzcinka (1998) provide a myopia argument, in which approximately half of all mutual fund returns are below aggregate market returns.

Table 3. Multivariate regression examining the relationship among insider trading, institutional ownership level, and future firm performance

	(1) Return($t+1$)	(2) Return($t+1$)	(3) Return($t+1$)
Constant	1.1853***	2.6952***	1.1638***
	(10.988)	(76.697)	(17.910)
PR	0.0824***	0.0682***	0.0852***
	(4.735)	(5.491)	(6.087)
PR*Institution	−0.0012***	−0.0014***	−0.0015***
	(−3.318)	(−5.740)	(−5.735)
Institution	0.0001	−0.0004***	0.0000
	(0.804)	(−2.616)	(0.118)
logSize	−0.0115***	−0.2485***	−0.0099**
	(−2.598)	(−50.645)	(−2.623)
ROA	−0.0166	0.0882***	0.0322
	(−0.175)	(3.692)	(0.535)
Leverage	−0.0132	−0.1622***	0.0073
	(−0.354)	(−5.410)	(0.214)
MB	0.0019	0.0103***	0.0003
	(1.082)	(7.887)	(0.192)
Return(t)	−0.0569***	−0.0953***	−0.0559***
	(−3.098)	(−19.838)	(−4.402)
Observations	48,597	48,641	48,597
R^2	0.021	0.106	0.101
Year dummies	Yes	Yes	No
Industry dummies	Yes	No	Yes
Firm dummies	No	Yes	No

Notes: Model (1) presents OLS clustering on both firm and time effects. Model (2) presents a firm fixed-effects model. Model (3) uses the Fama–MacBeth procedure. Return: returns adjusted for Fama and French (1993) and Carhart (1997) portfolio returns. PR: insiders' purchase ratio, defined as the number of shares purchased during the calendar year, divided by the total insider transactions, Purchases/(Purchases + Sales). Institution: the percentage of shares held by institutional owners. logSize: the logarithm of the market value of equity of the firm. ROA: return on assets, calculated as net income before extraordinary items divided by total assets. Leverage: the long-term debt of the firm divided by the book value of assets. MB: the market value of equity divided by its book value. All variables are winsorized at 1% and 99%. The sample period is 1989–2012.
*Significant at the 10% level.
**Significant at the 5% level.
***Significant at the 1% level.

returns in the presence of the moderating variable Institution. To confirm H1, Institution*PR needs to be negatively related to Return, indicating that increases in institutional ownership negatively affect the relationship between Return and insider trading; higher institutional ownership reduces (increases) the returns on insider purchasing (selling).

Table 3 presents our main results. Model (1) employs OLS by clustering on both firm and time effects and shows that PR is significantly and positively related to Return ($p < .01$) while Institution is non-significant. Firm size is negatively related to future returns, while ROA is unrelated, similar to leverage. More important, Institution*PR is negatively and significantly related to Return ($p < .01$). This result indicates that increases in institutional ownership attenuate the relationship between PR and Return, confirming H1.

Models (2) and (3) replicate these results using alternative statistical methodologies. Model (2) replicates the results using a firm fixed-effects procedure. In Model (3), and to correct for the correlation of residuals across firms in a given year given time dependencies in our panel,

we employ the Fama–MacBeth methodology in which we estimate our regression model for each year and report the time-series average of coefficients. Our inferences remain unchanged.

These results, which are statistically significant, are also economically relevant: In the case when PR = 1 (strictly insider purchasing), a standard deviation increase in institutional ownership results in a decrease of 5.2% in one-year-ahead returns.[4] This compares well with Seyhun (1988), who reports that insider sales result in market-adjusted returns of 4.5–12.3% over the forthcoming 12-month horizon. We next test whether the coefficient of the interaction term has explanatory power beyond insider trading separately. Because PR has a larger coefficient than the interaction variable, we test whether PR − Institution*PR = 0. The F-test results indicate that these coefficients are not equal ($p < .01$); therefore, the interaction variable has a partial moderating effect on insider trading profits.[5]

As Models (1)–(3) show, our interaction term, Institution*PR, is consistently negatively and significantly related to Return ($p < .01$). The results are robust to various statistical methodologies. Controlling for other determinants of institutional ownership (see Gompers & Metrick, 2001), such as the dividend yield, share price, share turnover, or past three years of returns, leaves the results unchanged.

4.4. Robustness Tests

We run several additional sets of tests to confirm our results, which we present in Table 4. Institutional holdings are heavily correlated with firm size ($\rho = 0.59, p < .01$, Table 2), rendering the interpretation of results problematic. To overcome this shortcoming, we use a two-step regression procedure to separate out size effects from institutional holdings. We include the lagged values of firm size and other explanatory variables (ROA, Leverage, market-to-book [MB], industry, year) as a first-stage predictor for institutional holdings, to decompose our institutional measure into two parts. First, there is the fitted value of the regression (Institution-Fitted), the part predicted on the basis of firm size and other explanatory variables that influence institutional holdings. Second, there is the residual part (Institution-Residual), which should be independent of determining factors. We investigate the relationship between both parts of the institutional holding measure and future returns by including them in our regressions. Such procedures have been previously used in the financial economics literature (Almeida & Wolfenzon, 2005; Bowen, Rajgopal, & Venkatachalam, 2008; Ferreira & Laux, 2007). Bowen et al. (2008), for example, use this method to decompose earnings management measures into a fitted and residual portion on the basis of corporate governance characteristics and then investigate the valuation implications of the fitted portion. We include both the fitted value and the residual from our first-stage procedure as regressors to ensure that the procedure is appropriate (i.e. there is no induced omitted variable bias). Model (1) of Table 4 presents the results of the two-step procedure. As the table shows, both Institution-Fitted*PR and Institution-Residual*PR are negatively and significantly related to Return. In other words, the component of institutional holdings that is free of the size bias and other determining factors is negatively related to the profitability of insider trading.

In Model (2), we control for corporate governance, given that a strong self-selection bias influences institutional ownership. A clientele effect could exist when institutional owners self-select into firms with efficient governance practices that determine insider trading patterns, which in

[4]In Model (2), 28.65 × 0.0014 + 28.65 × 0.0004; data for this calculation appear in Table 1.

[5]In our statistical model, we assume that PR is independent of Institution, but it could be that insiders trade more when fewer institutions are present. We do not attempt to control for this occurrence, because this possible endogeneity biases our tests against finding the predicted results. We examine the relationship between institutions and frequency of insider trading in Table 7.

Table 4. Robustness of the main model

	(1) Return($t+1$)	(2) Return($t+1$)	(3) Return($t+1$)	(4) Return($t+1$)
Constant	1.2216***	0.8992***	1.1823***	1.2449***
	(12.342)	(12.191)	(11.240)	(11.843)
PR	0.1104***	0.0839***	0.0868***	0.6822***
	(4.225)	(3.499)	(5.475)	(3.474)
Institution-Residual*PR	−0.0006*			
	(−1.787)			
Institution-Predicted*PR	−0.0018***			
	(−3.103)			
Institution-Residual	0.0001			
	(0.464)			
Institution-Predicted	0.0003			
	(0.089)			
PR*Institution		−0.0014***	−0.0012***	−0.0155***
		(−3.429)	(−4.064)	(−4.045)
GIM		−0.0012		
		(−0.743)		
Bid−Ask			−1.4424***	
			(−2.640)	
Volatility			1.6412***	
			(3.923)	
Institution		0.0002	0.0002	−0.0004
		(0.562)	(1.206)	(−1.526)
Return(t)	−0.0581***	−0.0741**	−0.0756***	−0.0601***
	(−4.021)	(−2.437)	(−3.471)	(−3.156)
ROA	−0.0379	−0.0318	0.0815	−0.0168
	(−0.342)	(−0.220)	(0.869)	(−0.167)
Leverage	−0.0073	−0.0427	−0.0092	−0.0091
	(−0.185)	(−0.946)	(−0.244)	(−0.236)
MB	0.0030*	0.0034	0.0011	0.0019
	(1.925)	(1.167)	(0.506)	(1.020)
logSize	−0.0084	−0.0072	−0.0072	−0.0134***
	(−0.318)	(−1.404)	(−1.156)	(−2.973)
Observations	39,224	15,954	41,876	46,507
R^2	0.022	0.029	0.031	0.021
Year dummies	Yes	Yes	Yes	Yes
Industry Dummies	Yes	Yes	Yes	Yes

Notes: Model (1) presents results on a two-step regression model, in which in the first step we regress institutional holdings on firm size, the market to book ratio, leverage, ROA, and industry and year fixed effects, and we obtain fitted and residual values, which we use in the second step interacted with PR. Model (2) controls for corporate governance as proxied by the GIM index. Model (3) controls for information asymmetry as proxied by bid−ask spreads (Bid−Ask) and stock price idiosyncratic volatility (Volatility). Model (4) examines an alternative measure of insider trading, calculated as the aggregate dollar value of insider sales minus sales, normalized by the market value of the firm. For variable definitions, see Appendix A. All regressions use a two-way clustering procedure by firm and year. All variables are winsorized at 1% and 99%. The sample period is 1989−2012.
*Significant at the 10% level.
**Significant at the 5% level.
***Significant at the 1% level.

turn could result in a mechanical relationship between Institution*PR and Return. As a measure of governance, we employ the GIM index (GIM), which represents an aggregation of firm-level governance characteristics as developed by Gompers, Ishii, and Metrick (2003). As Model (2) indicates, using this measure as an additional control variable in our regression specification leaves our results and inferences intact.

In Model (3), we control for additional aspects of firms' information environment. Prior research indicates that both institutions and insiders benefit from information asymmetry. Both these classes of market participants possess superior information that they beneficially use in opaque settings (Keim & Madhavan, 2007; Piotroski & Roulstone, 2005; Sias, Starks, & Titman, 2006). We re-run our main regressions by introducing firm-idiosyncratic volatility, Volatility, calculated in line with Rajgopal and Venkatachalam (2011), and bid–ask spreads, calculated according to Jayaraman (2008). The results remain intact. In untabulated results when we introduce two other measures of information asymmetry, share turnover, and the number of analysts following the firm (we now have four measures of information asymmetry in one regression specification, in addition to our interaction variable Institution*PR), the results remain intact.[6]

In Model (4), we use an alternative measure of insider trading. A shortcoming of our current measure, PR, is that it does not measure the magnitude of the trades. Therefore, we calculate a new insider trading variable as the total dollar value of insider purchases minus sales, normalized by the market value of the firm; thus, this variable is the net aggregated value of insider trading (see Ke, Huddart, & Petroni, 2003). The results indicate that that our inferences remain intact.

In sum, results in this section indicate that higher levels of institutional ownership interact negatively with insider trading, resulting in lower one-year-ahead size/book-to-market/momentum-adjusted returns. Our results are robust to including a large number of covariates, such as firm-level governance, bid–ask spreads, idiosyncratic volatility, and alternative statistical methodologies. We next examine the role of institutional monitoring versus trading/pricing.

5. Monitoring Versus Trading/Pricing

5.1. Panel Tests

In this section, we explore the relationship between institutional monitoring and trading/pricing effects and the profitability of insider trading. In the prior discussion, we conjectured a negative relationship between institutional ownership levels and insider trading profitability due to general institutional investor trading/pricing and/or explicit monitoring. In the next series of tests, we try to identify drivers of this relationship. Tables 5–7 present our results.

In Model (1), we control for the effect of the Sarbanes–Oxley regulation as a mediating variable on the relationship between institutions and insider trading profitability. If institutional ownership plays a monitoring role on insider trading, the passage of external regulation, which also has a monitoring role, can potentially be a substitute for institutional monitoring. Consequently, the moderating role of institutional ownership on insider trading profitability could be reduced following Sarbanes–Oxley. To examine this possibility, we further construct interaction variables between the passage of Sarbanes–Oxley, institutional holdings, and insider trading. SarbOx is a time dummy that denotes the passage of the act. If our conjectures are correct, our crucial coefficient, SarbOx*Institution*PR, should reverse the effect of institutional holdings (i.e. Institution*PR). The results are consistent with this; the triple interaction has a positive sign ($p < .01$), opposite in sign to that of Institution*PR. Therefore, the results of this test indicate a monitoring role for institutional owners (which diminished after the passage of Sarbanes–Oxley).

[6]The results are also robust to the inclusion of beta, three-year prior returns, and the logarithm of total assets. In another robustness tests, we examine the time horizon of our documented relationships given that institutions are more likely to be active with respect to insider trading to achieve short-term performance. We find that insider trades predict future returns starting three months and persisting up to two years after the occurrence of the trades. Moreover, insider trading predicts abnormal returns around earnings announcements up to four quarters in advance. In all these tests, we find a dampening effect of institutions.

Table 5. Institutional trading/pricing versus monitoring

Panel A:

	(1) Return($t+1$)	(2) Return($t+1$)	(3) Return($t+1$)
Constant	1.2370***	1.0855***	1.1885***
	(22.439)	(22.792)	(19.976)
PR	0.0868***	0.0622***	0.0595***
	(5.490)	(3.701)	(3.061)
PR*Institution	−0.0018***	−0.0007***	
	(−5.446)	(−2.677)	
SarbOx*Institution*PR	0.0016***		
	(2.943)		
SarbOx	−0.0925***		
	(−3.204)		
SarbOx*Institution	0.0003		
	(0.548)		
PR*SarbOx	−0.0341		
	(−1.336)		
Trading*PR		−0.0254***	
		(−4.174)	
Trading		−0.0038	
		(−0.357)	
PR*Transient			0.0008
			(1.259)
PR*Dedicated			−0.0012**
			(−2.038)
PR*Indexer			−0.0007*
			(−1.767)
Return(t)	−0.0559***	−0.0520**	−0.0594***
	(−2.857)	(−2.554)	(−2.900)
logSize	−0.0109**	−0.0087	−0.0121***
	(−2.539)	(−1.640)	(−2.621)
ROA	0.0019	−0.0068	−0.0125
	(0.019)	(−0.069)	(−0.126)
Leverage	−0.0102	−0.0309	−0.0175
	(−0.261)	(−0.873)	(−0.444)
MB	0.0022	0.0021	0.0019
	(1.198)	(0.978)	(0.974)
Institution	−0.0000	0.0000	
	(−0.063)	(0.022)	
Indexer			−0.0002
			(−0.653)
Dedicated			−0.0005
			(−1.312)
Transient			0.0014**
			(2.083)
Observations	46,091	37,289	45,269
R^2	0.021	0.021	0.022
Year dummies	Yes	Yes	Yes
Industry dummies	Yes	Yes	Yes

(*Continued*)

Table 5. Continued

Panel B:

	(1) CEO trades only Return($t+1$)	(2) High-level executive Return($t+1$)	(3) Low-level executive Return($t+1$)
Constant	0.9285***	1.1787***	1.1924***
	(10.999)	(17.963)	(10.331)
PR	0.0480*	0.0737***	0.0795***
	(1.667)	(4.476)	(4.708)
PR*Institution	−0.0005	−0.0011***	−0.0010**
	(−0.853)	(−3.160)	(−2.478)
Institution	0.0001	0.0001	0.0001
	(0.587)	(0.544)	(0.772)
logSize	−0.0157**	−0.0112**	−0.0106**
	(−1.970)	(−2.536)	(−2.321)
ROA	−0.0655	−0.0269	0.0139
	(−0.583)	(−0.271)	(0.153)
Leverage	−0.0159	−0.0127	−0.0232
	(0.153)	(−0.348)	(−0.504)
MB	0.0052**	0.0022	0.0032
	(2.513)	(1.138)	(1.567)
Return(t)	−0.0544**	−0.0553***	−0.0596***
	(−2.148)	(−2.866)	(−2.966)
Observations	17,875	45,144	26,946
R^2	0.027	0.020	0.023
Year dummies	Yes	Yes	Yes
Industry dummies	No	Yes	No
Firm dummies	Yes	Yes	Yes

Notes: In Panel A, Model (1) examines the effect of the Sarbanes–Oxley regulation on the institutional-insider trading relation, SarbOx is a dummy equal to 1 in the period subsequent to the passage of the act, 0 otherwise. Model (2) presents results on a two-step regression procedure, in which in the first stage we regress institutional trading on institutional holding and in the second stage we use the residual (Trading), in an interactive term with PR. Model (3) presents results on the Bushee (1998) institutional classifications. In Panel B, Models (4)–(6) examine insider trading by the CEO, high-level executives, and low-level executives, respectively. See Appendix A for variable definitions. Regressions are conducted using OLS clustering on both firm and year. All variables are winsorized at 1% and 99%. The sample period is 1989–2012.

*Significant at the 10% level.

**Significant at the 5% level.

***Significant at the 1% level.

In Model (2) of Panel A of Table 5, we examine the role of institutional trading. Given that the trading patterns of (sophisticated) institutions have consequential pricing effects, we expect institutional trading to erode insider trading profits. Moreover, heavy institutional trading indicates an unstable shareholder base, which is contrary to the monitoring effect expected from stable ownership. In other words, the greater the institutional trading, the less stable the ownership of the firm is and, consequently, the less explicit institutional monitoring is. Given that institutional trading and holdings are highly correlated ($\rho = 0.44$, $p < .01$), we again use a two-step regression procedure. In the first stage, we regress institutional trading on holdings. The residual value, Trading, would indicate institutional trading over and above what is dictated by the level of institutional holdings, which is free of a collinearity bias. Model (2) presents our results; here, both Trading*PR and Institution*PR are negatively and significantly related to future returns. The significance of both interaction terms indicates that both institutional trading and monitoring are at play. If institutional trading fully proxies

Table 6. The relationship between institutions and insider trading returns: evidence from daily insider trading data

Panel A:

Purchases	(1) CEO Return($t+1$)	(2) High-level executive Return($t+1$)	(3) Low-level executive Return($t+1$)
Median Return	4.94%	−1.44%	−3.15%
Mean Return	8.03%	5.40%	0.94%
Institution	0.0013**	0.0012***	0.0010***
	(2.229)	(3.543)	(4.765)
Return(−30, −2)	−0.1697***	−0.1423***	−0.1432***
	(−3.035)	(−3.537)	(−4.608)
Volatility	3.0923***	3.5778***	2.6239***
	(9.028)	(15.649)	(15.066)
logSize	−0.0175**	−0.0088	−0.0256***
	(−2.188)	(−1.644)	(−10.278)
ROA	−0.2050***	−0.2628***	−0.2916***
	(−2.755)	(−4.899)	(−8.586)
MB	−0.0149***	−0.0199***	−0.0111***
	(−17.899)	(−7.364)	(−8.384)
Leverage	−0.0678	−0.0800**	0.0548**
	(−1.289)	(−2.259)	(2.292)
Observations	41,913	42,320	175,528
R^2	0.182	0.129	0.105
Sales	(4) CEO Return($t+1$)	(5) High-level executive Return($t+1$)	(6) Low-level executive Return($t+1$)
Median Return	−3.46%	−8.65%	−7.05%
Mean Return	−7.11%	−8.55%	−8.40%
Institution	0.0019***	0.0005***	0.0013***
	(9.420)	(2.610)	(11.032)
Return(−30, −2)	−0.0678	−0.0219	−0.0559**
	(−1.578)	(−0.605)	(−2.319)
Volatility	−0.7310***	−1.2893***	−1.6584***
	(−3.297)	(−6.038)	(−10.547)
logSize	−0.0312***	−0.0218***	−0.0302***
	(−8.014)	(−9.365)	(−10.921)
ROA	0.1557***	0.0107	−0.1189***
	(3.173)	(0.269)	(−4.418)
MB	−0.0105***	−0.0114***	−0.0041***
	(−6.372)	(−7.236)	(−8.998)
Leverage	−0.0286	−0.1117***	−0.0911***
	(−0.744)	(−3.745)	(−4.354)
Observations	227,564	188,071	630,334
R^2	0.062	0.054	0.040

Panel B:

	(1) Opportunistic buy Return($t+1$)	(2) Opportunistic sell Return($t+1$)	(3) Routine buy Return($t+1$)	(4) Routine sell Return($t+1$)
Constant	−0.0479	−0.3397**	0.1140*	−0.7612***
	(−0.167)	(−1.983)	(1.908)	(−6.364)

(*Continued*)

Table 6. Continued

Panel B:

	(1) Opportunistic buy Return($t+1$)	(2) Opportunistic sell Return($t+1$)	(3) Routine buy Return($t+1$)	(4) Routine sell Return($t+1$)
Institution	0.0009**	0.0005***	0.0010*	0.0001
	(2.265)	(2.917)	(1.956)	(0.415)
Return (−6, −1)	0.0083	0.0356	−0.0037	0.0162
	(0.198)	(1.480)	(−0.091)	(0.582)
logSize	−0.0095	−0.0008	−0.0020	−0.0045
	(−1.370)	(−0.255)	(−0.311)	(−1.067)
ROA	−0.0940	0.1421**	−0.1137	−0.0477
	(−0.984)	(2.318)	(−1.018)	(−0.730)
MB	−0.0120***	−0.0050***	−0.0137***	−0.0064***
	(−3.144)	(−3.064)	(−3.486)	(−3.044)
Leverage	−0.0298	−0.0072	−0.1397**	−0.0583
	(−0.444)	(−0.236)	(−2.148)	(−1.370)
Volatility	1.8895***	1.0663***	1.7734***	0.5861
	(4.853)	(3.753)	(3.987)	(1.376)
Observations	10,175	29,440	12,205	24,721
R^2	0.052	0.012	0.050	0.019
Industry dummies	Yes	Yes	Yes	Yes

Notes: In Panel A, Models (1)–(3) examine insider purchases for CEOs, high-level executives, and low-level executives, respectively. Models (4)–(6) do the same for insider sales. In Panel B, Models (1)–(4) examine opportunistic purchases, opportunistic sales, routine purchases, and routines sales, respectively. Return: cumulative abnormal returns using the market model, calculated using daily data over a one-year horizon starting the day of insider trading (Panel A), and for consistency with Cohen et al. (2012), abnormal returns are calculated using monthly data in Panel B. Both use the market model as a benchmark. All variables are winsorized at 1% and 99%. Regressions are conducted using OLS clustering on both firm and transaction date. The sample period is 1989–2012 for Panel A, while for Panel B we use the same time frame as Cohen et al. (2012), 1989–2007.

*Significant at the 10% level.

**Significant at the 5% level.

***Significant at the 1% level.

for active price-moving mechanisms, institutional holdings would control for monitoring effects.

In Model (3), we use the Bushee (1998) classification of institutions according to ownership and investment styles. Dedicated institutions are expected to monitor, while transient and indexing institutions are expected to have trading/pricing effects, though indexers could also represent an indirect monitoring role, given their ability to vote with their feet. We construct three interaction variables, Dedicated*PR, Indexer*PR, and Transient*PR. The results indicate that only the first and second interaction variables are negative and significant, providing evidence for a monitoring effect through dedicated institutions. In addition, the results indicate a trading/pricing effect through indexing institutions, which exert price pressures but can also play an indirect monitoring role. Note that the interaction term Transient*PR is not significant, potentially indicating that active trading/pricing does not play a role in the profitability of insider trading. Alternatively, the non-significance of Transient*PR could be due to the possibility that transient investors correlate with short-term returns while institutional trading correlates with longer-term performance.

In Panel B of Table 5, we examine the trading patterns of various categories of insiders. We split our insiders into three sub-groups: the CEO (Model 1); high-level insiders, such as the CFO, the chairman of the board, and the COO (Model 2); and low-level insiders, such as

Table 7. The relationship between institutions and the frequency of insider trades

	(1) %OpportunisticSales	(2) %OpportunisticBuys
Constant	0.3982**	0.7199**
	(2.224)	(2.423)
Institution	0.0002	0.0023***
	(0.930)	(4.597)
logSize	−0.0039	−0.0248***
	(−1.086)	(−2.943)
Return(t)	0.0121**	0.0101
	(2.085)	(0.909)
ROA	−0.0284	−0.0255
	(−0.680)	(−0.352)
Leverage	0.1601***	−0.0045
	(4.839)	(−0.082)
MB	−0.0078***	0.0016
	(−5.570)	(0.529)
Observations	64,712	26,192
R^2	0.046	0.061
Year dummies	Yes	Yes
Industry dummies	Yes	Yes

Notes: Model (1) examines the number of opportunistic sales, divided by total sales. Model (2) examines the number of opportunistic purchases over total purchases. All variables are winsorized at 1% and 99%. Regressions use OLS with double clustering on both firm and year. The sample period is 1989–2007 for the Cohen et al. (2012) variables.
*Significant at the 10% level.
**Significant at the 5% level.
***Significant at the 1% level.

non-executive directors, other directors, and chief technology officer (Model 3). If institutions are monitors, their effect should be most pronounced for the CEO and high-level directors. In contrast, the effect due to trading/pricing should affect all insiders equally. We construct interaction variables for each of the three insider sub-groups. We show that for all sub-groups, PR is also always positive and significant, though the significance is markedly lower for CEO trades. The interaction Institution*PR is negative and significant for both high- and low-level executives, but not for CEO trades. Collectively, these results reveal a trading/pricing effect and not a monitoring effect. If the direct monitoring effect was the prevailing role, the results would have been most pronounced for the CEO than for lower-level executives. Instead, the results are contrary to that; CEOs with the presumed highest information advantage are the ones who trade profitably, likely because they are first movers with respect to institutional trading/pricing practices.

5.2. *H2: Institutional Ownership and Profitability of Insider Purchases: Evidence from Disaggregated Insider Trading Data*

So far, our analysis has examined insider trading aggregated at the firm level over the calendar year. We next adopt an alternative methodology by examining the profitability of each individual insider trade. This methodology has the advantage in that we can better examine the role of institutions on purchases versus sales and separate out institutional incentivization from monitoring. If institutions exhibit a monitoring effect, they are more likely to punish opportunistic insider sales than opportunistic insider purchases, given that the former results in real losses

to investors while the latter is mechanically related to increased profits for existing shareholders. Moreover, the incentivizing perspective suggests that insiders should benefit from favorable movements in stock prices by trading on their own account, as such stock movements induce agent effort.

We draw data from the universe of insider trades available on Thomson Financial from 1989 to 2012. We use daily CRSP data to calculate yearly cumulative returns for each individual trade using the market model, starting at the day of the trade (calculating returns over a six-month period leaves inferences unchanged). We identify 1,340,324 trades with complete data to compute returns. We split the sample further between sales (1,073,093) and purchases (267,231) and further delineate it into trades by the CEO, high-level executives, and low-level executives. We measure institutional holdings at the beginning of the year and compute returns starting the day the insider transaction occurs. We also control for the past 30-day returns, share price volatility, and the standard control variables as per Table 3. Each regression is clustered by firm and the date of the trade. Table 6 presents our results.

First, we show that the average insider trade, whether positive or negative, generates negative abnormal returns calculated over a one-year period (−1.44% for high-level insiders, and −3.15% for low-level ones), except for CEO transactions, which generate risk-adjusted returns of approximately 4.94% on average. In contrast, sale transactions are always (indirectly) profitable, as all long horizon returns are negative, with returns being −8.65% for high-level executives. However, CEO insider sales are the least profitable, perhaps because of the scrutiny to which CEOs are subject when it comes to selling insider shares.

Second, we show that institutions are positively related to the profits of insider purchases conducted by the CEO and high- and low-level executives (Models 1–3). This suggests an incentivization perspective to insider purchases, in support of H2. In contrast, for insider sales (Models 4–6), we show that institutions curtail the (indirect) profits of CEO sales and sales by high- and low-level executives. The effect is strongest for CEO sales, suggesting an additional monitoring role of institutions when it comes to CEO insider sales. Finally, the results on CEO trades (Models 1 and 3) highlight the contrasting role of institutions when it comes to CEO purchasing and selling, in which there is an incentivization for CEO purchases but a monitoring role for insider sales.

These results indicate several dynamics. The average insider purchase is not profitable from a risk-adjusted standpoint, except that of the CEO, who presumably has the highest information advantage. There is institutional incentivization of purchase transactions. Regarding insider sales, institutions reduce the (indirect) profitability of such transactions, as the price drop is less the more institutions are present. These results are interpreted in a (indirect) monitoring context, in which insiders self-select into profitable purchases but not sales. There is no evidence of pricing effects, as institutions would have affected both sales and purchases equally.[7]

In Panel B of Table 6, we employ Cohen et al.'s (2012) methodology to further understand the nature of individual insider trades. We separate individual trades into two categories, opportunistic and routine (i.e. whether insiders' current trades are based on predictable prior year trading patterns). Similar to Cohen et al. (2012), we classify all trades conducted in a month into one of four categories: opportunistic sales or buys and routine sells or buys. Next, we calculate future

[7]In another unreported robustness analysis, we conduct 5 × 5 sorts on institutional ownership and insider trading and calculate alphas from Fama–French regressions on HML, SMB, and Momentum factors. We calculate institutional holdings at the beginning of the quarter, and we calculate insider trading within the subsequent calendar quarter. We calculate Fama–French returns over the next 12 months after the end of the calendar quarter over which insider trading is measured. The results indicate that insider sales are not profitable but that insider sales are profitable and are the most profitable in the higher quintiles of institutional ownership, suggesting an incentivization role of institutions.

returns over the forthcoming 12 months, using monthly CRSP data. Similar to Panel A in Table 6, we treat these trading returns as a dependent variable in regressions that include institutional holdings (Institution), the six-month stock price run-up before the trades, and our standard control variables.

Given that each month can include a combination of opportunistic and routine purchases/sales, to avoid contamination, we separate out our monthly trade data into whether they exclusively belonging to one category only. We identify 77,000 firm-month observations in which insider trades belong exclusively to only one of these categories. Models (1)–(4) of Panel B of Table 6 depict regressions for opportunistic buys, opportunistic sells, routine buys, and routine sells, respectively. The dependent variable is abnormal returns calculated with CRSP monthly data using the market model.

The results indicate that institutional holdings are positively related to the profitability of both opportunistic insider sales and purchases (Models 1 and 2). Institutional holdings are unrelated to routine insider sales and weakly related to routine insider purchases. These results provide a refinement to those obtained in Panel A, in which from a monitoring standpoint, institutions constrain the profitability of opportunistic insider sales, but not opportunistic purchases (an incentivization role), confirming H2. This monitoring role for institutions suggests that opportunistic insider sales before price falls are shunned, unless they are routine. In summary, the results in Panels A and B indicate that profitable purchasing before price run-ups is an acceptable practice (confirming H2). Also, in line with Carlton and Fischel's (1983) and Leland's (1992) arguments, allowing insider trading acts as an incentivizing mechanism that induces effort and increases shareholder welfare. In contrast, the profitability of opportunistic insider sales is lower in the presence of institutions, indicating both a monitoring and pricing role.

5.3. Institutions and the Frequency of Insider Trading

To further understand the monitoring/incentivizing versus trading/pricing role of institutions, we next conduct a frequency analysis of insider trades. If the monitoring/incentivizing role of institutions deters the incidence of profitable insider trading, we should observe a higher frequency of opportunistic insider purchases versus sales, given high institutional ownership. Table 7 reports the results.

We calculate two variables, the percentage of opportunistic sale transactions divided by total sale transactions (%OpportunisticSales) and the percentage of opportunistic purchase transactions divided by total purchase transactions (%OpportunisticBuys). The results in Table 7 indicate that institutions are unrelated to the incidence of opportunistic sales. In contrast, for opportunistic buys, the relationship is positive: Institutional ownership is positively related to the incidence of opportunistic insider sales.[8] This again suggests an incentivizing role, similar to the discussion in the preceding sections (5.1–5.2), confirming H2 and the notion that insider trading acts as an incentivizing mechanism, inducing agent effort and leading to shareholder welfare.

6. Conclusion

This research examines the relationship between institutional ownership and insider trading profitability. We hypothesize that institutional ownership, as sophisticated investors and users

[8]It could be the case that reverse causality is driving our results with respect to insider sales, in which institutions self-select into firms with better insider trading practices. This explanation would still imply that firms with high levels of institutional ownership have a lower frequency of opportunistic insider sales.

of company information, reduces insider trading profits, after controlling for firm size and other factors. Our empirical results strongly confirm this prediction; insider profits are inversely related to the presence of institutional ownership, and this finding is robust with respect to a variety of sensitivity tests and alternative methods. These results are both statistically significant and economically relevant.

We also explore whether these results could be attributed to a monitoring mechanism or to a trading/pricing effect that erodes the value of managers' private information. To do so, we examine a host of factors associated with institutional monitoring and trading/pricing. Our results suggest that both factors are at play. Moreover, our results indicate that institutions are particularly adept at constraining the profitability of insider sales, but not purchases. This latter result is particularly noteworthy, given that a large number of studies have argued that allowing and facilitating insider trading could improve the welfare of shareholders (Bebchuk, 1994; Carlton & Fischel, 1983; Dye, 1984; Leland, 1992); however, empirical evidence on the mechanism does not yet exist.

The results of this study provide useful new knowledge to financial research by adding empirical verification to an intuition often held but not well demonstrated – institutional owners are sophisticated investors whose presence helps drive market efficiency; that is, their presence attenuates the profitability of insider trades. This study also suggests that institutional investors use insider trading as a powerful contracting mechanism, in terms of facilitating insider purchases. Although our evidence is from macro outcomes, future research could investigate the channels in terms of how institutional investors use insider trading as an incentivizing device, perhaps by examining large 'insider' institutions (or blockholders) or managers of family-controlled firms and their specific actions.

This study has several features that affect our ability to generalize. Importantly, we measure institutional trades on a quarterly basis; thus, we cannot directly match insider trades to those of institutions. Even if data were available, current academic knowledge still has much to disentangle in terms of how to proxy for institutional trading and its price informativeness. Nevertheless, this study has implications for policy makers and market participants. Apart from their role in explicit corporate monitoring, institutional owners appear to play an important role in limiting the benefits of insider trading and also providing visibility through their own trading activities of the direction of insider proprietary information. In this way, long-term institutional owners provide a kind of 'back door' governance mechanism, even when they do not engage in explicit monitoring.

Care should be exercised regarding our findings, and further research is necessary on the nature of insider and institutional trading. Institutions, especially those with large ownership levels over long horizons, may be regarded as insiders themselves. We do not attempt to determine whether both institutions and insiders trade on private information, both trade on public information, or one trades on public while the other trades on private information. Thus, regarding the welfare of the minority shareholder, we are unable to provide firm policy recommendations. We observe a 'crowding' out effect by one type of informed investor toward another, which in itself could be detrimental to minority shareholders. Finally, the results could also be viewed from an opposite perspective – that it is insiders who reduce the profitability of institutional trades. These are matters for future research to examine in greater detail.

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Appendix A: Definitions of Selected Variables

Research Variables

PR: Insiders' purchase ratio, defined as the number of shares purchased during the calendar year, divided by the total insider transactions, Purchases/(Purchases + Sales). In an alternative formulation for Model (4) in Table 4, we calculate PR as the dollar value of insider purchases minus the dollar value of insider sales, normalized by the market value of equity of the firm. Higher (lower) values by both these variables indicate insider purchases (sales).

Institution: The percentage of shares held by institutional owners measured on the last calendar quarter of the year.

Institution-Predicted: Fitted values obtained from regressing institutional holdings on firm size, profitability, leverage, market-to-book, industry and year, using pooled regressions on the full sample.

Institution-Residual: Residual values obtained after calculating fitted values of institutional ownership (Institution-Predicted).

Other Variables

Return: Firm returns calculated according to Fama and French (1993) and Carhart (1997), adjusted for size, book-to-market, and momentum, calculated using CRSP monthly data.

Leverage: The long-term debt of the firm divided by the book value of assets.

MB: The market value of equity divided by its book value.

Size: The market value of equity at fiscal year-end.

ROA: Return on assets, calculated as net income before extraordinary items divided by total assets.

Volatility: The yearly average of the monthly variance of market-adjusted returns. Monthly variance is computed by taking the excess of daily stock returns over the daily return on the value weighted market portfolio within a month, multiplied by the number of trading days in the month.

Bid−Ask: The difference between bid and ask, normalized by stock price, calculated on the last trading day of the year.

GIM: The governance index, as developed by Gompers, Ishii, and Metrick (2003), taking into account the number of anti-takeover provisions in a firm charter, from a set of unique 24 governance rules.

SarbOx: A dummy variable equaling 1 if the period is subsequent to the passage of the Sarbanes−Oxley regulatory act, and 0 otherwise.

Trading: The residual from a two-step procedure. In the first step, we calculate a measure of institutional trading using the methodology devised by Ferreira and Laux (2007). We calculate the absolute value of the quarterly change in institutional holdings, aggregated yearly over all institutions trading shares in the firm, divided by total shares traded during the year. In the second step, this variable is regressed on institutional ownership, and the residual is denoted as Trading.

Dedicated: Institutions that hold a relatively larger proportion of shares for the longer term.

Indexer: Institutions that hold diversified portfolios of longer duration.

Transient: High frequency institutions motivated by profiting from short-term price changes.

Return(−30, −2): Cumulative share return from 30 days before the insider trade to 2 days before, calculated using daily stock prices.

Return(−6, −1): Cumulative share return from six months before the insider trade to one month before, calculated using monthly stock prices.

OpportunisticSales: The number of opportunistic insider sales, calculated using the methodology of Cohen et al. (2012), divided by the total number of insider sales.

OpportunisticBuys: The number of opportunistic insider purchases, calculated using the methodology of Cohen et al. (2012), divided by the total number of insider purchases.