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### Article

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Article

# Insider Trading before Earnings News: The Role of Executive Pay Disparity

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**Abstract:** We investigate how executive pay disparity affects insider profits around earnings news. Our findings reveal that high pay disparity is linked to higher abnormal returns from insider purchases before positive news, suggesting insiders exploit good news for greater gains. Conversely, it is associated with lower abnormal returns from insider sales before negative news, indicating less benefit from such sales. These insights highlight the influence of pay disparity on insider trading and underscore the importance of understanding this dynamic to improve decision-making and reduce misuse of insider information.

**Keywords:** insider gains; CEO pay gap; CEO pay slice; earnings disclosure; good news; bad news



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## 1. Introduction

Insider trading involves the buying or selling of a security by an individual who possesses non-public information about the security. The legality of insider trading hinges on the timing of the trade, and legitimate insiders are obliged to adhere to strict disclosure regulations. This study focuses specifically on lawful insider trading conducted by directors, CEOs, and executive officers who engage in trading their company's shares prior to corporate earnings disclosures.

Lawful insider trading (hereafter insider trading) activities have long been recognized as conveying private information regarding forthcoming earnings, thereby functioning as signals that impact the firm's value (Ball and Brown 1968; Damodaran and Liu 1993; Kraft et al. 2014; Aussenegg et al. 2018; Biggerstaff et al. 2020; Cziraki and Gider 2021). Given that insider trades signal changes in firm value to other market participants, they have a direct impact on share prices and, consequently, the wealth of shareholders. Therefore, understanding the factors that drive insider trading is a crucial and extensively discussed subject in academic literature.

Despite existing research on insider trading, the role of managerial power in pay setting as an explanation for abnormal returns from insider trades prior to earnings announcements has not been examined. Unraveling the relationships between insider trading profits and executive pay disparity is vital for shareholders. This study aims to provide empirical evidence on how pay disparity between the CEO and other top executives influences insiders' ability to profit from their informational advantage.

The executive pay disparity represents the difference in compensation between the highest-ranking executive in a company (typically the CEO) and the average pay of other executives. This pay disparity has been the subject of increasing scrutiny due to concerns about income inequality and its potential consequences. It is believed that a significant executive pay disparity may affect corporate governance, shareholder value, and market

efficiency. According to the managerial power and executive pay hypothesis, a significant wage gap between CEOs and other senior executives can lead to CEOs solidifying their positions and weakening the firm's board (Bebchuk and Fried 2003; Rajan and Wulf 2006; Dai et al. 2016). Consequently, this may result in decreased motivation among other executives, shorter tenures, or an increased likelihood of corporate insider trading. On the contrary, the tournament hypothesis suggests that a substantial disparity in executive compensation acts as a strong incentive to attract other executives to vie for the CEO role. In this scenario, other senior executives possessing the necessary skills to become internal CEO candidates are more inclined to remain with the company in the long run, thereby strengthening the firm's board (Lazear and Rosen 1981; Kale et al. 2009; Schwarz and Severinov 2010). In turn, this may decrease the likelihood of insider trading. As such, the presence of market imperfections, management incentives, and information asymmetry between insiders and investors suggests that executive pay disparity may play a role in insiders' pursuit of trading profits.

We contribute to the literature in two main ways. First, while prior research has focused on executive compensation's impact on performance (Core et al. 1999) or insider trading (Jaffe 1974), more recent studies (Cziraki and Gider 2021) suggest a stronger connection between insider trading gains and firm-specific characteristics. We extend this literature by showing that pay disparity among executives affects insiders' ability to achieve abnormal returns from trades, adding depth to existing theories of compensation's role in corporate governance (Bebchuk et al. 2011). Second, this study introduces a new approach by analyzing market reaction to insider trading before earnings announcements, moderated by pay disparity. Prior research (Jenter 2005) has looked at insider trades and market reactions, but more recent studies (Evgeniou et al. 2022) highlight the timing ability of insiders within firms. We contribute by showing that pay disparity enhances the market's differential response, suggesting that executive compensation structures influence both insiders' actions and market reactions to anticipated earnings news. Overall, this study expands on the understanding of how executive compensation structures—particularly pay disparity—affect insider trading and market dynamics, contributing to a more integrated view of governance, compensation, and market efficiency.

Understanding the link between executive pay disparity and insider trading returns has important implications for a wide range of stakeholders. For corporate governance, it can inform how companies design executive compensation structures to mitigate potential conflicts of interest and reduce the risk of opportunistic insider trading. For policymakers and regulators, these insights can guide the development of frameworks to ensure fairness and transparency in executive pay practices, potentially improving market integrity. Investors, on the other hand, can benefit from recognizing how disparities in executive pay may influence insider behavior, which in turn can affect stock prices and broader market performance. This knowledge can help investors make more informed decisions by understanding how executive pay inequality might signal key dynamics within the firm.

The remainder of this paper is organized as follows: Section 2 reviews the relevant literature. Section 3 describes our data sample selection and research methodology. Section 4 discusses our empirical results and findings from the event study and baseline multivariate regression. Section 5 presents the results of our robustness tests. Finally, Section 6 provides some conclusions.

## 2. Theoretical Framework and Hypotheses

We study the effect of executive pay disparity on insider profitability by testing hypotheses based on information asymmetry, managerial power, and tournament competition. Information asymmetries between corporate insiders and investors arise when investors are unable to effectively assess the competence of managers or can only do so at a high cost. The level of information asymmetry within a firm has a direct impact on the credibility of earnings news, making corporate disclosures crucial in this regard. An extensive empirical literature highlights the finding that corporate insiders consistently outperform the broader

market, indicating that insider trading can serve as a valuable signal containing early information about earnings for investors (Cohen et al. 2012; Aitken et al. 2015; Hillier et al. 2015; Choi et al. 2023).

The managerial power and executive pay hypothesis suggest that a higher executive pay disparity is associated with larger insider trading returns. This relationship can be attributed to lower board quality and the increased likelihood of non-CEO executives relying more on income from insider trading. Bebchuk and Fried (2003), Adams et al. (2005), Chen et al. (2013), and Le et al. (2022) provide evidence that a high CEO pay slice is connected to CEO entrenchment. A significant CEO pay slice indicates an entrenched CEO and weak board quality, which can lead to a breakdown in good governance. Strier (2010) argues that higher pay packages result from poor corporate governance, leading to inadequate investor protection.

Additionally, a lack of promotion opportunities often results in non-CEO senior executives earning lower compensation relative to the CEO, which can drive them to seek alternative income sources, such as insider trading. Bebchuk and Fried (2003) highlight how CEOs have greater control over their own compensation, often leading to a disparity in pay between the CEO and other top executives. This disparity is reinforced by the lack of career advancement opportunities for non-CEO executives, who do not benefit from the same level of influence over compensation decisions. As these executives find themselves stagnating in their roles with limited prospects for promotion, they become increasingly dependent on other forms of income to compensate their lower salaries. The study suggests that limited promotion opportunities and the resulting compensation gap may push non-CEO executives toward risky or unethical financial practices such as insider trading to bridge their income disparity.

Furthermore, several researchers have suggested that weaker boards are associated with lower investor protection and an increase in insider returns (LaPorta et al. 1997, 2000). In line with this, Dai et al. (2016) find that poor corporate governance contributes to higher insider sale returns.

Building upon the above discussion, we propose the following hypothesis:

**Hypothesis 1 (H1).** *There is a positive relationship between executive pay disparity and corporate insider returns.*

While the managerial power and executive pay hypothesis predict that executive pay disparity may contribute to potential agency problems, the tournament hypothesis views this pay disparity as a remedy for agency problems. A high executive pay disparity represents a stronger incentive for individuals competing for the CEO position (Lambert et al. 1993; Main et al. 1995; Bebchuk and Fried 2003; Kale et al. 2009). In the CEO promotion tournament, contestants require firm-specific skills that are less beneficial if senior executives do not intend to stay in the firm for long. This dynamic helps build a pool of high-quality internal CEO candidates, increases investor protection, and discourages opportunistic behavior (Masulis and Mobbs 2011; Schwarz and Severinov 2010; Ali and Hirshleifer 2017). Consequently, if the tournament hypothesis dominates, there should be a lower level of insider returns. Therefore, we propose our second hypothesis:

**Hypothesis 2 (H2).** *The executive pay disparity is negatively associated with insider abnormal returns.*

### 3. Data and Variables

#### 3.1. Sample Construction

Table 1 presents key characteristics of our sample, including the number of firms, market capitalization, and their respective shares in total market values. Our study analyzes earnings announcements from the 340 largest non-financial firms listed on major indices in eight developed markets: US (DJIA), UK (FTSE100), Australia (ASX50), Canada

(TSX60), Germany (DAX), France (CAC40), Belgium (BEL20), and the Netherlands (AEX). These markets have strong corporate governance, investor protection, and legislation in place to safeguard shareholders against accounting errors and fraudulent practices (e.g., Sarbanes–Oxley Act or equivalent measures). The selected firms represent 60.75% of the total market capitalization in these countries. This selection ensures that our dataset is both extensive and diverse, covering a significant portion of the world’s most active and liquid financial markets. These developed markets provide a comprehensive view of insider trading behavior in a broad, high capitalization context, which is crucial for studying the relationship between executive pay disparity and insider trading returns.

**Table 1.** Sample distribution.

Country	Index	Number of Firms	Market Cap (Trillion USD)	Representation of the Market
U.K.	FTSE100	92	5.678	62.24%
U.S.	DJIA	29	1.927	28.35%
Australia	ASX50	50	1.219	51.50%
Canada	TSX60	59	1.62	72.26%
Germany	DAX	30	1.094	58.53%
France	CAC40	36	1.351	67.28%
Belgium	BEL20	19	0.429	66.31%
Netherlands	AEX	25	0.575	79.53%
Total = 340			Average = 60.75%	

Source: Bloomberg—data collected for the period 2008–2019.

Our study covers the period from 2008 to 2019, prior to the pandemic. We chose to start in 2008 for two reasons. Firstly, data before 2008 is less comprehensive and consistent. Secondly, the 2008 financial crisis led to increased scrutiny of insider behavior and stricter regulations. By examining this period, we gain insights into insider behavior and potential changes in corporate governance and regulation that may have been prompted by the crisis.

Our data were collected from various databases. Insider transaction information, actual earnings, earnings forecasts, insider trading volume, and the number of trading insiders were obtained from the Bloomberg database. Insider transactions are transactions from executives and directors, who hold positions that give them access to non-public information about the company and are required to disclose their trades in the company’s securities to regulatory authorities. Stock prices, earnings disclosure events, and accounting information were sourced from Refinitiv DataStream. Executive pay data were manually collected from the annual reports of the firms in our sample. It is worth noting that our sample only includes CEOs with at least one year of tenure in their respective firms.

We focus on insider open-market purchases and sales of shares, excluding share grants and option exercises, in line with prior studies (Gebka et al. 2017; Jeng et al. 2003; Lakonishok and Lee 2001). Our analysis specifically examines insider trades that occur before the earnings announcement, considering the fifty-day period leading up to it as the pre-announcement period. This event window captures the time between board meeting preparations and the public announcement of earnings. In fact, insiders take advantage of the upcoming good earnings news by buying instead of selling. Therefore, instances of selling before the good news may be attributed to liquidity-related factors. Similarly, insider purchases before the bad earnings news may be a result of a liquidity surplus. As such, our dataset for Buy/Good news events only includes cases where the earnings surprise is equal to or greater than zero, while our Sell/Bad news dataset consists of events with a negative earnings surprise.

During this study period, we collected a total of 3475 insider trading events occurring before earnings announcements out of 9052 earnings disclosures and 25,820 insider

transactions recorded during the period studied. Our data consists of 1311 purchases and 2164 sales. The data coverage details can be found in Table 2. Canada, the USA, and Australia had the highest number of insider transactions prior to earnings disclosures, with Canada leading in both purchases and sales. In contrast, the USA had 18 insider purchases and 481 insider sales. Germany had the smallest number of insider sales at 37 transactions, while insider purchases were roughly three times higher at 117 transactions. On average, insiders conducted their trades well ahead of the announcement dates, with an average of 25.35 days for purchases and 26.2 days for sales.

**Table 2.** Insider trading—Open market share purchase and sale transactions.

Country	Stock Indices	No. of Firms	All Insider Transactions	No. of Insider Transactions Prior to Disclosures			Average Days Prior to Disclosures	
				Total	Purchases	Sales	Purchases	Sales
United Kingdom	FTSE100	92	4233	239	139	100	26.58	30.91
United States	DOW30	29	3964	499	18	481	26.33	23.91
Canada	TSX60	59	9612	1634	645	989	25.75	28.09
Australia	ASX50	50	3245	459	257	202	21.77	19.43
Germany	DAX	30	1151	154	117	37	28.11	27.19
France	CAC40	36	1742	151	72	79	29.05	30.06
The Netherlands	AEX	25	686	127	27	100	15.07	24.76
Belgium	BEL20	19	1187	212	36	176	29.08	25.84
Total		340	25,820	3475	1311	2164	25.35	26.2

Source: Bloomberg—data collected for the period 2008–2019.

### 3.2. Empirical Design and Variables

Since it is not feasible to calculate the actual insider return without access to detailed account-level transaction information such as price and volume, researchers measure insider returns by comparing the performance of trades executed by corporate insiders with a benchmark or market index. In line with established practices in the literature, we employ the market model and event study method to assess the abnormal returns of insider transactions, as outlined by [Brown and Warner \(1985\)](#), [MacKinlay \(1997\)](#), and subsequent authors.

In our analysis, the event date is considered as the date when the insiders conduct their trades, denoted as  $t = 0$ . We compute insider abnormal returns over various event windows, including the  $t + 5$  [0–5],  $t + 10$  [0–10],  $t + 20$  [0–20],  $t + 30$  [0–30],  $t + 40$  [0–40], and  $t + 50$  [0–50] day periods. The abnormal return  $AR_{it}$  for firm  $I$  on day  $t$  is defined as follows:

$$AR_{it} = [R_{it} - (\alpha + \beta_i MR_t)] \times \theta \tag{1}$$

where  $R_{it}$  represents the actual insider returns of firm  $I$  on day  $t$ , and  $MR_t$  represents the market return on day  $t$ . The parameter  $\theta$  denotes the direction of the trade, taking the value of +1 if the trade is a “Buy” and −1 if it is a “Sell”. It is important to note that insider sales result in abnormal profits when the share price decreases. Therefore, the abnormal returns are multiplied by −1 to measure the insider gains. To assess the market response to the events, the cumulative abnormal returns, CARs, are calculated for each company for different time windows and tested for normal distribution.

Next, we conduct a regression analysis to examine the relationship between the cumulative abnormal returns of insiders and executive pay disparity. Our multivariate analysis exhibits the following characteristics:

Earnings surprise proxy model

$$CAR = \beta_0 + \beta_1 SURPRISE + \beta_2 CEOGAP_{-1} + \beta_3 ACCRUALS + \beta_4 TRADINGVOL + \beta_5 OCFPS_{-1} + \beta_6 FIRMSIZE + \beta_7 MB + \beta_8 LEVERAGE_{-1} + \beta_9 RETVOL + \beta_{10} \Delta\_RETVOL + \epsilon_i \tag{2}$$

Change in actual earnings proxy model

$$CAR = \beta_0 + \beta_1 ChgEARNINGS + \beta_2 CEOGAP_{-1} + \beta_3 ACCRUALS + \beta_4 TRADINGVOL + \beta_5 OCFPS_{-1} + \beta_6 FIRMSIZE + \beta_7 MB + \beta_8 LEVERAGE_{-1} + \beta_9 RETVOL + \beta_{10} \Delta\_RETVOL + \epsilon_i \tag{3}$$

where,  $CAR_i$  represents the cumulative abnormal returns of transaction  $I$  prior to earnings announcements, calculated over various event windows as described earlier. The key variables in our analysis are as follows:

- $CEOGAP_{-1}$  is the CEO pay gap, proxied for executive pay disparity, calculated as the difference between total CEO pay and the mean pay of the other top four executives in the previous year, divided by the total pay of the top five executives, following [Bebchuk et al. \(2011\)](#).
- $SURPRISE$  is the earnings surprise, calculated as the difference between actual and expected earnings divided by actual earnings.
- $ChgEARNINGS$  is the change in earnings per share between year  $t$  and year  $t - 1$ , divided by earnings per share in year  $t - 1$ .
- $TRADINGVOL$  is insider trading volume, measured as the natural logarithm of the trading volume conducted by insiders.
- $ACCRUALS$  are abnormal accruals, measured using the [Jones \(1991\)](#) model. Accruals are commonly used for earnings smoothing purposes and insider self-trading interests, as shown in previous studies ([Agarwal et al. 2007](#); [Aboody et al. 2005](#); [Sawicki and Shrestha 2012](#); [Chowdhury et al. 2017](#)). Consistent with the mainstream literature, we employ accruals as a measure of earnings management.

Following the mainstream literature, we include control variables to account for firm-specific characteristics in our regression model, as used by [Agrawal and Cooper \(2015\)](#), [Jenter \(2005\)](#), [Aggarwal and Samwick \(1999, 2003\)](#), and [Jin \(2002\)](#).

- $OCFPS_{-1}$  is operating cash flow per share in the previous year, which serves as our proxy for financial liquidity.
- $FIRMSIZE$  is the natural logarithm of market capitalization, representing firm size.
- $BM$  is book-to-market ratio, calculated as the book value divided by the market capitalization.
- $LEVERAGE_{-1}$  is the ratio of total debt over total assets in the previous year, capturing the firm’s leverage.
- $RETVOL$  is stock return volatility, measured as the standard deviation of stock returns for the 250 to 126 days leading up to the insider trading events.
- $\Delta\_RETVOL$  is the change in stock return volatility, obtained by subtracting  $RETVOL$  from the standard deviation of the firm’s daily stock returns for the 125 days to 1 day prior to the insider trading events.

We repeat our empirical analysis using the CEO pay slice  $CPS_{-1}$ , which is computed as the total CEO pay divided by the total pay of the top five executives in the previous year.

Earnings surprise proxy model

$$CAR = \beta_0 + \beta_1 CPS_{-1} + \beta_2 SURPRISE + \gamma [\text{Controls}] + \epsilon_i \tag{4}$$

Changes in actual earnings proxy model

$$CAR = \beta_0 + \beta_1 CPS_{-1} + \beta_2 ChgEARNINGS + \gamma [\text{Controls}] + \epsilon_i \tag{5}$$

where  $CAR_i$  represents the cumulative abnormal returns of transaction  $I$  prior to earnings announcements measured over various event windows, and  $CPS_{-1}$  is the ratio of total CEO pay divided by the total pay of the top five executives in the previous year. We included control variables as described in Equations (2) and (3). To account for country-specific effects, we adjusted our standard errors for eight clusters corresponding to the countries.

## 4. Empirical Results

### 4.1. Descriptive Statistics

Table 3 displays the descriptive statistics of our sample set. In Panel A, the mean cumulative abnormal returns (CARs) show an increasing trend as the event periods expand. For the Buy sample, the mean CAR is 0.209% for the [0 to 5] period, rising to 1.284% for the [0 to 50] period. Similarly, for the Sell sample, the mean insider returns are 0.13% for the [0 to 5] period, increasing to 1.66% for the [0 to 50] period. These results indicate a positive market reaction to insider purchases and a negative reaction to insider sales as the event windows widen. On average, the cumulative abnormal returns of insider sales surpass those of the buy sample, suggesting a stronger market response to insider sales compared to insider purchases.

Table 3. Descriptive Statistics.

Panel (A): Insiders Cumulative Abnormal Returns									
CAR [Event Period]	Buy Sample			Sell Sample			Full Sample		Total Obs.
	N	Mean	St. Dev.	N	Mean	St. Dev.	Min	Max	
(%)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
CAR [0 to 5]	1311	0.209	5.77	2164	0.130	4.80	−35.69	57.94	3475
CAR [0 to 10]	1311	0.369	7.20	2164	0.429	6.88	−52.11	50.32	3475
CAR [0 to 20]	1311	0.689	11.14	2164	0.817	10.16	−93.02	86.07	3475
CAR [0 to 30]	1311	0.912	15.74	2164	1.223	13.56	−113.20	139.65	3475
CAR [0 to 40]	1311	1.061	18.24	2164	1.426	15.72	−143.24	183.11	3475
CAR [0 to 50]	1311	1.284	20.02	2164	1.660	17.63	−199.05	198.86	3475
Panel (B): Independent Variables									
	Buy Sample			Sell Sample			Full Sample		Total Obs.
	N	Mean	St. Dev.	N	Mean	St. Dev.	Min	Max	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
SURPRISE (%)	1194	13.09	86.77	1995	7.16	61.67	−433.30	865.9	3189
ChgEARNINGS (%)	1256	−0.21	74.71	2050	11.40	76.68	−440.0	500.0	3306
CEOGAP	934	0.20	0.11	1607	0.17	0.15	−0.20	0.66	2541
ACCRUALS	1301	0.01	0.07	2135	0.009	0.063	−0.80	0.37	3166
BUY (1,000 shares)	1309	896.30	4733.8				1	81,654	1309
SELL (1,000 shares)				2162	369.80	2903.2	1	75,893	2162
OCFPS (in US\$)	1288	1.12	3.43	2137	1.55	3.90	−38.08	47.13	3425
FIRMSIZE (in million US\$)	1253	20,868	28,796	2095	57,988	96,293	215.40	647,361	3348
MB	1238	2.89	9.51	2063	3.28	4.34	0.19	315.6	3301
LEVERAGE (%)	1253	26.75	15.02	2082	21.59	14.82	0.000	93.70	3335
RETVOL (%)	1309	1.96	1.05	2162	2.05	1.27	0.43	9.45	3471
Δ_RETVOL (%)	1309	−0.07	1.03	2162	0.12	1.04	−5.95	5.26	3471

Notes: This table reports descriptive statistics for a sample of 1311 purchases and 2164 sales traded by officers and directors between 2008 and 2019. Panel (A) presents a summary of CARs in 6 event periods; Panel (B) reports summary statistics of the independent variables. SURPRISE is earning surprise, defined as the difference between actual and expected earnings divided by actual earnings. The change in earning ChgEARNINGS is the change between earning per share for year  $t$  and year  $t - 1$  divided by earning per share year  $t - 1$ . CEOGAP is the CEO gap ratio, measured as the difference between the total CEO pay and the mean of other four executives' pay divided by the total pay of the top five executives; ACCRUALS is abnormal accrual measured using a modified version of the Jones (1991) model. Insiders' buying/selling volume BUY/SELL is the purchase/sale volume made by insiders. OCFPS is operating cash flow per share. FIRMSIZE is defined as the total market capitalization of a firm. Market to book value MB is the book value divided by the total market capitalization of a stock. Financial leverage LEVERAGE<sub>-1</sub> is the ratio of total debt over total assets in the previous year. Return volatility of a stock RETVOL is the standard deviation of daily stock returns computed over trading days [−250, −126] relative to the insider trading day. The change in standard deviation Δ\_RETVOL equals the standard deviation of the firm's daily stock returns computed over trading days [−125, −1] relative to the insider trading day minus RETVOL.



Panel B summarizes the 12 independent variables. Notably, purchase transactions have a higher average earnings surprise (*SURPRISE*) of 13.09% compared to the Sell sample's average of 7.16%. Conversely, the average change in earnings (*ChgEARNINGS*) is larger for the Sell sample at 11.40% compared to the Buy sample's average of −0.21%. This difference stems from variations between analysts' expectations and actual earnings. The CEO pay gap ratio ranges from −20% to 66%, with negative values indicating lower CEO compensation than the average of the other executives. Purchase transactions have an average insider dealing volume of 869.3 thousand shares, while sales have an average of 369.8 thousand shares. The Buy sample's mean market capitalization is \$20.868 billion, while the Sell sample's is approximately \$57.988 billion, suggesting that insider purchases are more common in smaller firms, while insider sales are more prevalent in larger firms.

Table 4 shows the results of the test for normal distribution of cumulative abnormal returns (*CARs*) in different event periods. *CARs* are significantly different from 0 in most event periods, indicating a significant insider gain over the broader market. The average *CARs* for the Sell/Bad news sample gradually increase from 0.492% to 3.856% for the [0 to 5] and [0 to 50] event periods, respectively, and are highly significant. These values are also significantly higher than the *CARs* for the purchase/good news sample, ranging from 0.258% to 3.363% for the same event periods. Notably, the difference between Buy for good news and Sell for bad news events is significant for the [0 to 10], [0 to 20], and [0 to 30] event windows, indicating a higher level of information asymmetry surrounding bad news compared to good news.

**Table 4.** *CARs* of insider trading activities in different event periods.

Panel (A): Buy and Sell Activities for the Whole Sample					
Event Period	Buy		Sell		Mean Difference Test
	Total Sample (N = 1311)		Total Sample (N = 2164)		
	<i>CAR</i>	<i>t-Value</i>	<i>CAR</i>	<i>t-Value</i>	<i>t-Value</i>
[0 to 5]	0.209	1.38	0.13	1.31	0.413
[0 to 10]	0.369	1.87 *	0.429	3.11 **	−0.24
[0 to 20]	0.689	2.27 **	0.817	4.33 ***	−0.33
[0 to 30]	0.912	2.07 *	1.223	4.81 ***	−0.59
[0 to 40]	1.061	2.08 *	1.426	4.80 ***	−0.60
[0 to 50]	1.284	2.30 **	1.66	4.95 ***	−5.60

Panel (B): Buy in Good News and Sell in Bad News					
Event Period	Buy (Positive Earnings Surprise)		Sell (Negative Earnings Surprise)		Mean Difference Test
	Total Sample (N = 743)		Total Sample (N = 631)		
	<i>CAR</i>	<i>t-Value</i>	<i>CAR</i>	<i>t-Value</i>	<i>t-Value</i>
[0 to 5]	0.258	1.10	0.492	2.42 **	−0.76
[0 to 10]	0.419	1.49	1.263	4.69 ***	−2.17 **
[0 to 20]	1.611	3.66 **	3.115	7.55 ***	−2.49 **
[0 to 30]	2.740	4.41 ***	4.144	8.35 ***	−1.76 *
[0 to 40]	2.989	4.20 ***	3.522	6.42 ***	−0.59
[0 to 50]	3.363	4.32 ***	3.856	5.68 ***	−0.47

Notes: Panel (A) presents the cumulative abnormal returns *CARs* of insiders for the whole Buy/Sell activities. Panel (B) reports the cumulative abnormal returns *CARs* of insider buy in the Good news and sell in the Bad news. The mean difference test shows the *t*-value of the mean *CAR* difference between Insider buys and Insider sells. A positive or negative value the difference test indicates that there is a higher or lower value for Buy Sample than that for Sell Sample. \*  $p < 0.1$ ; \*\*  $p < 0.05$ ; \*\*\*  $p < 0.01$ .

Figure 1 illustrates the variation of insider abnormal returns across different event windows (0 to 50 days). In the initial 20-day window, there is a slight disparity between the average abnormal returns (*AARs*) of buying and selling transactions. However, from day 20 to day 50, the market shows a significantly stronger reaction to insider selling transactions compared to insider buying transactions.

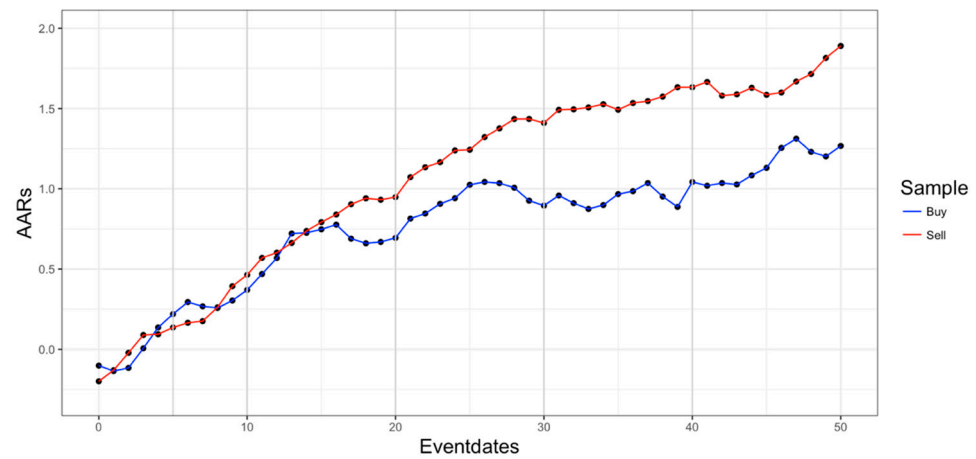


Figure 1. Average Insider Abnormal Returns for Buy and Sell Samples over 50 days.

Figures 2 and 3 display the correlation coefficients among the variables within the Buy and Sell samples, respectively. In Figure 2, we observe a significant and positive correlation between *SURPRISE* and *CAR*, indicating a positive association between earnings surprise and insider purchase returns. Additionally, we note a significant and negative correlation between  $\Delta\_RETVOL$  and *CAR*, suggesting that a decrease in equity risk leads to higher returns in insider purchase activities. In contrast, Figure 3 illustrates a negative relationship between *SURPRISE* and *CAR*, indicating a negative association between earnings surprise and insider sale returns. Moreover, we observe a positive relationship between  $\Delta\_RETVOL$  and *CAR*, implying that an increase in equity risk influences changes in managers’ holdings through stock sales. Both figures demonstrate low correlation coefficients, which mitigates concerns related to multicollinearity that could potentially have affected our regression results.

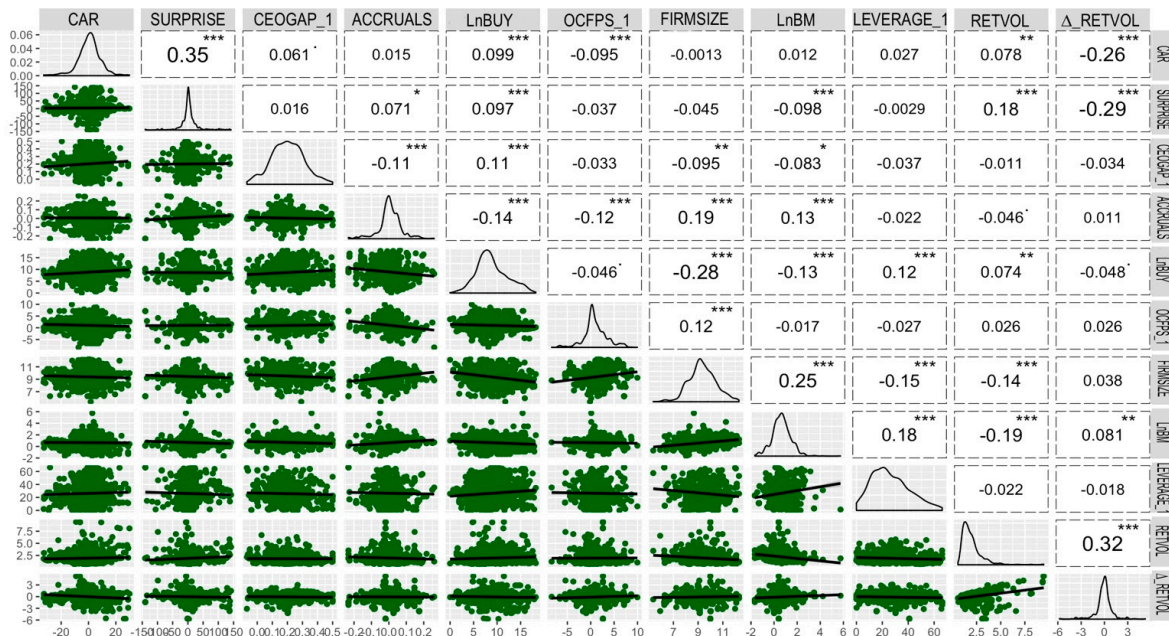


Figure 2. Correlation Matrix of Independent Variables—Purchase Sample. (\*  $p < 0.1$ ; \*\*  $p < 0.05$ ; \*\*\*  $p < 0.01$ ).

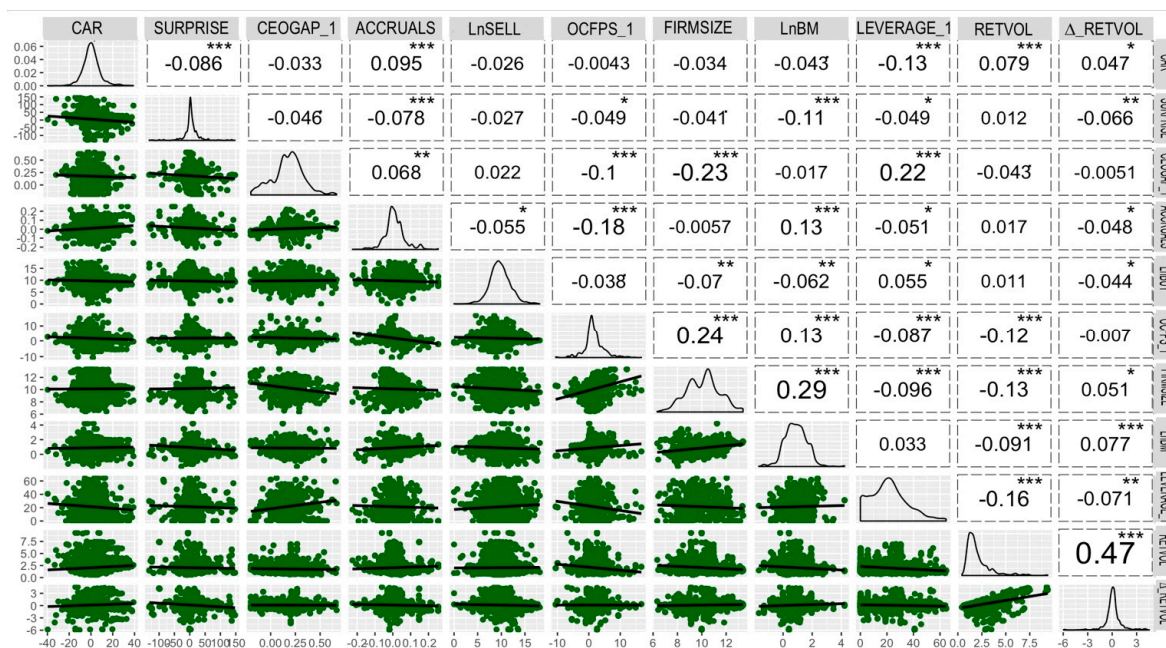


Figure 3. Correlation Matrix of Independent Variables—Sale Sample. (\*  $p < 0.1$ ; \*\*  $p < 0.05$ ; \*\*\*  $p < 0.01$ ).

#### 4.2. Main Models

We analyze the relationship between insider cumulative abnormal returns in different event periods and two key variables: CEO pay gap and earnings surprises. The regression results are presented in Tables 5 and 6. In both tables, columns (1) to (6) show the regression results for CARs in the event periods and other independent variables, using earnings surprise (*SURPRISE*) as a proxy for earnings changes. Columns (7) to (12) use changes in actual earnings (*ChgEARNINGS*) as a proxy. The models also include controls for firm-level factors and stock risks.

Table 5 presents regression results for the Buy/Good news sample, showing significant positive relationships between insider trading returns (*CARs*) and earnings proxies. These findings confirm insider trading as a signal for future earnings, with insider buying returns positively linked to changes in the firm’s earnings. Notably, *CARs* in columns (2) to (6) exhibit a strong positive relationship with earnings surprises. The coefficient for the 40-day window is particularly significant, indicating a 7.7% increase in insider abnormal returns for every 1% rise in earnings surprise. However, the coefficient for the [0 to 5] event period is insignificant, suggesting no significant relationship between earnings surprise and *CAR* [0–5]. Using *ChgEARNINGS* as a proxy for actual earnings changes, we find a significant positive relationship between earnings surprises and *CARs* in columns (10), (11), and (12). However, in column (8) alone, the coefficient is negative and significant at the 10% level, indicating that a 1% increase in insider returns for the first 10 days after their purchases predicts a 0.5% decrease in earnings changes. Overall, the coefficients of *SURPRISE* in the Buy sample are higher than those of *ChgEARNINGS*, suggesting that insiders rely more on earnings surprise information than changes in earnings. The coefficients of *SURPRISE* and *ChgEARNINGS* in the 10-day window columns are relatively small (0.008 and  $-0.005$ , respectively), indicating that insider cumulative abnormal returns for 10-day windows may not reliably signal upcoming earnings information. However, the coefficient of *SURPRISE* significantly increases for the 20-day window (0.038) and the 40-day window (0.077), suggesting that firms “leak” earnings news earlier relative to the 20-day window.

**Table 5.** Determinants of insider gains, main regression—Buy before the Good news disclosures.

Dependent Variable:	SURPRISE						ChgEARNINGS																	
	CAR [5] (1)	CAR [0–10] (2)	CAR [0–20] (3)	CAR [0–30] (4)	CAR [0–40] (5)	CAR [0–50] (6)	CAR [0–5] (7)	CAR [0–10] (8)	CAR [0–20] (9)	CAR [0–30] (10)	CAR [0–40] (11)	CAR [0–50] (12)												
SURPRISE	0.004 (0.187)	0.008 (0.008)	*** (0.000)	0.038 (0.000)	*** (0.000)	0.073 (0.000)	*** (0.000)	0.077 (0.000)	*** (0.000)	0.074 (0.000)	*** (0.000)													
ChgEARNINGS								−0.002 (0.456)	−0.005 (0.051)	* (0.155)	0.005 (0.012)	0.012 (0.024)	** (0.024)	0.012 (0.024)	** (0.024)	0.010 (0.074)	*							
CEOGAP <sub>−1</sub>	2.364 (0.218)	3.919 (0.078)	* (0.020)	6.695 (0.020)	** (0.036)	7.737 (0.036)	** (0.043)	8.348 (0.043)	** (0.004)	12.697 (0.004)	*** (0.004)			2.07 (0.260)	2.773 (0.197)	4.404 (0.133)	3.783 (0.338)	3.89 (0.372)	8.668 (0.054)	*				
CEOGAP <sub>−1</sub> *SURPRISE	0.042 (0.218)	0.175 (0.000)	*** (0.000)	0.284 (0.000)	*** (0.000)	0.393 (0.000)	*** (0.000)	0.422 (0.000)	*** (0.000)	0.422 (0.000)	*** (0.000)													
CEOGAP <sub>−1</sub> *ChgEARNINGS								0.035 (0.176)	0.014 (0.640)	0.0002 (0.997)	−0.031 (0.567)	−0.059 (0.329)	−0.089 (0.154)											
ACCRUALS	2.747 (0.391)	7.186 (0.053)	* (0.011)	12.258 (0.011)	** (0.009)	16.132 (0.009)	*** (0.120)	10.672 (0.013)	** (0.317)	18.042 (0.013)	** (0.026)	3.114 (0.026)	8.141 (0.026)	** (0.000)	17.746 (0.000)	*** (0.000)	27.693 (0.000)	*** (0.000)	22.886 (0.002)	*** (0.002)	30.345 (0.000)	*** (0.000)		
LnBUY	−0.000 (0.996)	0.043 (0.558)	0.260 (0.007)	*** (0.007)	0.370 (0.003)	*** (0.003)	0.451 (0.002)	*** (0.002)	0.445 (0.002)	*** (0.002)	0.017 (0.790)	0.063 (0.389)	0.298 (0.003)	*** (0.003)	0.427 (0.002)	*** (0.002)	0.427 (0.002)	*** (0.002)	0.501 (0.001)	*** (0.001)	0.483 (0.002)	*** (0.002)		
OCFPS <sub>−1</sub>	−0.013 (0.842)	−0.018 (0.805)	−0.256 (0.009)	*** (0.009)	−0.326 (0.009)	*** (0.033)	−0.296 (0.138)	** (0.485)	−0.215 (0.380)	−0.039 (0.425)	−0.057 (0.679)	−0.309 (0.100)	*** (0.292)	−0.487 (0.000)	*** (0.000)	−0.468 (0.000)	*** (0.000)	−0.468 (0.000)	*** (0.000)	−0.421 (0.003)	*** (0.003)			
FIRMSIZE	0.095 (0.668)	0.012 (0.962)	0.411 (0.217)	0.244 (0.566)	0.271 (0.569)	0.438 (0.380)	0.17 (0.425)	0.438 (0.380)	0.17 (0.425)	0.438 (0.380)	0.17 (0.425)	0.103 (0.679)	* (0.100)	0.559 (0.292)	0.482 (0.292)	0.585 (0.247)	0.482 (0.247)	0.585 (0.247)	0.482 (0.247)	0.585 (0.247)	0.781 (0.133)	0.781 (0.133)		
LnMB	−0.076 (0.793)	−0.05 (0.882)	0.51 (0.237)	1.067 (0.053)	* (0.031)	1.334 (0.031)	** (0.008)	1.744 (0.008)	*** (0.008)	−0.063 (0.818)	0.004 (0.991)	0.424 (0.331)	0.961 (0.102)	1.187 (0.068)	* (0.068)	1.672 (0.013)	** (0.013)	1.672 (0.013)	** (0.013)	1.672 (0.013)	** (0.013)			
LEVERAGE <sub>−1</sub>	0.045 (0.002)	*** (0.002)	0.052 (0.003)	*** (0.003)	0.066 (0.156)	*** (0.167)	0.039 (0.202)	0.043 (0.202)	0.043 (0.202)	0.043 (0.202)	0.043 (0.202)	0.043 (0.202)	0.043 (0.202)	0.043 (0.202)	0.043 (0.202)	0.043 (0.202)	0.043 (0.202)	0.043 (0.202)	0.043 (0.202)	0.043 (0.202)	0.043 (0.202)	0.043 (0.202)		
RETVOL	0.415 (0.142)	0.522 (0.111)	1.386 (0.002)	*** (0.002)	1.815 (0.001)	*** (0.001)	3.289 (0.000)	*** (0.000)	4.038 (0.000)	*** (0.000)	0.675 (0.010)	0.958 (0.002)	2.879 (0.000)	*** (0.000)	5.067 (0.000)	*** (0.000)	6.711 (0.000)	*** (0.000)	6.711 (0.000)	*** (0.000)	7.590 (0.000)	*** (0.000)		
Δ_RETVOL	−1.328 (0.001)	*** (0.000)	−1.825 (0.000)	*** (0.000)	−4.179 (0.000)	*** (0.000)	−4.844 (0.000)	*** (0.000)	−5.391 (0.000)	*** (0.000)	−6.197 (0.000)	*** (0.000)	−1.778 (0.000)	*** (0.000)	−2.443 (0.000)	*** (0.000)	−6.175 (0.000)	*** (0.000)	−8.853 (0.000)	*** (0.000)	−9.708 (0.000)	*** (0.000)	−10.494 (0.000)	*** (0.000)
Constant	−3.171 (0.196)	−3.527 (0.215)	−11.832 (0.002)	*** (0.002)	−11.998 (0.011)	** (0.011)	−15.918 (0.003)	*** (0.003)	−20.186 (0.000)	*** (0.000)	−4.324 (0.068)	* (0.079)	−4.874 (0.079)	* (0.000)	−15.222 (0.000)	*** (0.000)	−18.836 (0.000)	*** (0.000)	−23.542 (0.000)	*** (0.000)	−28.321 (0.000)	*** (0.000)		
Observations	832	832	832	832	832	832	832	832	843	843	843	843	843	843	843	843	843	843	843	843	843	843		
Adjusted R <sup>2</sup>	0.052	0.100	0.356	0.443	0.434	0.433	0.433	0.433	0.065	0.092	0.268	0.304	0.313	0.338	0.338	0.338	0.338	0.338	0.338	0.338	0.338	0.338		

Notes: This table reports the OLS estimation for insider trading of 6 event windows from [0–5] to [0–50] and earning proxies *SURPRISE* and *ChgEARNINGS*. The dependent variable is cumulative abnormal return *CAR* [event period]; *SURPRISE* is earning surprise, defined as the difference between actual and expected earnings divided by actual earnings. The change in earnings *ChgEARNING* is the change between earnings per share for year *t* and year *t* − 1 divided by earnings per share year *t* − 1. *CEOGAP*<sub>−1</sub> is the CEO gap ratio of year *t* − 1, measured as the difference between the total CEO pay and the mean of other four executives' pay divided by the total pay of the top five executives; *CEOGAP*<sub>−1</sub>\* *SURPRISE* is the interactive variable between *CEOGAP*<sub>−1</sub> and *SURPRISE*; *CEOGAP*<sub>−1</sub>\**ChgEARNINGS* is the interactive variable between *CEOGAP*<sub>−1</sub> and *ChgEARNINGS*; *ACCRUALS* is the measure of abnormal accrual using a modified version of the Jones (1991) model. Insiders' trading volume *LnBUY* is the natural logarithm of the purchasing volumes made by insiders. *OCFPS* is operating cash flow per share. *FIRMSIZE* is defined as the natural logarithm of total market capitalization. Market-to-book value *MB* is defined as the book value divided by the total market capitalization of a stock. *LnMB* is the natural logarithm of *MB*. Financial leverage *LEVERAGE*<sub>−1</sub> is the ratio of total debt over total assets in the previous year. Return volatility of a stock *RETVOL* is the standard deviation of daily stock returns computed over trading days [−250, −126] relative to the insider trading day. The change in standard deviation *Δ\_RETVOL* equals the standard deviation of the firm's daily stock returns computed over trading days [−125, −1] relative to the insider trading day minus *RETVOL*. The *p*-values are shown below the estimates in parentheses (). \* *p* < 0.1; \*\* *p* < 0.05; \*\*\* *p* < 0.01.

**Table 6.** Determinants of insider gains, main regression—Sell before Bad News disclosures.

Dependent Variable:	SURPRISE						ChgEARNINGS					
	CAR [5] (1)	CAR [0–10] (2)	CAR [0–20] (3)	CAR [0–30] (4)	CAR [0–40] (5)	CAR [0–50] (6)	CAR [0–5] (7)	CAR [0–10] (8)	CAR [0–20] (9)	CAR [0–30] (10)	CAR [0–40] (11)	CAR [0–50] (12)
SURPRISE	0.001 (0.645)	−0.006 * (0.065)	−0.002 (0.583)	−0.016 *** (0.003)	−0.010 * (0.087)	−0.009 (0.206)						
ChgEARNINGS							0.001 (0.445)	0.002 (0.284)	0.002 (0.395)	0.003 (0.376)	−0.0003 (0.942)	−0.002 (0.652)
CEOGAP <sub>−1</sub>	−0.186 (0.786)	−0.751 (0.414)	−2.544 ** (0.043)	−4.049 *** (0.009)	−3.450 ** (0.049)	−5.239 (0.011)	−0.429 (0.510)	−1.068 (0.244)	−2.811 ** (0.035)	−4.004 ** (0.014)	−3.079 * (0.084)	−4.782 ** (0.022)
CEOGAP <sub>−1</sub> *SURPRISE	−0.057 ** (0.013)	−0.034 (0.273)	−0.045 (0.286)	−0.087 * (0.092)	−0.058 (0.320)	−0.077 ** (0.258)						
CEOGAP <sub>−1</sub> *ChgEARNINGS							0.015 * (0.088)	0.011 (0.351)	0.021 (0.244)	0.022 (0.300)	−0.002 (0.936)	0.01 (0.723)
ACCRUALS	−6.761 *** (0.000)	−7.701 *** (0.002)	−7.844 ** (0.017)	−13.703 *** (0.001)	−15.958 *** (0.000)	−12.00 ** (0.025)	−6.879 *** (0.000)	−8.230 *** (0.001)	−7.490 ** (0.030)	−11.993 *** (0.005)	−13.277 *** (0.004)	−9.708 * (0.071)
LnSELL	0.012 (0.804)	−0.042 (0.510)	−0.160 * (0.063)	−0.294 *** (0.006)	−0.257 ** (0.032)	−0.336 (0.017)	−0.035 (0.420)	−0.145 ** (0.020)	−0.377 *** (0.000)	−0.523 *** (0.000)	−0.467 *** (0.000)	−0.563 *** (0.000)
OCFPS <sub>−1</sub>	0.019 (0.501)	0.018 (0.627)	0.029 (0.571)	0.056 (0.372)	0.105 (0.257)	0.105 ** (0.205)	0.018 (0.443)	0.003 (0.927)	0.046 (0.351)	0.041 (0.490)	0.08 (0.222)	0.08 (0.297)
FIRMSIZE	−0.215 ** (0.028)	−0.416 *** (0.002)	−0.452 ** (0.012)	−0.511 ** (0.021)	−0.667 *** (0.008)	−0.654 * (0.025)	−0.262 *** (0.004)	−0.540 *** (0.000)	−0.674 *** (0.000)	−0.696 *** (0.002)	−0.797 *** (0.002)	−0.734 ** (0.011)
LnMB	−0.246 (0.161)	−0.386 (0.102)	−0.753 ** (0.020)	−0.647 (0.103)	−0.317 (0.479)	−0.873 (0.095)	−0.173 (0.273)	−0.172 (0.439)	−0.335 (0.298)	−0.062 (0.875)	0.209 (0.628)	−0.348 (0.489)
LEVERAGE <sub>−1</sub>	−0.001 (0.897)	−0.01 (0.330)	−0.006 (0.682)	−0.005 (0.794)	−0.014 (0.479)	0.004 *** (0.878)	−0.006 (0.450)	−0.024 ** (0.030)	−0.024 (0.124)	−0.021 (0.270)	−0.029 (0.176)	−0.015 (0.548)
RETVOL	−0.770 *** (0.000)	−1.083 *** (0.000)	−1.688 *** (0.000)	−1.806 *** (0.000)	−1.598 *** (0.000)	−1.947 *** (0.000)	−0.805 *** (0.000)	−1.477 *** (0.000)	−2.457 *** (0.000)	−2.564 *** (0.000)	−2.022 *** (0.000)	−2.652 *** (0.000)
Δ_RETVOL	1.198 *** (0.000)	1.719 *** (0.000)	2.837 *** (0.000)	3.291 *** (0.000)	3.012 *** (0.000)	3.553 *** (0.000)	1.337 *** (0.000)	2.526 *** (0.000)	4.293 *** (0.000)	4.742 *** (0.000)	4.047 *** (0.000)	5.035 *** (0.000)
Constant	3.587 *** (0.004)	7.299 *** (0.000)	10.730 *** (0.000)	13.180 *** (0.000)	14.110 *** (0.000)	16.081 *** (0.000)	4.644 *** (0.000)	10.313 *** (0.000)	15.982 *** (0.000)	17.855 *** (0.000)	17.487 *** (0.000)	19.678 *** (0.000)
Observations	1353	1353	1353	1353	1353	1353	1405	1405	1405	1405	1405	1405
Adjusted R <sup>2</sup>	0.051	0.053	0.07	0.08	0.051	0.048	0.056	0.09	0.119	0.104	0.066	0.071

Notes: This table reports the OLS estimation for insider trading of 6 event windows from [0–5] to [0–50] and earning proxies *SURPRISE* and *ChgEARNINGS*. The dependent variable is cumulative abnormal return *CAR* [*event period*]; *SURPRISE* is earning surprise, defined as the difference between actual and expected earnings divided by actual earnings. The change in earnings *ChgEARNING* is the change between earnings per share for year *t* and year *t* − 1 divided by earnings per share year *t* − 1. *CEOGAP*<sub>−1</sub> is the CEO gap ratio of year *t* − 1, measured as the difference between the total CEO pay and the mean of other four executives' pay divided by the total pay of the top five executives; *CEOGAP*<sub>−1</sub>\**SURPRISE* is the interactive variable between *CEOGAP*<sub>−1</sub> and *SURPRISE*; *CEOGAP*<sub>−1</sub>\**ChgEARNINGS* is the interactive variable between *CEOGAP*<sub>−1</sub> and *ChgEARNINGS*; *ACCRUALS* is the measure of abnormal accrual using a modified version of the Jones (1991) model. Insiders' trading volume *LnSELL* is the natural logarithm of the selling volumes made by insiders. *OCFPS* is operating cash flow per share. *FIRMSIZE* is defined as the natural logarithm of total market capitalization. Market-to-book value *MB* is defined as the book value divided by the total market capitalization of a stock. *LnMB* is the natural logarithm of *MB*. Financial leverage *LEVERAGE*<sub>−1</sub> is the ratio of total debt over total assets in the previous year. Return volatility of a stock *RETVOL* is the standard deviation of daily stock returns computed over trading days [−250, −126] relative to the insider trading day. The change in standard deviation *Δ\_RETVOL* equals the standard deviation of the firm's daily stock returns computed over trading days [−125, −1] relative to the insider trading day minus *RETVOL*. The *p*-values are shown below the estimates in parentheses (.) \* *p* < 0.1; \*\* *p* < 0.05; \*\*\* *p* < 0.01.

Next, we analyze the relationship between insider abnormal returns and CEO pay gap. The coefficients of  $CEOGAP_{-1}$  in columns (2) to (6) and column (12) are positively and significantly associated with insiders' CARs. This supports our hypothesis H1, suggesting that a larger CEO pay gap encourages corporate insiders to leverage inside information for trades. For example, in column (3), a 1% increase in the CEO pay gap leads to a 6.69% rise in insider abnormal returns for the 20-day event window. The positive and significant impacts of  $CEOGAP_{-1}$  and earnings surprise proxies on insider abnormal returns imply that insiders in firms with greater executive pay disparity are more likely to exploit their superior information on earnings through purchases (Bebchuk and Fried 2003; Morse et al. 2011). Furthermore, firms with higher executive pay disparity tend to exhibit higher levels of information asymmetry, which insiders can exploit through strategic timing of trades, particularly around earnings announcements (Cohen et al. 2012). Insiders in firms with greater executive pay disparity may be more motivated to bridge the compensation gap by capitalizing on their knowledge of future earnings. This heightened motivation, coupled with the financial incentives of generating abnormal returns, can drive insiders to engage in more aggressive and strategic trading activities, resulting in positive relationships between the CEO pay gap and insider abnormal returns.

Furthermore, the interaction between CEO pay gap and earnings surprise enhances the impact of earnings surprises on insider profits. The coefficients of the interaction terms in columns (2)–(6) of Table 5 show strong positive and significant relationships with insider abnormal returns. We argue that insiders in firms with a larger CEO pay gap are more likely to capitalize on future earnings surprises for profitable trades. The combined effect of CEO pay gap and earnings surprise amplifies the impact of earnings surprise on insider trading returns. This convergence of factors influences market perception and reactions to insider trading activities. Investors and market participants may interpret the convergence of these factors as a signal of the strength and reliability of the insider information being used. This positive market response further magnifies the effect of the CEO pay gap on insider abnormal returns. Insiders in firms with a larger CEO pay gap show greater ability to shape market perceptions and generate stronger reactions through their trades, resulting in higher abnormal returns.

The positive and significant impacts of the CEO pay gap on insider purchase returns support our hypothesis H1. From a managerial power perspective, several factors contribute to this relationship. Firstly, a large CEO pay gap indicates power concentration and weaker board oversight, which can allow insiders with superior information to exploit this advantage for personal gain, particularly through purchases based on positive earnings news (Bebchuk and Fried 2003; Core et al. 1999). Secondly, firms with larger CEO pay gaps often exhibit characteristics like higher CEO entrenchment and succession risks, which reflect uncertain business environments and potential variations in future performance (Fahlenbrach 2009; Morse et al. 2011). Insiders may time their purchases strategically around positive earnings announcements, leading to higher abnormal returns (Cohen et al. 2012). Thirdly, a larger CEO pay gap may signal a skilled and successful CEO, which can boost investor confidence and attract more investors to the firm. This increased demand for the company's stock can raise the returns on insider purchases (Jenter and Lewellen 2015). Finally, the concentration of decision-making power in the CEO's hands allows for opportunistic behavior, where CEOs can capitalize on positive earnings news for personal gain through insider trading, further driving up insider returns (Bebchuk and Fried 2003; Fahlenbrach 2009).

The signs and significance levels on other control variables align with our expectations and previous research. We find a positive and highly significant association between *ACCRUALS* and insider cumulative abnormal returns in most columns, indicating that insiders actively engage in earnings management for their own benefit, particularly in relation to their stock purchase activities prior to good earnings news (See Aboudy et al. 2005; Sawicki and Shrestha 2012; and Chowdhury et al. 2017). Higher levels of accruals indicate a greater degree of earnings management. By leveraging their superior knowledge

of inside information, insiders may manipulate earnings accruals upward, allowing them to engage in buying trades before good earnings announcements and thus profit from their stock purchases.

$\lnBUY$  exhibits a positive and significant relationship with insider purchase abnormal returns in columns (3) to (6) and (9) to (12). This suggests that when insiders engage in larger volume stock purchases, it may influence outsiders to imitate their trades, leading to an increase in stock market prices and ultimately improving insider abnormal returns. This observation aligns with Bettis et al. (1997), who highlight that outsiders can achieve significant abnormal returns by replicating insider trades.

We observe a negative and significant relationship between  $OCFPS_{-1}$  and  $CARs$  in columns (3) to (5) and (9) to (12). This implies that insiders belonging to firms with declining operating cash flows tend to achieve higher returns from their insider purchases. This phenomenon can be explained by several factors. First, insiders have an information advantage, accessing non-public information about the company's financial performance. They time their purchases strategically based on expected recovery or positive developments not yet reflected in the stock price. Second, a decline in operating cash flows can lead to undervaluation of the company's stock, prompting insiders to acquire shares at a discounted price, anticipating future improvements. Third, insiders with a contrarian investment approach may buy shares during periods of negative sentiment when external investors are pessimistic, expecting a future recovery and subsequent increase in stock prices.

The coefficient for  $FIRMSIZE$  is significant only in column (9) at a 10% level. The coefficient for market-to-book value is significant in columns (4), (5), (6), (11), and (12).

Further, we observe a positive association between  $CARs$  and  $LEVERAGE_{-1}$  in columns (1) to (3), and (7) to (9). Insiders in companies with higher debt levels in the previous year tend to generate greater abnormal returns.

$RETVOL$  shows a strong positive association with  $CARs$ , indicating that higher stock return volatility corresponds to greater insider trading returns. However, we also observe a negative relationship between  $CARs$  and  $\Delta\_RETVOL$  (change in return volatility). This can be interpreted in two ways. Firstly, a decrease in return volatility suggests a more stable market with fewer opportunities for insiders to exploit mispriced securities. As a result, insider trading may yield lower cumulative abnormal returns. Secondly, the negative relationship suggests that insiders may be less successful in generating abnormal returns when market conditions become more predictable. This aligns with previous research by Aggarwal and Samwick (1999, 2003) and Jin (2002).

Table 6 presents the regression model results for the Sell/Bad news sample. In contrast to the Buy/Good news sample, we find negative and statistically significant coefficients for insiders' cumulative abnormal returns ( $CARs$ ) in relation to earnings surprise ( $SURPRISE$ ) in columns (2), (4), and (5). The coefficients indicate that a 1% increase in earnings surprise is associated with a decrease of 0.01%, 0.02%, and 0.01% in  $CAR$  [0–10],  $CAR$  [0–30], and  $CAR$  [0–40], respectively. These findings suggest that insider sellers can achieve higher returns when upcoming earnings fall below expectations. The negative coefficients indicate that insider selling transactions can serve as a signal for a decline in future earnings, allowing insiders to mitigate losses or take advantage of declining stock prices. In columns (7) to (12), we do not find a significant relationship between  $CARs$  and earnings changes ( $ChgEARNING$ ).

The weaker relationship between insider sale returns prior to bad earnings news and earnings surprises, compared to insider purchase returns prior to good earnings news, can be attributed to several factors. First, information asymmetry: Negative insider information may not be widely known, leading to a delayed market reaction. Second, insider motivations: Selling insiders may have diverse reasons, weakening the relationship. Third, market response: Good news prompts immediate stock price increases, while bad news may have a more muted or delayed reaction. Fourth, timing and reporting: Insiders may have early access to positive information, allowing timely purchases, while bad news may take longer to materialize, leading to delayed sales.

The negative and significant coefficients of  $CEOGAP_{-1}$  in multiple columns (3) to (5) and (9) to (12) tends to contradict our hypothesis  $H1$  and support the tournament hypothesis ( $H2$ ) in insider selling activities. These coefficients may indicate that a larger CEO pay gap is associated with lower abnormal returns for insiders selling their shares. This finding suggests that a higher CEO pay gap may have a demotivating effect on insiders, reducing their incentive to engage in profitable insider sales (See Lambert et al. 1993; Main et al. 1995; Bebchuk and Fried 2003; and Kale et al. 2009). Conversely, a smaller pay gap between the CEO and other executives may demotivate them from pursuing the CEO position, potentially resulting in lower management quality. In such cases, insiders are more likely to exploit their informational advantages during stock sales, leading to higher insider returns (See Inci 2012; Dai et al. 2016). Taken together these results demonstrate the complex relationship between the CEO pay gap, management quality, and insider returns, highlighting the role of the CEO pay gap in shaping insiders' motivations, trading behavior, and abnormal returns.

The coefficients relating to the interaction between  $CEOGAP_{-1}$  and  $SURPRISE$  in Table 6 exhibit both negativity and statistical significance in columns (1), (4), and (6). In simpler terms, the combined impact of CEO pay gap and earnings surprise on insider trading consistently demonstrates a negative and statistically significant correlation. This implies that when considering the influence of earnings surprise, the already observed negative and significant relationship between CEO pay gap and insider trading returns is further accentuated.

The coefficients associated with the interaction between  $CEOGAP_{-1}$  and  $SURPRISE$  in Table 6 are negative and statistically significant in columns (1), (4), and (6). In other words, the joint effect of CEO pay gap and earnings surprise on insider trading is still characterized by a negative and significant association. This suggests that when accounting for the influence of earnings surprise, the negative and significant relationship between the CEO pay gap and insider trading returns is further amplified.

Overall, the negative impacts of the CEO pay gap on insider sale returns suggest that firms with a larger CEO pay gap exhibit characteristics and mechanisms that discourage insiders from engaging in opportunistic behavior and exploiting negative news for personal gain through insider sales. This can be explained by several factors. First, a high CEO pay gap signals a concentration of power and control in the hands of the CEO, leading to greater scrutiny and oversight by the board of directors, making it more challenging for insiders to engage in opportunistic behavior such as selling stocks based on inside information. Consequently, insiders in firms with a high CEO pay gap may be deterred from exploiting bad earnings news for personal gain through insider sales. Second, a high CEO pay gap represents a stronger incentive for individuals competing for the CEO position. The CEO promotion tournament helps to build a pool of high-quality internal CEO candidates, increases investor protection, and discourages opportunistic behavior. This effectively discourages insiders from engaging in fraudulent or manipulative practices, reduces the likelihood of insiders benefiting from insider sales before bad earnings news and leads to lower insider-sale returns. Third, a high CEO pay gap may indicate a higher level of CEO entrenchment and lower succession risk. In such cases, the CEO's interests may align more closely with the long-term success of the company. Insiders, including the CEO, may be more inclined to hold on to their shares instead of selling them, as they anticipate improved future performance and long-term rewards. This reduces selling activity among insiders in firms with a high CEO pay gap and can contribute to lower insider sale returns.

The relationships between insider abnormal returns and the remaining control variables also exhibit significant findings across most cases. Notably, we observe negative coefficients for earnings management  $ACCRUALS$  in all columns. The finding that insider sales returns before bad earnings news have a negative relationship with accruals can be attributed to two main factors. Firstly, the market perceives higher accruals as a red flag for lower quality or riskier financial reporting, leading to decreased abnormal returns for insiders. Secondly, higher accruals signal lower financial reporting quality, eroding



investor confidence. Insiders selling stocks in companies with higher accruals may face lower demand or a higher risk premium, resulting in lower returns.

Regarding insider sale trading volume  $LnSELL$ , we find negative and significant coefficients in columns (3) to (5) and (8) to (12). This indicates that higher insider returns from sales transactions are associated with a decrease in insider trading volume. Several factors may contribute to this pattern. First, insiders with access to more significant and valuable information are more likely to engage in selling when insider trading volume is low. They may possess insider knowledge about negative developments or anticipate poor future prospects for the company. Second, insiders who sell during a period of low insider trading volume can carefully choose the timing and execution of their sales to take advantage of their insights, leading to higher returns compared to average market conditions. With fewer insiders participating in selling activities, the impact of each individual insider's selling is more pronounced. The limited insider selling that occurs during this period tends to attract attention and potentially signals a stronger conviction in their decision to sell. As a result, the sales transactions are more likely to generate higher-than-average returns. In contrast, high insider trading volume involves more insiders selling, diluting the impact of individual activity and resulting in average or lower returns. Increased selling activity may also include insiders selling for reasons other than private information, such as diversification or personal financial needs. There is weak evidence, only column (6), that insider sale returns are associated with the operating cash flow of the bad news firms, at the 5% level of significance. The coefficients of  $FIRMSIZE$  display a negative and significant association with  $CARs$  in all columns, consistent with the prior literature (Seyhun 1986; Agrawal and Cooper 2015). This implies that larger firms tend to have lower abnormal returns for insiders in their stock sales.

Interestingly, the impact of stock risk on insider abnormal returns in the Sell/Bad news sample differs from the findings in the Buy/Good news sample in Table 5. We observe a negative coefficient for stock return volatility  $RETVOL$  and a positive coefficient for change in stock return volatility  $\Delta\_RETVOL$ . This suggests that insiders in firms characterized by low but increasing equity risk are more inclined to exploit earnings information to benefit their stock sales.

Overall, the findings in Tables 5 and 6 suggest that both insider purchasing and selling activities can provide meaningful insights into firms' future earnings information. The relationship between earnings surprises and insider returns is more significant for insider purchases. Table 5 shows a positive and strongly significant association between insider buying activities and both proxies of corporate earnings. This indicates that insiders tend to achieve higher returns when they purchase stocks in response to positive news about future earnings. On the other hand, Table 6 reveals a negative and weaker significant relationship between insider returns and earnings surprises, specifically in the  $SURPRISE$  model.

Notably, there are differences in the relationship between the CEO pay gap and the profitability of insider trading between the Buy/Good news and Sell/Bad news transactions. A larger CEO pay gap is associated with higher abnormal returns for insiders purchasing new shares, while it is associated with lower abnormal returns for insiders selling their shares. When the interaction term between  $SURPRISE$  and  $CEOGAP_{-1}$  is incorporated, it adds further impact to insider abnormal returns.

Furthermore, the contrasting impact of earnings accruals on insider trading in purchase and sale activities shows that insiders manipulate earnings to align with their objectives, suggesting the use of earnings management strategies to enhance their trading outcomes.

Regarding trading volumes, our contrasting results indicate that insiders increase purchase volumes when exploiting positive news about firms' future earnings, while decreasing selling volumes when capitalizing on negative news. This suggests that insiders strategically adjust their trading volumes based on their anticipation of earnings outcomes.

This study also finds that operating cash flows are negatively and significantly related to insider purchase returns, while the relationship between operating cash flows and insider sale returns is positive but weaker.

Lastly, higher stock return volatility is associated with higher insider purchase returns, but a negative relationship exists between insider purchase returns and changes in stock return volatility. This can be interpreted in two ways: A decrease in return volatility indicates a more stable market with limited opportunities for insiders. Or insiders are less successful in generating abnormal returns when market conditions become more predictable. Conversely, higher stock return volatility is linked to lower insider sale returns, and there is a positive relationship between insider sale returns and changes in stock-return volatility. This suggests that insiders in firms characterized by low but increasing equity risk are more likely to exploit earnings information to benefit their stock sales.

## 5. Robustness Tests

### 5.1. Additional Managerial Controls

To ensure the robustness of our findings, we conducted additional tests to examine managerial determinants that could impact corporate insider returns. These determinants provide insights into the overall quality of a firm's corporate governance. We included variables such as CEO tenure (*CEOTENURE*) to assess the impact of CEO incumbency on insider returns, CEO/Chairman duality (*CEODUAL*) to capture the influence of combining these roles, board size (*BOARDSIZE*) to control for the size and composition of the board of directors, and the percentage of independent directors on the board (*INDDIR*) to explore the relationship between independent directors and insider trading outcomes.

In Table 7, which presents the results for the Buy/Good news sample, we find that the positive and strongly significant relationships between insider returns and key explanatory variables, such as *SURPRISE*, *CEOGAP<sub>-1</sub>*, the interaction term between *CEOGAP<sub>-1</sub>* and *SURPRISE*, and *LnBUY*, persisted after introducing the managerial variables. Earnings surprises have a significantly strong impact on insider purchase returns in columns (3), (4), (5), and (6), with corresponding coefficients being 0.03, 0.06, 0.07, and 0.06, respectively. CEO pay gaps are significant in columns (2), (3), (4), (5), and (6), with the corresponding coefficients being 4.14, 7.80, 9.91, 10.72, and 14.90, respectively. The interaction between earnings surprises and the CEO pay gap exhibits strong significance in columns (2), (3), (4), (5), and (6), with corresponding coefficients of 0.15, 0.26, 0.41, 0.44, and 0.44, respectively.

These findings, like those in Table 5, support our hypothesis *H1* regarding insider trading behavior and its association with the CEO pay gap, earnings surprise, and purchasing volume. The inclusion of these managerial variables did not significantly impact the relationships between insider trading and our key variables. Similar to the discussion of results in Table 5, the positive impacts of the CEO pay gap on insider abnormal returns can be explained by several factors. First, a large CEO pay gap indicates power concentration and lower board quality. Insiders, with superior information, exploit this advantage through insider purchases, benefiting from positive earnings news and achieving higher returns. Second, firms with a larger CEO pay gap often face higher CEO entrenchment and succession risk, indicating uncertain business environments. Insiders strategically time their purchases to align with positive earnings news, resulting in higher insider purchase returns. Third, a larger CEO pay gap can signal a skilled and experienced CEO leading the company's success. This boosts investor confidence and attracts more investors, increasing demand for the company's stock and driving up insider purchase returns. Fourth, a large CEO pay gap reflects a concentration of power and control within the CEO's hands. CEOs can act opportunistically and exploit good earnings news for personal gain through insider purchases, contributing to higher insider purchase returns.

**Table 7.** Additional regression model—Buy before Good news disclosures.

Dependent Variable:	SURPRISE						ChgEARNINGS						
	CAR [5] (1)	CAR [0–10] (2)	CAR [0–20] (3)	CAR [0–30] (4)	CAR [0–40] (5)	CAR [0–50] (6)	CAR [0–5] (7)	CAR [0–10] (8)	CAR [0–20] (9)	CAR [0–30] (10)	CAR [0–40] (11)	CAR [0–50] (12)	
SURPRISE	0.004 (0.243)	0.005 (0.144)	0.033 *** (0.000)	0.065 *** (0.000)	0.069 *** (0.000)	0.064 *** (0.000)							
ChgEARNINGS							−0.001 (0.645)	−0.005 * (0.053)	0.003 (0.379)	0.009 * (0.054)	0.009 * (0.095)	0.007 (0.209)	
CEOGAP <sub>−1</sub>	2.672 (0.212)	4.136 * (0.095)	7.800 ** (0.012)	9.913 ** (0.013)	10.721 ** (0.016)	14.897 *** (0.002)		2.401 (0.237)	3.209 (0.173)	5.359 * (0.082)	5.545 (0.176)	5.757 (0.206)	10.792 ** (0.021)
CEOGAP <sub>−1</sub> *SURPRISE	0.029 (0.437)	0.150 *** (0.000)	0.266 *** (0.000)	0.407 *** (0.000)	0.444 *** (0.000)	0.444 *** (0.000)							
CEOGAP <sub>−1</sub> *ChgEARNINGS							0.044 (0.109)	0.034 (0.275)	0.032 (0.436)	0.013 (0.816)	−0.024 (0.690)	−0.044 (0.474)	
ACCRUALS	3.794 (0.271)	7.452 * (0.062)	11.716 ** (0.020)	7.038 (0.269)	0.991 (0.890)	8.58 (0.248)	3.614 (0.281)	7.192 * (0.065)	13.019 ** (0.011)	11.406 * (0.092)	5.72 (0.447)	13.648 * (0.075)	
LnBUY	0.015 (0.833)	0.058 (0.466)	0.307 *** (0.003)	0.363 *** (0.005)	0.456 *** (0.002)	0.403 *** (0.007)	0.027 (0.685)	0.068 (0.384)	0.296 *** (0.004)	0.351 *** (0.010)	0.427 *** (0.005)	0.379 ** (0.014)	
OCFPS <sub>−1</sub>	−0.05 (0.475)	−0.054 (0.505)	−0.328 *** (0.002)	−0.333 ** (0.011)	−0.297 ** (0.043)	−0.185 (0.224)	−0.059 (0.324)	−0.07 (0.310)	−0.309 *** (0.001)	−0.386 *** (0.002)	−0.353 *** (0.009)	−0.291 ** (0.034)	
FIRMSIZE	−0.029 (0.915)	−0.141 (0.655)	0.031 (0.937)	−0.408 (0.419)	−0.257 (0.650)	−0.309 (0.599)	0.019 (0.944)	−0.086 (0.776)	0.172 (0.665)	−0.148 (0.780)	0.144 (0.806)	0.144 (0.810)	
LnMB	−0.071 (0.826)	−0.116 (0.754)	0.404 (0.385)	0.974 (0.101)	1.179 * (0.077)	1.686 ** (0.015)	−0.057 (0.849)	−0.052 (0.883)	0.274 (0.547)	0.663 (0.274)	0.772 (0.252)	1.317 * (0.056)	
LEVERAGE <sub>−1</sub>	0.045 *** (0.005)	0.050 *** (0.006)	0.067 *** (0.004)	0.078 *** (0.008)	0.085 *** (0.010)	0.087 ** (0.011)	0.044 *** (0.005)	0.045 ** (0.012)	0.063 *** (0.008)	0.076 ** (0.015)	0.081 ** (0.019)	0.083 ** (0.019)	
RETVOL	0.256 (0.413)	0.355 (0.326)	0.966 ** (0.034)	1.582 *** (0.007)	3.093 *** (0.000)	3.993 *** (0.000)	0.481 * (0.093)	0.591 * (0.075)	2.121 *** (0.000)	4.059 *** (0.000)	5.720 *** (0.000)	6.584 *** (0.000)	
Δ_RETVOL	−1.332 *** (0.000)	−1.947 *** (0.000)	−4.236 *** (0.000)	−5.175 *** (0.000)	−5.584 *** (0.000)	−6.791 *** (0.000)	−1.821 *** (0.000)	−2.407 *** (0.000)	−5.956 *** (0.000)	−8.660 *** (0.000)	−9.356 *** (0.000)	−10.402 *** (0.000)	
CEOTENURE	−0.002 (0.975)	0.047 (0.429)	0.087 (0.245)	0.107 (0.264)	0.088 (0.414)	0.088 (0.432)	0.022 (0.658)	0.115 ** (0.046)	0.249 *** (0.001)	0.396 *** (0.000)	0.393 *** (0.000)	0.383 *** (0.001)	
CEODUAL	0.889 (0.257)	1.934 ** (0.033)	4.196 *** (0.000)	3.172 ** (0.029)	3.345 ** (0.040)	2.869 * (0.090)	1.161 (0.127)	2.498 *** (0.005)	5.682 *** (0.000)0	6.000 *** (0.000)	6.272 *** (0.000)	5.738 *** (0.001)	
INDDIR	−0.002 (0.916)	−0.004 (0.845)	−0.014 (0.583)	−0.061 * (0.059)	−0.079 ** (0.030)	−0.059 (0.117)	0.003 (0.839)	0.008 (0.677)	0.008 (0.768)	−0.035 (0.305)	−0.053 (0.165)	−0.041 (0.294)	
BOARDSIZE	0.083 (0.332)	0.062 (0.532)	0.172 (0.166)	0.087 (0.582)	0.005 (0.980)	0.011 (0.953)	0.069 (0.403)	0.045 (0.639)	0.031 (0.806)	−0.17 (0.310)	−0.301 (0.106)	−0.278 (0.143)	

Table 7. Cont.

Dependent Variable:	SURPRISE						ChgEARNINGS					
	CAR [5] (1)	CAR [0–10] (2)	CAR [0–20] (3)	CAR [0–30] (4)	CAR [0–40] (5)	CAR [0–50] (6)	CAR [0–5] (7)	CAR [0–10] (8)	CAR [0–20] (9)	CAR [0–30] (10)	CAR [0–40] (11)	CAR [0–50] (12)
Constant	−2.721 (0.336)	−2.676 (0.413)	−9.789 ** (0.017)	−3.728 (0.475)	−6.638 (0.257)	−10.411 * (0.088)	−3.954 (0.149)	−4.47 (0.160)	−13.152 *** (0.002)	−9.642 * (0.081)	−13.336 ** (0.030)	−17.281 *** (0.006)
Observations	755	755	755	755	755	755	767	767	767	767	767	767
Adjusted R <sup>2</sup>	0.054	0.111	0.395	0.474	0.466	0.467	0.071	0.12	0.339	0.383	0.386	0.411

Notes: This table reports the OLS estimation for insider trading of 6 event windows from [0–5] to [0–50] and earning proxies *SURPRISE* and *ChgEARNINGS*. The dependent variable is cumulative abnormal return *CAR [event period]*. *SURPRISE* is earning surprise, defined as the difference between actual and expected earnings divided by actual earnings. The change in earnings *ChgEARNING* is the change between earnings per share for year *t* and year *t* – 1 divided by earnings per share year *t* – 1. *CEOGAP*<sub>–1</sub> is the CEO gap ratio of year *t* – 1, measured as the difference between the total CEO pay and the mean of other four executives’ pay divided by the total pay of the top five executives; *CEOGAP*<sub>–1</sub>\**SURPRISE* is the interactive variable between *CEOGAP*<sub>–1</sub> and *SURPRISE*; *CEOGAP*<sub>–1</sub>\**ChgEARNINGS* is the interactive variable between *CEOGAP*<sub>–1</sub> and *ChgEARNINGS*; *ACCRUALS* is the measure of abnormal accrual using a modified version of the Jones (1991) model. Insiders’ trading volume *LnBUY* is the natural logarithm of the buying volumes made by insiders. *OCFPS* is operating cash flow per share. *FIRMSIZE* is defined as the natural logarithm of total market capitalization. Market-to-book value *MB* is defined as the book value divided by the total market capitalization of a stock. *LnMB* is the natural logarithm of *MB*. Financial leverage *LEVERAGE*<sub>–1</sub> is the ratio of total debt over total assets in the previous year. Return volatility of a stock *RETVOL* is the standard deviation of daily stock returns computed over trading days [–250, –126] relative to the insider trading day. The change in standard deviation  $\Delta\_RETVOL$  equals the standard deviation of the firm’s daily stock returns computed over trading days [–125, –1] relative to the insider trading day minus *RETVOL*. CEO’s tenure *CEOTENURE* is the number of years that a CEO has been at the helm of a firm. A dummy variable *CEODUAL* equals to one if CEO holds the position of the chairman of the board; otherwise, it equals zero. Percentage of independent directors *INDDIR* is the number of independent directors divided by the total number of members of the board. *BOARDSIZE* is the total number of members of the board. The *p*-values are shown below the estimates in parentheses ().\* *p* < 0.1; \*\* *p* < 0.05; \*\*\* *p* < 0.01.

The results for the managerial variables in Table 7 show that board size does not have a statistically significant impact on insider returns, while CEO/chairman duality, CEO tenure, and the presence of independent directors do show significant relationships. The positive relationship between *CEOTENURE* and *CARs* suggests that CEOs with longer tenures have a deeper understanding of the company and its future prospects. Their experience and knowledge allow them to make more informed decisions when purchasing company stock, leading to higher returns for insiders involved in these transactions. *CEODUAL* has a positive and significant effect on *CARs* in most columns, except for columns (1) and (7), indicating that firms with combined CEO and chairman roles experienced higher insider returns. This aligns with Ryan and Wiggins (2001), suggesting that dominant CEOs may prioritize personal agendas, motivating non-CEO executives to seek alternative income sources, including insider trading. The coefficients of *INDDIR* are significantly negative for the event periods [0–30] and [0–40], indicating that an increase of one independent director within a firm resulted in a decrease of 0.06% and 0.08% in insider buying returns in columns (3) and (4), respectively. This aligns with the findings of Hermalin and Weisbach (2003), suggesting that the presence of independent directors can impact the behavior and decisions of corporate insiders.

The control variables in Table 7 are consistent with our findings in Table 5. We find a positive and significant association between *ACCRUALS* and *CARs* in multiple columns (2), (3), (8), (9), (10), and (12). This supports previous studies by Aboudy et al. (2005), Sawicki and Shrestha (2012), and Chowdhury et al. (2017), which suggest that insiders engage in earnings management to benefit from their stock trading activities. *LnBUY* exhibits a positive and significant relationship with *CARs* in columns (3) to (6) and (9) to (12). This implies that larger volume stock purchases by insiders influence outsiders to imitate their trades, leading to increased stock market prices and improved insider abnormal returns. These findings align with Bettis et al. (1997), who suggest that outsiders can achieve significant abnormal returns by replicating insider trades. We also find a negative and significant relationship between *OCFPS<sub>-1</sub>* and *CARs* in columns (3) to (5) and (9) to (12). Insiders in firms with declining cash flows tend to achieve higher returns from their insider purchases. This negative relationship can be explained by factors outlined in the discussion of Table 5, including information advantage, undervaluation, and contrarian investing. Insiders leverage their non-public information to strategically time their purchases, anticipating recoveries or positive developments not yet reflected in the stock price. They may also take advantage of lower stock prices resulting from declining cash flows, expecting future improvements in the company's performance. Additionally, insiders with a contrarian investment approach buy shares when others are pessimistic, anticipating a future recovery and subsequent increase in stock prices. Moreover, we find a positive association between *CARs* and *LEVERAGE<sub>-1</sub>* in all columns, indicating that companies with higher debt levels tend to generate greater insider abnormal returns. The coefficient for stock return volatility *RETVOL* exhibits a strongly positive association with cumulative abnormal returns *CARs*, from columns (3) to (12). This means that as return volatility increases, the cumulative abnormal returns generated by insider trading also increase. We also observe a negative relationship between *CARs* and  $\Delta\_RETVOL$  in all columns. A decrease in return volatility indicates a more stable and less volatile market environment, limiting the opportunities for insiders to exploit mispriced securities or market inefficiencies. Hence, the cumulative abnormal returns derived from insider trading activities may decrease. This finding is consistent with the studies of Aggarwal and Samwick (1999, 2003) and Jin (2002).

Table 8 presents results for the Sell/Bad news sample with managerial variables. The coefficients remain significant and are similar to those in Table 6, indicating no change in relationships. We observe negative and significant coefficients for insider cumulative abnormal returns (*CARs*) in relation to *SURPRISE* only in columns (2) and (4). As discussed in Table 6, several factors can explain the differences in signs and the weaker relationship compared to insider purchases in the Buy/Good news sample. Firstly, information

asymmetry may play a role. Insider sales before bad earnings news suggest that insiders possess negative information about the company's financial performance. However, this negative information may not be equally known or accessible to the general public or other market participants. As a result, the market may not fully incorporate the negative news until the official earnings announcement, leading to a weaker relationship between insider sale returns and subsequent earnings surprises. Secondly, insiders' motivation may differ between insider purchases and sales. Insider purchases before good earnings news often signal confidence in the company's prospects. Conversely, insider sales before bad earnings news can stem from various motivations, such as personal financial needs, diversification, or even pessimistic views about the company's future. These diverse motivations can dilute the relationship between insider sales and earnings surprises. Thirdly, market response also plays a role. Positive earnings surprises often trigger an immediate increase in stock price, reflecting the market's positive response. In contrast, negative earnings surprises may receive a more subdued or delayed market reaction. This difference in market response contributes to the weaker relationship between insider sales and earnings surprises when compared to insider purchases. Lastly, timing and reporting discrepancies may affect the relationship. Insiders may have more timely access to positive information, enabling them to make purchases before the news becomes public. In contrast, negative news or poor earnings may take longer to materialize or be fully realized by insiders, leading to delays in insider sales. This timing discrepancy can impact the strength of the relationship between insider transactions and subsequent earnings surprises.

The coefficients for  $CEOGAP_{-1}$  show a negative and statistically significant relationship in columns (5) and (6). Notably, when we analyze the interaction between  $CEOGAP_{-1}$  and earnings variables (*SURPRISE* and *ChgEARNINGS*) we observe that the coefficients associated with this interaction term are negative and statistically significant in columns (1), (2), (3), (4), (11), and (12). These results, consistent with our hypothesis H2, indicate that the negative and significant relationship between CEO pay gap and *CARs* magnified because of the influence of earnings surprise/change. These findings provide valuable insights into the intricate dynamics among CEO pay gap, management quality, and insider returns in the context of insider selling activities. They suggest that the CEO pay gap plays a crucial role in shaping the incentives and motivations of insiders, ultimately influencing their trading behavior and the resulting abnormal returns. Firms with a larger CEO gap ratio tend to motivate executives to strive harder to attain the CEO position, thereby enhancing the overall management quality of the firm and leading to lower insider returns (as supported by Lambert et al. 1993; Main et al. 1995; Bebchuk and Fried 2003; Kale et al. 2009, among others). Vice versa, a smaller gap between the CEO and other executives may discourage them from aspiring to the CEO position, potentially diminishing the firm's management quality. In such cases, insiders may be incentivized to exploit their informational advantages in stock sales, resulting in higher insider returns (as suggested by Inci 2012; Dai et al. 2016).

In Table 8, we observe weakly significant relationships between insider returns and managerial control variables, i.e., CEO's tenure, CEO/Chairman duality, and independent directors. These results have limited use, given that there is no strong significant association between insider returns prior to earnings announcements and the main earnings proxy variables (*SURPRISE* and *ChgEARNINGS*).

**Table 8.** Additional regression model—Sell before the Bad news disclosures.

Dependent Variable:	SURPRISE						ChgEARNINGS					
	CAR [5] (1)	CAR [0–10] (2)	CAR [0–20] (3)	CAR [0–30] (4)	CAR [0–40] (5)	CAR [0–50] (6)	CAR [0–5] (7)	CAR [0–10] (8)	CAR [0–20] (9)	CAR [0–30] (10)	CAR [0–40] (11)	CAR [0–50] (12)
SURPRISE	−0.003 (0.259)	−0.007 ** (0.021)	0.001 (0.750)	−0.012 ** (0.030)	−0.008 (0.181)	−0.006 (0.402)						
ChgEARNINGS							0.001 (0.619)	0.002 (0.328)	0.004 (0.214)	0.004 (0.202)	0.002 (0.539)	0.004 (0.433)
CEOGAP <sub>−1</sub>	−0.341 (0.692)	−1.146 (0.328)	−2.049 (0.199)	−3.221 (0.102)	−3.857 * (0.084)	−4.780 * (0.066)	−0.434 (0.591)	−1.074 (0.352)	−1.385 (0.405)	−1.566 (0.442)	−1.927 (0.386)	−2.257 (0.385)
CEOGAP <sub>−1</sub> *SURPRISE	−0.114*** (0.000)	−0.120 *** (0.007)	−0.169 *** (0.006)	−0.216 *** (0.004)	−0.083 (0.323)	−0.106 (0.280)						
CEOGAP <sub>−1</sub> *ChgEARNINGS							0.021 * (0.078)	0.004 (0.830)	−0.012 (0.639)	−0.024 (0.430)	−0.075 ** (0.025)	−0.115 *** (0.004)
ACCRUALS	−7.359*** (0.000)	−8.582 *** (0.001)	−8.167 ** (0.019)	−15.209 *** (0.000)	−17.972 *** (0.000)	−14.399 ** (0.012)	−7.336 *** (0.000)	−9.477 *** (0.000)	−8.717 ** (0.017)	−15.068 *** (0.001)	−16.776 *** (0.001)	−13.274 ** (0.020)
LnSELL	0.036 (0.462)	−0.018 (0.794)	−0.11 (0.231)	−0.269 ** (0.018)	−0.263 ** (0.041)	−0.341 ** (0.023)	−0.016 (0.738)	−0.099 (0.135)	−0.294 *** (0.003)	−0.442 *** (0.000)	−0.400 *** (0.002)	−0.499 *** (0.001)
OCFPS <sub>−1</sub>	0.015 (0.597)	0.021 (0.604)	0.062 (0.252)	0.1 (0.132)	0.134 * (0.076)	0.149 * (0.090)	0.022 (0.368)	0.02 (0.577)	0.099 * (0.053)	0.101 (0.107)	0.141 ** (0.040)	0.138 * (0.085)
FIRMSIZE	−0.216 * (0.064)	−0.491 *** (0.002)	−0.491 ** (0.024)	−0.589 ** (0.028)	−0.757 ** (0.013)	−0.737 ** (0.037)	−0.260 ** (0.018)	−0.619 *** (0.000)	−0.637 *** (0.005)	−0.657 ** (0.017)	−0.809 *** (0.007)	−0.787 ** (0.025)
LnMB	−0.26 (0.179)	−0.319 (0.224)	−0.665 * (0.063)	−0.42 (0.342)	−0.202 (0.686)	−0.693 (0.235)	−0.172 (0.333)	−0.169 (0.506)	−0.491 (0.179)	−0.183 (0.683)	−0.091 (0.852)	−0.625 (0.274)
LEVERAGE <sub>−1</sub>	0.002 (0.800)	−0.009 (0.448)	−0.004 (0.789)	−0.004 (0.830)	−0.006 (0.805)	0.01 (0.703)	−0.004 (0.632)	−0.024 ** (0.041)	−0.019 (0.280)	−0.016 (0.451)	−0.016 (0.496)	−0.003 (0.921)
RETVOL	−0.739*** (0.000)	−1.003 *** (0.000)	−1.549 *** (0.000)	−1.633 *** (0.000)	−1.512 *** (0.000)	−1.950 *** (0.000)	−0.822 *** (0.000)	−1.517 *** (0.000)	−2.443 *** (0.000)	−2.594 *** (0.000)	−2.154 *** (0.000)	−2.868 *** (0.000)
Δ_RETVOL	1.197 *** (0.000)	1.578 *** (0.000)	2.776 *** (0.000)	3.122 *** (0.000)	3.010 *** (0.000)	3.608 *** (0.000)	1.444 *** (0.000)	2.683 *** (0.000)	4.619 *** (0.000)	5.179 *** (0.000)	4.653 *** (0.000)	5.883 *** (0.000)
CEOTENURE	−0.040 * (0.068)	−0.036 (0.231)	−0.076 * (0.060)	−0.03 (0.545)	0.043 (0.451)	0.06 (0.361)	−0.036 * (0.081)	−0.029 (0.316)	−0.093 ** (0.027)	−0.037 (0.469)	0.048 (0.389)	0.055 (0.399)
CEODUAL	−0.185 (0.542)	0.075 (0.857)	−0.523 (0.351)	−0.774 (0.263)	−1.177 (0.133)	−0.917 (0.316)	−0.295 (0.293)	−0.499 (0.213)	−1.453 ** (0.012)	−1.709 ** (0.016)	−1.956 ** (0.012)	−1.684 * (0.062)
INDDIR	−0.002 (0.872)	0.012 (0.364)	0.0001 (0.996)	0.016 (0.469)	0.038 (0.119)	0.024 (0.404)	0.002 (0.816)	0.028 ** (0.022)	0.022 (0.210)	0.034 (0.122)	0.057 ** (0.017)	0.043 (0.122)
BOARDSIZE	0.065 (0.179)	0.092 (0.162)	0.14 (0.116)	0.154 (0.1620)	0.162 (0.193)	0.157 (0.280)	0.032 (0.463)	0.103 (0.103)	0.074 (0.418)	0.057 (0.611)	0.12 (0.321)	0.11 (0.436)

Table 8. Cont.

Dependent Variable:	SURPRISE						ChgEARNINGS					
	CAR [5] (1)	CAR [0–10] (2)	CAR [0–20] (3)	CAR [0–30] (4)	CAR [0–40] (5)	CAR [0–50] (6)	CAR [0–5] (7)	CAR [0–10] (8)	CAR [0–20] (9)	CAR [0–30] (10)	CAR [0–40] (11)	CAR [0–50] (12)
Constant	2.941 ** (0.047)	5.824 *** (0.004)	9.034 *** (0.001)	10.233 *** (0.003)	9.674 ** (0.012)	12.560 *** (0.005)	4.178 *** (0.003)	7.513 *** (0.000)	12.616 *** (0.000)	13.323 *** (0.000)	11.007 *** (0.005)	14.539 *** (0.002)
Observations	1201	1201	1201	1201	1201	1201	1257	1257	1257	1257	1257	1257
Adjusted R <sup>2</sup>	0.067	0.059	0.082	0.084	0.057	0.05	0.071	0.108	0.146	0.126	0.094	0.094

Notes: This table reports the OLS estimation for insider trading of 6 event windows from [0–5] to [0–50] and earning proxies *SURPRISE* and *ChgEARNINGS*. The dependent variable is cumulative abnormal return *CAR [event period]*. *SURPRISE* is earning surprise, defined as the difference between actual and expected earnings divided by actual earnings. The change in earnings *ChgEARNING* is the change between earnings per share for year *t* and year *t* – 1 divided by earnings per share year *t* – 1. *CEOGAP<sub>-1</sub>* is the CEO gap ratio of year *t* – 1, measured as the difference between the total CEO pay and the mean of other four executives’ pay divided by the total pay of the top five executives; *CEOGAP<sub>-1</sub>\*SURPRISE* is the interactive variable between *CEOGAP<sub>-1</sub>* and *SURPRISE*; *CEOGAP<sub>-1</sub>\*ChgEARNINGS* is the interactive variable between *CEOGAP<sub>-1</sub>* and *ChgEARNINGS*; *ACCRUALS* is the measure of abnormal accrual using a modified version of the Jones (1991) model. Insiders’ trading volume *LnSELL* is the natural logarithm of the buying volumes made by insiders. *OCFPS* is operating cash flow per share. *FIRMSIZE* is defined as the natural logarithm of total market capitalization. Market-to-book value *MB* is defined as the book value divided by the total market capitalization of a stock. *LnMB* is the natural logarithm of *MB*. Financial leverage *LEVERAGE<sub>-1</sub>* is the ratio of total debt over total assets in the previous year. Return volatility of a stock *RETVOL* is the standard deviation of daily stock returns computed over trading days [–250, –126] relative to the insider trading day. The change in standard deviation  $\Delta\_RETVOL$  equals the standard deviation of the firm’s daily stock returns computed over trading days [–125, –1] relative to the insider trading day minus *RETVOL*. CEO’s tenure *CEOTENURE* is the number of years that a CEO has been at the helm of a firm. A dummy variable *CEODUAL* equals to one if the CEO holds the position of the chairman of the board; otherwise, it equals zero. Percentage of independent directors *INDDIR* is the number of independent directors divided by the total number of members of the board. *BOARDSIZE* is the total number of members of the board. The *p*-values are shown below the estimates in parentheses ( ). \* *p* < 0.1; \*\* *p* < 0.05; \*\*\* *p* < 0.01.



The relationships between insider abnormal returns and the control variables in Table 8 are consistent with Table 6. First, we observe the strongly significant negative coefficients for earnings management *ACCRUALS*, indicating that insider abnormal returns from stock sales are strongly influenced by managers' earnings-management practices. Second, we find negative and significant coefficients of *LnSELL* in columns (4), (5), (6), and (9) to (12). When there is a lower level of insider trading activity (i.e., fewer shares being sold by insiders), the insiders who do engage in selling tend to achieve higher returns from those sales. The explanation could be that when insider trading volume is low, the insiders who decide to sell their shares are likely doing so based on more significant and valuable information. They may have insider knowledge about negative developments or poor future prospects of the company, leading them to strategically time their sales to maximize their returns. As a result, the limited insider selling that occurs during this period tends to generate higher-than-average returns. In contrast, when insider trading volume is high, it implies that there is a greater number of insiders selling their shares. This broader participation may dilute the impact of any particular insider's selling activity, leading to more average or lower returns. The coefficients of *FIRMSIZE* exhibit a consistent negative and significant association with *CARs* across all columns (1) to (12), which aligns with prior research (Seyhun 1986; Agrawal and Cooper 2015). This implies that larger firms tend to have lower abnormal returns for insiders in their stock sales. Notably, the impact of a stock risk on insider abnormal returns in the Sell/Bad news sample in Table 8 contrasts with the findings in the Buy/Good news sample presented in Table 7. Specifically, there is a negative coefficient for stock return volatility *RETVOL* and a positive coefficient for change in stock return volatility  $\Delta\_RETVOL$  in all columns. This suggests that insiders in firms characterized by low but increasing equity risk are more inclined to exploit earnings information to benefit from their stock sales.

Overall, the findings presented in Tables 7 and 8 are consistent with the results obtained in Tables 5 and 6, respectively. Insider returns from both purchasing and selling activities serve as meaningful indicators of firms' future earnings information with the relationship between earnings surprises and insider returns being more significant for the purchase sample. Particularly, in Table 7, a positive and significant association is revealed between the profitability of insiders' buying activities and both proxies of corporate earnings. This suggests that insiders tend to achieve higher returns when purchasing stocks in response to positive news about future earnings. In contrast, Table 8 documents a weaker negative and significant relationship between insider returns and earnings surprises.

Importantly, notable differences emerge in the relationship between the CEO pay gap and the profitability of insider trading between the Buy/Good news and Sell/Bad news transactions. The impact of the CEO pay gap on insider returns remains statistically significant when considering earnings surprise, with a stronger positive effect observed in the buy sample compared to a weaker negative effect observed in the sell sample. Moreover, when incorporating the interaction term between *SURPRISE* and *CEOGAP<sub>-1</sub>*, the effect of CEO pay gap on insider abnormal returns becomes more pronounced in both the Buy/Good news and Sell/Bad news samples.

Furthermore, when examining the impact of earnings accruals on insider trading, it is observed that insiders may manipulate earnings to align with their objectives. This suggests that more sophisticated insiders exploit earnings management strategies to enhance their trading outcomes.

Lastly, the contrasting results regarding the association between insider returns and trading volumes of insider purchases and sales indicate that insiders increase their purchase volumes when exploiting good news about firms' future earnings, while decreasing their selling volumes when capitalizing on bad news. This suggests that insiders strategically adjust their trading volumes based on their anticipation of the direction of earnings outcomes.

### 5.2. Alternative Measure of Executive Pay Disparity

It is possible that the CEO pay gap does not fully capture all available information regarding executive pay disparity. To address this concern, we use the alternative measure for executive pay disparity, CEO pay slice (*CPS*), as proposed by [Bebchuk et al. \(2011\)](#) to assess whether the results obtained from the primary models are consistent. In this section, we replicate our models in Equations (4) and (5) using the CEO pay slice in the previous year  $CPS_{-1}$ . The CEO pay slice *CPS* is defined as the ratio of the total pay of the CEO to the total compensation awarded to the top five executives. We present the results of these models in Tables 9 and 10.

The coefficients associated with CEO pay slice *CPS* in the regressions in Tables 9 and 10 have similar magnitudes as those reported for the CEO pay gap in Tables 5 and 6, respectively. This suggests that the inference drawn from the main models remains robust when considering alternative measures of executive pay disparity.

Table 9 in the Buy/Good news sample reveals several noteworthy findings. Firstly, in columns (1) to (6), the coefficients associated with *SURPRISE* in all event windows are positive and statistically significant. This indicates a strong positive relationship between earnings surprise and insider returns. Furthermore, in columns (10) and (11), the coefficients of *ChgEARNINGS* also exhibit positive and significant values.

Importantly, the analysis provides further compelling evidence of the impact of CEO pay slice on insider returns, particularly in the earnings surprise columns (2) to (6). The inclusion of the interaction term further strengthens the effect of  $CPS_{-1}$  when it interacts with earnings surprise. These results serve to reaffirm the validity of our hypothesis H1.

The effects of control variables, including *ACCRUALS*, *LnBUY*,  $OCFPS_{-1}$ , *LEVERAGE<sub>-1</sub>*, *RETVOL*, and  $\Delta\_RETVOL$ , on insider purchase returns in CEO pay slice models exhibit comparable quantitative patterns to our primary model. The relationships between these variables and insider returns remain consistent across both measures of executive pay disparity.

Table 10 displays the outcomes of the regression analysis conducted on the Sell/Bad news sample. We find negative associations between earnings surprise and insider sale returns for 10-day, 30-day, and 40-day event windows in columns (2), (4), and (5). Utilizing *ChgEARNINGS* as the predictor, we observe negative and statistically significant relationships between CEO pay slice  $CPS_{-1}$  and insider returns for 10-day, 20-day, and 30-day event windows in columns (8), (9), and (10). This finding provides further confirmation of our tournament hypothesis H2 within the context of insider selling activities.

The effects of control variables, such as *ACCRUALS*, *LnSELL*,  $OCFPS_{-1}$ , *LEVERAGE<sub>-1</sub>*, *RETVOL*, and  $\Delta\_RETVOL$ , on insider sale returns in our CEO pay slice models exhibit comparable quantitative patterns to our main model. The relationships between these variables and insider returns remain consistent using CEO pay slice as an alternative measure of executive pay disparity.

Overall, the results presented in both Tables 9 and 10 demonstrate the robustness of our findings. Regardless of whether we use CEO pay gap or CEO pay slice as the metric, the observed associations between executive pay disparity and insider returns remain consistent and significant.

**Table 9.** Alternative measure of disparity—Buy before the good news disclosures.

Dependent Variable	SURPRISE						ChgEARNINGS					
	CAR [5] (1)	CAR [0–10] (2)	CAR [0–20] (3)	CAR [0–30] (4)	CAR [0–40] (5)	CAR [0–50] (6)	CAR [0–5] (7)	CAR [0–10] (8)	CAR [0–20] (9)	CAR [0–30] (10)	CAR [0–40] (11)	CAR [0–50] (12)
SURPRISE	0.005 *	0.013 ***	0.047 ***	0.085 ***	0.091 ***	0.090 ***						
ChgEARNINGS							−0.001 (0.795)	−0.005 (0.086)	0.006 (0.126)	0.012 ** (0.020)	0.012 ** (0.034)	0.009 (0.117)
CPS_1	0.719 (0.544)	2.670 (0.052)	6.256 *** (0.000)	6.587 *** (0.004)	7.148 *** (0.005)	8.575 *** (0.002)	0.209 (0.848)	1.143 (0.369)	2.701 (0.122)	1.798 (0.445)	1.209 (0.641)	3.213 (0.228)
CPS_1*SURPRISE	0.032 (0.157)	0.113 (0.000)	0.196 *** (0.000)	0.272 *** (0.000)	0.324 *** (0.000)	0.331 *** (0.000)						
CPS_1*ChgEARNINGS							0.017 (0.360)	0.001 (0.973)	0.015 (0.633)	−0.012 (0.763)	−0.024 (0.591)	−0.032 (0.497)
ACCRUALS	1.252 (0.688)	4.969 (0.169)	9.827 ** (0.035)	13.306 ** (0.026)	7.405 (0.265)	14.041 ** (0.044)	3.028 (0.349)	6.985 * (0.065)	18.581 *** (0.000)	26.020 *** (0.000)	18.394 ** (0.017)	25.743 *** (0.002)
LnBUY	0.01 (0.876)	0.046 (0.526)	0.261 *** (0.006)	0.362 *** (0.003)	0.448 *** (0.001)	0.466 *** (0.001)	0.022 (0.720)	0.065 (0.366)	0.323 *** (0.002)	0.441 *** (0.001)	0.510 *** (0.000)	0.523 *** (0.001)
OCFPS_1	−0.025 (0.698)	−0.06 (0.424)	−0.346 *** (0.000)	−0.426 *** (0.001)	−0.394 *** (0.005)	−0.337 ** (0.020)	−0.009 (0.862)	−0.061 (0.320)	−0.077 (0.360)	−0.259 ** (0.023)	−0.385 *** (0.003)	−0.368 *** (0.005)
FIRMSIZE	0.1 (0.651)	0.034 (0.896)	0.471 (0.154)	0.305 (0.471)	0.367 (0.436)	0.529 (0.285)	0.151 (0.482)	0.134 (0.592)	0.461 (0.180)	0.452 (0.329)	0.698 (0.171)	0.883 (0.092)
LnMB	−0.113 (0.692)	−0.112 (0.736)	0.336 (0.430)	0.883 (0.106)	1.159 * (0.057)	1.484 ** (0.021)	−0.093 (0.731)	−0.039 (0.903)	0.237 (0.586)	0.725 (0.217)	0.961 (0.137)	1.357 (0.042)
LEVERAGE_1	0.042 *** (0.004)	0.052 *** (0.002)	0.067 *** (0.002)	0.044 *** (0.107)	0.049 (0.107)	0.044 (0.163)	0.042 *** (0.003)	0.047 *** (0.005)	0.061 *** (0.007)	0.036 (0.228)	0.042 (0.205)	0.035 (0.297)
RETVOL	0.33 (0.237)	0.447 (0.166)	1.269 *** (0.003)	1.684 *** (0.002)	3.122 *** (0.000)	3.821 *** (0.000)	0.655 ** (0.011)	0.932 *** (0.002)	2.618 *** (0.000)	4.673 *** (0.000)	6.288 *** (0.000)	7.117 *** (0.000)
Δ_RETVOL	−1.299 *** (0.000)	−1.754 *** (0.000)	−4.055 *** (0.000)	−4.677 *** (0.000)	−5.174 *** (0.000)	−5.972 *** (0.000)	−1.740 *** (0.000)	−2.406 *** (0.000)	−6.068 *** (0.000)	−8.647 *** (0.000)	−9.458 *** (0.000)	−10.304 *** (0.000)
Constant	−2.878 (0.251)	−3.863 (0.18)	−13.300 *** (0.000)	−13.339 *** (0.006)	−17.725 *** (0.001)	−21.678 *** (0.000)	−3.8 (0.113)	−4.977 * (0.076)	−14.392 *** (0.000)	−17.970 *** (0.001)	−23.548 *** (0.000)	−28.099 *** (0.000)
Observations	845	845	845	845	845	845	857	857	857	857	857	857
Adjusted R <sup>2</sup>	0.05	0.097	0.358	0.444	0.44	0.438	0.061	0.091	0.255	0.292	0.308	0.332

Notes: This table reports the OLS estimation for insider trading of 6 event windows from [0–5] to [0–50] and earning proxies (*SURPRISE* and *ChgEARNINGS*). The dependent variable is cumulative abnormal return *CAR* [*event period*]; *SURPRISE* is earning surprise, defined as the difference between actual and expected earnings divided by actual earnings. The change in earnings *ChgEARNING* is the change between earnings per share for year *t* and year *t* − 1 divided by earnings per share year *t* − 1. *CPS*<sub>−1</sub> is the CEO pay slice of year *t* − 1, measured as the total CEO pay to the total pay of the top five executives; *CPS*<sub>−1</sub>\**SURPRISE* is the interactive variable between *CPS*<sub>−1</sub> and *SURPRISE*; *CPS*<sub>−1</sub>\**ChgEARNINGS* is the interactive variable between *CPS*<sub>−1</sub> and *ChgEARNINGS*; *ACCRUALS* is the measure of abnormal accrual using the modified version of the Jones (1991) model. Insiders' trading volume *LnBUY* is the natural logarithm of the buying volumes made by insiders. *OCFPS* is operating cash flow per share. *FIRMSIZE* is defined as the natural logarithm of total market capitalization. Market to book value *MB* is defined as the book value divided by the total market capitalization of a stock. *LnMB* is the natural logarithm of *MB*. Financial leverage *LEVERAGE*<sub>−1</sub> is the ratio of total debt over total assets in the previous year. Return volatility of a stock *RETVOL* is the standard deviation of daily stock returns computed over trading days [−250, −126] relative to the insider trading day. The change in standard deviation Δ\_*RETVOL* equals the standard deviation of the firm's daily stock returns computed over trading days [−125, −1] relative to the insider trading day minus *RETVOL*. The *p*-values are shown below the estimates in parentheses ( ). \* *p* < 0.1; \*\* *p* < 0.05; \*\*\* *p* < 0.01.

**Table 10.** Alternative measure of disparity—Sell before the bad news disclosures.

Dependent Variable	SURPRISE						ChgEARNINGS					
	CAR [5] (1)	CAR [0–10] (2)	CAR [0–20] (3)	CAR [0–30] (4)	CAR [0–40] (5)	CAR [0–50] (6)	CAR [0–5] (7)	CAR [0–10] (8)	CAR [0–20] (9)	CAR [0–30] (10)	CAR [0–40] (11)	CAR [0–50] (12)
SURPRISE	−0.001 (0.795)	−0.005 * (0.086)	−0.006 (0.126)	−0.012 ** (0.020)	−0.012 ** (0.034)	0.009 (0.117)						
ChgEARNINGS							0.001 (0.298)	0.002 (0.307)	0.004 (0.152)	0.004 (0.183)	0.003 (0.428)	0.001 (0.819)
CPS <sub>−1</sub>	0.209 (0.848)	1.143 (0.369)	2.701 (0.122)	1.798 (0.445)	1.209 (0.641)	3.213 (0.228)	−0.169 (0.739)	−1.701 ** (0.017)	−2.689 *** (0.009)	−2.845 ** (0.024)	−1.259 (0.363)	−2.382 (0.141)
CPS <sub>−1</sub> *SURPRISE	0.017 (0.360)	0.001 (0.973)	0.015 (0.633)	−0.012 (0.763)	−0.024 (0.591)	−0.032 (0.497)						
CPS <sub>−1</sub> *ChgEARNINGS							0.014 ** (0.035)	0.006 (0.491)	−0.023 * (0.082)	−0.032 ** (0.046)	−0.035 ** (0.048)	0.044 ** (0.032)
ACCRUALS	3.028 (0.349)	6.985 * (0.065)	18.581 *** (0.000)	26.020 *** (0.000)	18.394 ** (0.017)	25.743 *** (0.002)	−7.166 *** (0.000)	−9.291 *** (0.000)	−10.472 *** (0.004)	−15.493 *** (0.000)	−16.949 *** (0.000)	−12.816 ** (0.023)
LnSELL	0.022 (0.720)	0.065 (0.366)	0.323 *** (0.002)	0.441 *** (0.001)	0.510 *** (0.000)	0.523 *** (0.001)	−0.035 (0.426)	−0.143 ** (0.022)	−0.371 *** (0.000)	−0.508 *** (0.000)	−0.457 *** (0.000)	−0.540 *** (0.000)
OCFPS <sub>−1</sub>	−0.009 (0.862)	−0.061 (0.320)	−0.077 (0.360)	−0.259 ** (0.023)	−0.385 *** (0.003)	−0.368 *** (0.005)	−0.004 (0.896)	−0.034 (0.453)	−0.133 ** (0.044)	−0.177 ** (0.029)	−0.191 ** (0.032)	−0.141 (0.173)
FIRMSIZE	0.151 (0.482)	0.134 (0.592)	0.461 (0.180)	0.452 (0.329)	0.698 (0.171)	0.883 (0.092)	* (0.215)	** (−0.515)	** (−0.482)	** (−0.448)	* (−0.457)	−0.43 (0.151)
LnMB	−0.093 (0.731)	−0.039 (0.903)	0.237 (0.586)	0.725 (0.217)	0.961 (0.137)	1.357 ** (0.042)	−0.171 (0.277)	−0.127 (0.568)	−0.251 (0.434)	0.049 (0.901)	0.369 (0.393)	−0.225 (0.656)
LEVERAGE <sub>−1</sub>	0.042 *** (0.003)	0.047 *** (0.005)	0.061 *** (0.007)	0.036 *** (0.228)	0.042 (0.205)	0.035 (0.297)	−0.008 (0.284)	−0.026 (0.020)	** (−0.035)	** (−0.035)	* (−0.048)	** (−0.033)
RETVOL	0.655 ** (0.011)	0.932 *** (0.002)	2.618 *** (0.000)	4.673 *** (0.000)	6.288 *** (0.000)	7.117 *** (0.000)	−0.793 *** (0.000)	−1.486 *** (0.000)	−2.531 *** (0.000)	−2.622 *** (0.000)	−2.090 *** (0.000)	−2.696 *** (0.000)
Δ_RETVOL	−1.740 *** (0.000)	−2.406 *** (0.000)	−6.068 *** (0.000)	−8.647 *** (0.000)	−9.458 *** (0.000)	−10.304 *** (0.000)	1.311 *** (0.000)	2.503 *** (0.000)	4.281 *** (0.000)	4.692 *** (0.000)	3.945 *** (0.000)	4.905 *** (0.000)
Constant	−3.8 (0.113)	−4.977 * (0.076)	−14.392 *** (0.000)	−17.970 *** (0.001)	−23.548 *** (0.000)	−28.099 *** (0.000)	4.248 *** (0.000)	10.689 *** (0.000)	15.259 *** (0.000)	16.403 *** (0.000)	14.826 *** (0.000)	17.284 *** (0.000)
Observations	857	857	857	857	857	857	1395	1395	1395	1395	1395	1395
Adjusted R <sup>2</sup>	0.061	0.091	0.255	0.292	0.308	0.332	0.054	0.09	0.121	0.104	0.066	0.068

Notes: This table reports the OLS estimation for insider trading of 6 event windows from [0–5] to [0–50] and earning proxies *SURPRISE* and *ChgEARNINGS*. The dependent variable is cumulative abnormal return *CAR [event period]*. *SURPRISE* is earning surprise, defined as the difference between actual and expected earnings divided by actual earnings. The change in earnings *ChgEARNING* is the change between earnings per share for year *t* and year *t* − 1 divided by earnings per share year *t* − 1. *CPS<sub>−1</sub>* is the CEO pay slice *CPS* of year *t* − 1, measured as the total CEO pay to the total pay of the top five executives; *CPS<sub>−1</sub>\*SURPRISE* is the interactive variable between *CPS<sub>−1</sub>* and *SURPRISE*; *CPS<sub>−1</sub>\*ChgEARNINGS* is the interactive variable between *CPS<sub>−1</sub>* and *ChgEARNINGS*; *ACCRUALS* is the measure of abnormal accrual using the modified version of the Jones (1991) model. Insiders' trading volume *LnSELL* is the natural logarithm of the selling volumes made by insiders. *OCFPS* is operating cash flow per share. *FIRMSIZE* is defined as the natural logarithm of total market capitalization. Market to book value *MB* is defined as the book value divided by the total market capitalization of a stock. *LnMB* is the natural logarithm of *MB*. Financial leverage *LEVERAGE<sub>−1</sub>* is the ratio of total debt over total assets in the previous year. Return volatility of a stock *RETVOL* is the standard deviation of daily stock returns computed over trading days [−250, −126] relative to the insider trading day. The change in standard deviation *Δ\_RETVOL* equals the standard deviation of the firm's daily stock returns computed over trading days [−125, −1] relative to the insider trading day minus *RETVOL*. The *p*-values are shown below the estimates in parentheses (\* *p* < 0.1; \*\* *p* < 0.05; \*\*\* *p* < 0.01).

### 5.3. CEO Pay Slice with Additional Managerial Variables

To ensure the reliability of our findings, we conduct robustness checks using CEO pay slice  $CPS_{-1}$  along with additional managerial determinants of corporate insider returns such as the CEO's tenure,  $CEOTENURE$ , CEO duality,  $CEODUAL$ , the number of independent directors,  $INDDIR$ , and board size,  $BOARDSIZE$ . The results from the Buy/Good news sample, as presented in Table 11, align with our expectations. Consistent with literature, we find a positive and significant relationship between earnings surprise and insider trading in columns (2) to (5). Furthermore, the coefficients of CEO pay slice  $CPS_{-1}$  exhibit a positive relationship with insider returns for columns (3), (4), and (5), i.e., the 20-day, 30-day, and 40-day event windows, with statistical significance levels at 1%, 10%, and 10%, respectively. This indicates that the CEO pay slice has a significant impact on insider returns during these time intervals. Notably, the interaction term between  $CPS_{-1}$  and earnings surprises is strongly significant in columns (2) to (5), underscoring the amplified effect of the CEO pay slice on insider purchase returns. This confirms the crucial role of earnings surprise in the connection between the CEO pay slice and insider trading within the context of insider purchase activities.

Turning our attention to the managerial variables in Table 11, CEO duality shows a positive and significant association with insider trading returns in columns (2) to (5) and (8) to (12), indicating its strong influence on insider trading behavior. Furthermore, CEO tenure has a strong and positive impact on insider purchase returns in columns (8) to (12). This suggests that longer-tenured CEOs, with their accumulated knowledge and experience, make more informed decisions when purchasing company stock, resulting in higher insider returns.

The other control variables analyzed in Table 11 exhibit similar signs and levels of significance to those reported in Table 7. These consistent findings reinforce the directional and statistical relationships identified in Table 7.

The regression results of the Sell/Bad news sample, as presented in Table 12, exhibit similarities to the findings reported in Table 8 regarding the signs and significance levels. Specifically, the results reveal negative and significant associations between earnings surprise and insider returns across the 30-day, 40-day, and 50-day event windows. Of particular importance is the identification of an incremental joint effect of earnings surprise on the relationship between CEO pay slice  $CPS_{-1}$  and insider returns in columns (1) to (7). This finding provides compelling evidence in support of our tournament hypothesis H2 in the context of insider selling activities.

The managerial and control variables in Table 12 exhibit similar signs and levels of significance to those reported in Table 8 and reinforce the directional and statistical relationships identified in Table 8.

**Table 11.** Alternative measure of disparity with addition managerial variables—Buy before the good news disclosures.

Dependent Variable:	SURPRISE						ChgEARNINGS					
	CAR [5] (1)	CAR [0–10] (2)	CAR [0–20] (3)	CAR [0–30] (4)	CAR [0–40] (5)	CAR [0–50] (6)	CAR [0–5] (7)	CAR [0–10] (8)	CAR [0–20] (9)	CAR [0–30] (10)	CAR [0–40] (11)	CAR [0–50] (12)
SURPRISE	0.005 (0.130)	0.009 ** (0.018)	0.041 *** (0.000)	0.076 *** (0.000)	0.082 *** (0.000)	0.005 (0.130)						
ChgEARNINGS							−0.000 (0.990)	−0.005 * (0.074)	0.004 (0.346)	0.008 (0.136)	0.007 (0.240)	0.004 (0.471)
CPS <sub>−1</sub>	0.201 (0.880)	1.868 (0.223)	5.131 *** (0.008)	4.686 * (0.057)	5.096 * (0.063)	0.201 (0.880)	−0.17 (0.890)	0.821 (0.564)	2.423 (0.194)	0.803 (0.746)	−0.088 (0.975)	2.532 (0.369)
CPS <sub>−1</sub> *SURPRISE	0.026 (0.267)	0.099 *** (0.000)	0.182 *** (0.000)	0.263 *** (0.000)	0.318 *** (0.000)	0.026 (0.267)						
CPS <sub>−1</sub> *ChgEARNINGS							0.016 (0.412)	−0.001 (0.980)	0.006 (0.851)	−0.034 (0.400)	−0.047 (0.289)	−0.049 (0.286)
ACCRUALS	2.516 (0.455)	5.552 (0.154)	10.269 ** (0.036)	5.088 (0.415)	−1.417 (0.839)	2.516 (0.455)	3.666 (0.273)	6.938 * (0.074)	13.546 *** (0.008)	11.390 * (0.092)	5.392 (0.472)	13.728 * (0.074)
LnBUY	0.025 (0.709)	0.058 (0.456)	0.301 *** (0.002)	0.353 *** (0.005)	0.452 *** (0.002)	0.025 (0.709)	0.03 (0.651)	0.065 (0.390)	0.298 *** (0.003)	0.355 *** (0.008)	0.443 *** (0.003)	0.420 *** (0.006)
OCFPS <sub>−1</sub>	−0.056 (0.428)	−0.083 (0.310)	−0.402 *** (0.000)	−0.415 *** (0.002)	−0.381 *** (0.010)	−0.056 (0.428)	−0.057 (0.345)	−0.078 (0.262)	−0.330 *** (0.000)	−0.412 *** (0.001)	−0.377 *** (0.006)	−0.338 ** (0.014)
FIRMSIZE	−0.036 (0.895)	−0.146 (0.643)	0.01 (0.980)	−0.499 (0.323)	−0.344 (0.541)	−0.036 (0.895)	0.025 (0.923)	−0.056 (0.853)	0.183 (0.643)	−0.155 (0.767)	0.121 (0.836)	0.132 (0.825)
LnMB	−0.102 (0.749)	−0.155 (0.673)	0.295 (0.522)	0.869 (0.141)	1.102 * (0.094)	−0.102 (0.749)	−0.084 (0.777)	−0.078 (0.823)	0.192 (0.672)	0.604 (0.316)	0.745 (0.266)	1.175 * (0.086)
LEVERAGE <sub>−1</sub>	0.041 *** (0.009)	0.048 *** (0.008)	0.063 *** (0.006)	0.077 *** (0.008)	0.085 *** (0.009)	0.041 *** (0.009)	0.041 *** (0.007)	0.041 *** (0.019)	0.056 ** (0.015)	0.066 ** (0.031)	0.073 ** (0.032)	0.069 ** (0.047)
RETVOL	0.187 (0.545)	0.285 (0.424)	0.886 ** (0.048)	1.458 ** (0.011)	2.936 *** (0.000)	0.187 (0.545)	0.525 * (0.063)	0.668 ** (0.041)	2.174 *** (0.000)	4.088 *** (0.000)	5.685 *** (0.000)	6.548 *** (0.000)
Δ_RETVOL	−1.322 *** (0.000)	−1.886 *** (0.000)	−4.149 *** (0.000)	−5.017 *** (0.000)	−5.364 *** (0.000)	−1.322 *** (0.0001)	−1.797 *** (0.000)	−2.403 *** (0.000)	−6.000 *** (0.000)	−8.689 *** (0.000)	−9.382 *** (0.000)	−10.526 *** (0.000)
CEOTENURE	−0.002 (0.973)	0.051 (0.388)	0.095 (0.203)	0.119 (0.211)	0.087 (0.411)	−0.002 (0.973)	0.022 (0.649)	0.115 ** (0.043)	0.255 *** (0.001)	0.395 *** (0.000)	0.392 *** (0.000)	0.392 *** (0.000)
CEODUAL	0.872 (0.261)	2.086 ** (0.021)	4.168 *** (0.000)	3.565 ** (0.014)	3.869 ** (0.016)	0.872 (0.261)	1.032 (0.171)	2.363 *** (0.007)	5.270 *** (0.000)	5.838 *** (0.000)	6.279 *** (0.000)	5.360 *** (0.002)
INDDIR	0.002 (0.895)	0.005 (0.787)	0.01 (0.681)	−0.031 (0.329)	−0.047 (0.185)	0.002 (0.895)	0.006 (0.740)	0.012 (0.532)	0.023 (0.377)	−0.023 (0.498)	−0.04 (0.288)	−0.017 (0.657)
BOARDSIZE	0.099 (0.244)	0.072 (0.461)	0.208 * (0.091)	0.145 (0.355)	0.077 (0.660)	0.099 (0.244)	0.08 (0.329)	0.047 (0.618)	0.056 (0.652)	−0.127 (0.442)	−0.245 (0.182)	−0.212 (0.258)

Table 11. Cont.

Dependent Variable:	SURPRISE						ChgEARNINGS					
	CAR [5] (1)	CAR [0–10] (2)	CAR [0–20] (3)	CAR [0–30] (4)	CAR [0–40] (5)	CAR [0–50] (6)	CAR [0–5] (7)	CAR [0–10] (8)	CAR [0–20] (9)	CAR [0–30] (10)	CAR [0–40] (11)	CAR [0–50] (12)
Constant	−2.544 (0.391)	−3.208 (0.349)	−12.054 *** (0.006)	−5.359 (0.330)	−8.624 (0.160)	−2.544 (0.391)	−3.737 (0.192)	−4.751 (0.152)	−14.490 *** (0.001)	−9.890 * (0.087)	−13.278 *** (0.039)	−18.384 *** (0.006)
Observations	766	766	766	766	766	766	779	779	779	779	779	779
Adjusted R <sup>2</sup>	0.052	0.109	0.394	0.47	0.467	0.052	0.066	0.116	0.334	0.379	0.383	0.406

Notes: This table reports the OLS estimation for insider trading of 6 event windows from [0–5] to [0–50] and earning proxies *SURPRISE* and *ChgEARNINGS*. The dependent variable is cumulative abnormal return *CAR* [event period]. *SURPRISE* is earning surprise, defined as the difference between actual and expected earnings divided by actual earnings. The change in earnings *ChgEARNING* is the change between earnings per share for year *t* and year *t* – 1 divided by earnings per share year *t* – 1. *CPS*<sub>–1</sub> is the CEO pay slice of year *t* – 1, measured as the total CEO pay to the total pay of the top five executives; *CPS*<sub>–1</sub>\**SURPRISE* is the interactive variable between *CPS*<sub>–1</sub> and *SURPRISE*; *CPS*<sub>–1</sub>\**ChgEARNINGS* is the interactive variable between *CPS*<sub>–1</sub> and *ChgEARNINGS*; *ACCRUALS* is the measure of abnormal accrual using the modified version of the Jones (1991) model. Insiders’ trading volume *LnBUY* is the natural logarithm of the buying volumes made by insiders. *OCFPS* is operating cash flow per share. *FIRMSIZE* is defined as the natural logarithm of total market capitalization. Market to book value *MB* is defined as the book value divided by the total market capitalization of a stock. *LnMB* is the natural logarithm of *MB*. Financial leverage *LEVERAGE*<sub>–1</sub> is the ratio of total debt over total assets in the previous year. Return volatility of a stock *RETVOL* is the standard deviation of daily stock returns computed over trading days [–250, –126] relative to the insider trading day. The change in standard deviation  $\Delta\_RETVOL$  equals the standard deviation of the firm’s daily stock returns computed over trading days [–125, –1] relative to the insider trading day minus *RETVOL*. CEO’s tenure *CEOTENURE* is the number of years that a CEO has been at the helm of a firm. A dummy variable *CEODUAL* equals to one if the CEO holds the position of the chairman of the board; otherwise, it equals zero. Percentage of independent directors *INDDIR* is the number of independent directors divided by the total number of members of the board. *BOARDSIZE* is the total number of members of the board. The *p*-values are shown below the estimates in parentheses ( ). \* *p* < 0.1; \*\* *p* < 0.05; \*\*\* *p* < 0.01.

Table 12. Alternative measure of disparity with addition managerial variables—Sell before the bad news disclosures.

Dependent Variable:	SURPRISE						ChgEARNINGS					
	CAR [5] (1)	CAR [0–10] (2)	CAR [0–20] (3)	CAR [0–30] (4)	CAR [0–40] (5)	CAR [0–50] (6)	CAR [0–5] (7)	CAR [0–10] (8)	CAR [0–20] (9)	CAR [0–30] (10)	CAR [0–40] (11)	CAR [0–50] (12)
SURPRISE	−0.003 (0.289)	0.002 (0.610)	−0.006 (0.209)	−0.023 *** (0.000)	−0.018 ** (0.016)	−0.014 * (0.091)						
ChgEARNINGS							0.001 (0.391)	0.002 (0.325)	0.004 (0.133)	0.005 (0.169)	0.002 (0.547)	0.003 (0.537)
CPS <sub>–1</sub>	0.31 (0.646)	−0.711 (0.441)	−0.697 (0.577)	−0.262 (0.866)	1.95 (0.265)	1.234 (0.547)	0.133 (0.832)	−0.803 (0.371)	−0.968 (0.453)	0.444 (0.779)	2.306 (0.183)	1.378 (0.497)
CPS <sub>–1</sub> *SURPRISE	−0.089 *** (0.001)	−0.085 ** (0.017)	−0.128 *** (0.009)	−0.197 *** (0.001)	−0.170 ** (0.012)	−0.148 * (0.062)						
CPS <sub>–1</sub> *ChgEARNINGS							0.022 ** (0.012)	0.004 (0.743)	0.012 (0.484)	0.021 (0.345)	0.02 (0.403)	0.001 (0.959)
ACCRUALS	−7.644 *** (0.000)	−8.890 *** (0.001)	−8.838 ** (0.012)	−16.070 *** (0.000)	−18.910 *** (0.000)	−15.516 *** (0.007)	−7.307 *** (0.000)	−9.701 *** (0.000)	−9.132 ** (0.013)	−15.614 *** (0.001)	−17.691 *** (0.000)	−14.510 ** (0.013)

Table 12. Cont.

Dependent Variable:	SURPRISE						ChgEARNINGS														
	CAR [5] (1)	CAR [0–10] (2)	CAR [0–20] (3)	CAR [0–30] (4)	CAR [0–40] (5)	CAR [0–50] (6)	CAR [0–5] (7)	CAR [0–10] (8)	CAR [0–20] (9)	CAR [0–30] (10)	CAR [0–40] (11)	CAR [0–50] (12)									
LnSELL	0.035 (0.479)	−0.022 (0.748)	−0.108 (0.240)	−0.263 (0.021)	** (0.069)	−0.234 (0.037)	*	−0.314 (0.768)	**	−0.014 (0.111)	−0.106 (0.002)	−0.298 (0.037)	***	−0.434 (0.000)	***	−0.390 (0.003)	***	−0.503 (0.001)	***		
OCFPS <sub>−1</sub>	0.004 (0.882)	0.011 (0.783)	0.047 (0.389)	0.077 (0.251)	0.117 (0.125)	0.137 (0.125)	0.028 (0.265)	0.021 (0.554)	0.101 (0.051)	*	0.104 (0.099)	*	0.146 (0.035)	**	0.139 (0.088)	*					
FIRMSIZE	−0.121 (0.298)	−0.405 (0.011)	** (0.178)	−0.289 (0.285)	−0.283 (0.358)	−0.276 (0.460)	−0.26 (0.042)	−0.221 (0.042)	**	−0.567 (0.000)	***	−0.513 (0.022)	**	−0.444 (0.103)	−0.423 (0.157)	−0.399 (0.255)					
LnMB	−0.252 (0.195)	−0.281 (0.290)	−0.629 (0.081)	* (0.344)	−0.42 (0.613)	−0.254 (0.228)	−0.709 (0.249)	−0.204 (0.542)	−0.155 (0.217)	−0.45 (0.765)	−0.133 (0.972)	−0.018 (0.972)	−0.464 (0.418)								
LEVERAGE <sub>−1</sub>	−0.004 (0.673)	−0.015 (0.207)	−0.015 (0.342)	−0.02 (0.323)	−0.024 (0.297)	−0.008 (0.752)	−0.006 (0.502)	−0.028 (0.023)	**	−0.025 (0.155)	−0.025 (0.239)	−0.029 (0.207)	−0.018 (0.508)								
RETVOL	−0.706 (0.000)	*** (0.000)	−0.971 (0.000)	*** (0.000)	−1.505 (0.000)	*** (0.000)	−1.555 (0.000)	*** (0.000)	−1.328 (0.000)	*** (0.000)	−1.778 (0.000)	*** (0.000)	−0.801 (0.000)	***	−1.493 (0.000)	***	−2.418 (0.000)	***	−2.528 (0.000)	***	
Δ_RETVOL	1.169 (0.000)	*** (0.000)	1.548 (0.000)	*** (0.000)	2.725 (0.000)	*** (0.000)	3.069 (0.000)	*** (0.000)	2.796 (0.000)	*** (0.000)	3.408 (0.000)	*** (0.000)	1.422 (0.000)	***	2.652 (0.000)	***	4.534 (0.000)	***	5.062 (0.000)	***	
CEOTENURE	−0.039 (0.079)	* (0.177)	−0.041 (0.061)	* (0.659)	−0.078 (0.659)	−0.023 (0.318)	0.058 (0.297)	0.071 (0.051)	−0.041 (0.051)	*	−0.039 (0.192)	−0.105 (0.014)	** (0.425)	−0.042 (0.366)	0.052 (0.366)	0.055 (0.412)					
CEODUAL	−0.256 (0.396)	0.028 (0.946)	−0.692 (0.216)	−1.03 (0.136)	−1.03 (0.030)	−1.707 (0.116)	** (0.030)	−1.437 (0.274)	−0.306 (0.200)	−0.515 (0.200)	−0.515 (0.008)	−1.539 (0.008)	*** (0.008)	−1.895 (0.008)	*** (0.008)	−2.373 (0.003)	*** (0.003)	−2.110 (0.021)	** (0.021)		
INDDIR	0.0004 (0.968)	0.009 (0.490)	−0.005 (0.782)	0.011 (0.583)	0.033 (0.161)	0.013 (0.631)	−0.0001 (0.987)	0.021 (0.073)	*	0.01 (0.564)	0.021 (0.293)	0.021 (0.293)	0.042 (0.061)	*	0.023 (0.386)						
BOARDSIZE	0.045 (0.336)	0.066 (0.300)	0.085 (0.322)	0.077 (0.466)	0.049 (0.685)	0.028 (0.844)	0.085 (0.844)	0.03 (0.483)	0.086 (0.164)	0.035 (0.692)	−0.012 (0.912)	−0.008 (0.946)	−0.034 (0.806)								
Constant	1.988 (0.221)	5.777 (0.010)	*** (0.007)	8.155 (0.007)	*** (0.030)	8.079 (0.030)	** (0.252)	4.831 (0.252)	*	8.557 (0.083)	** (0.012)	8.103 (0.000)	*** (0.000)	13.213 (0.000)	*** (0.000)	12.518 (0.002)	*** (0.002)	8.464 (0.046)	** (0.046)	13.084 (0.009)	*** (0.009)
Observations	1185	1185	1185	1185	1185	1185	1185	1240	1240	1240	1240	1240	1240	1240	1240	1240	1240	1240	1240	1240	
Adjusted R <sup>2</sup>	0.065	0.055	0.078	0.083	0.058	0.046	0.072	0.107	0.146	0.124	0.09	0.084									

Notes: This table reports the OLS estimation for insider trading of 6 event windows from [0–5] to [0–50] and earning proxies SURPRISE and ChgEARNINGS. The dependent variable is cumulative abnormal return CAR [event period]; SURPRISE is earning surprise, defined as the difference between actual and expected earnings divided by actual earnings. The change in earnings ChgEARNING is the change between earnings per share for year  $t$  and year  $t - 1$  divided by earnings per share year  $t - 1$ . CPS<sub>−1</sub> is the CEO pay slice of year  $t - 1$ , measured as the total CEO pay to the total pay of the top five executives; CPS<sub>−1</sub>\*SURPRISE is the interactive variable between CPS<sub>−1</sub> and SURPRISE; CPS<sub>−1</sub>\*ChgEARNINGS is the interactive variable between CPS<sub>−1</sub> and ChgEARNINGS; ACCRUALS is the measure of abnormal accrual using the modified version of the Jones (1991) model. Insiders' trading volume LnSELL is the natural logarithm of the selling volumes made by insiders. OCFPS is operating cash flow per share. FIRMSIZE is defined as the natural logarithm of total market capitalization. Market to book value MB is defined as the book value divided by the total market capitalization of a stock. LnMB is the natural logarithm of MB. Financial leverage LEVERAGE<sub>−1</sub> is the ratio of total debt over total assets in the previous year. Return volatility of a stock RETVOL is the standard deviation of daily stock returns computed over trading days [−250, −126] relative to the insider trading day. The change in standard deviation Δ\_RETVOL equals the standard deviation of the firm's daily stock returns computed over trading days [−125, −1] relative to the insider trading day minus RETVOL. CEO's tenure CEOTENURE is the number of years that a CEO has been at the helm of a firm. A dummy variable CEODUAL equals to one if the CEO holds the position of the chairman of the board; otherwise, it equals zero. Percentage of independent directors INDDIR is the number of independent directors divided by the total number of members of the board. BOARDSIZE is the total number of members of the board. The  $p$ -values are shown below the estimates in parentheses (). \*  $p < 0.1$ ; \*\*  $p < 0.05$ ; \*\*\*  $p < 0.01$ .



## 6. Conclusions

This research aims to explore the connection between executive pay disparity and insider trading returns prior to corporate earnings disclosures. Previous studies have suggested that insider trades convey private information and act as signals for firm value. In this study, we specifically examine the influence of the executive pay disparity on abnormal returns generated from insider purchases before both good and bad earnings news.

Our study analyzes earnings announcements from 2008 to 2019 for the 340 largest non-financial firms listed on major indices in eight developed markets: US (DJIA), UK (FTSE100), Australia (ASX50), Canada (TSX60), Germany (DAX), France (CAC40), Belgium (BEL20), and the Netherlands (AEX). These markets have robust corporate governance frameworks and investor protection measures, such as the Sarbanes-Oxley Act. The selected firms represent 60.75% of the total market capitalization in these countries. We chose to begin our study in 2008 because it provided comprehensive and consistent data, and it was a significant year for insider transactions. The 2008 financial crisis prompted increased scrutiny and tighter regulations on insider behavior and disclosure requirements.

Our results provide contrasting evidence regarding the relationship between executive pay disparity and insider abnormal returns prior to earnings disclosures. The impact of executive pay disparity on the profitability of insider trading varies depending on the type of transaction, whether it is a purchase before good earnings news or a sale before bad earnings news.

On the one hand, we find evidence of a significant positive association between executive pay disparity and insider cumulative abnormal returns from insider purchases before good earnings news. From a managerial power perspective, the positive impacts of executive pay disparity on insider purchase returns can be attributed to several factors. Firstly, a large executive pay disparity signifies a significant power and compensation difference within the organization. Insiders, particularly CEOs, have access to superior information and are more likely to exploit it through insider purchases, capitalizing on positive earnings news. Secondly, firms with a larger executive pay disparity often face higher CEO entrenchment and succession risk, leading insiders to strategically time their purchases with positive earnings news, anticipating a brighter future. This alignment between insider purchases, executive pay disparity, and good earnings news contributes to higher returns. Additionally, a larger executive pay disparity signals a skilled and experienced CEO, increasing investor confidence and attracting more investors, driving up insider purchase returns. Lastly, a large executive pay disparity may enable CEOs to act opportunistically and exploit good earnings news for personal gain through insider purchases, resulting in higher returns.

Conversely, our analysis of insider sales before bad earnings news reveals a significant negative relationship between executive pay disparity and insider abnormal returns. From a tournament hypothesis perspective, the negative impacts of executive pay disparity on insider sale returns can be explained by several factors. Firstly, a high executive pay disparity indicates concentrated power and control, making it harder for insiders, including the CEO, to engage in opportunistic behavior like selling stocks based on inside information. This deters insiders in firms with a high executive pay disparity from exploiting bad earnings news through insider sales. Secondly, firms with large executive pay disparities tend to have stronger corporate governance practices and stricter regulatory oversight. This discourages insiders from engaging in fraudulent or manipulative practices, resulting in lower insider sale returns. Thirdly, a high executive pay disparity suggests lower succession risk and greater alignment of the CEO's interests with the company's long-term success. Insiders, including the CEO, are more likely to hold onto their shares, anticipating improved future performance in the longer term, which reduces insider selling activity and lowers sale returns. In summary, according to the tournament hypothesis, the negative impacts of executive pay disparity on insider sale returns indicate that firms with greater executive pay disparity discourage opportunistic behavior and the exploitation of negative news through insider sales.

We also find that insider purchases before good news exhibit a strong positive relationship between insider returns and earnings surprises, whereas insider sales before bad news demonstrate a weaker negative relationship between insider returns and earnings surprises. Several factors contribute to the contrasting and weaker relationship between insider sale returns before bad news and insider purchase returns before good news. First, information asymmetry arises because insiders possess negative information that may not be widely known, delaying the market's incorporation of the negative news. Second, different motivations drive insider purchases (confidence in company prospects) and sales (financial needs, diversification, pessimistic views), diluting the relationship. Third, the market response may differ, with positive surprises yielding immediate stock price increases, while negative surprises receive a more subdued or delayed reaction. Lastly, timing and reporting discrepancies occur as insiders have timely access to positive information, enabling pre-public purchases, whereas negative news may take longer to materialize, resulting in delayed sales.

In addition, as we explore the impacts of other control variables on insider abnormal returns, we find that the trading volume of insiders' purchases is positively related to insider purchase abnormal returns. This is likely indicating that larger stock volume purchases can influence outsiders to imitate the trades, leading to increased stock prices and improved insider returns. Conversely, a decrease in insider trading volume is associated with higher insider returns from sales transactions. Insiders tend to sell more during periods of low trading volume, leveraging their valuable information to maximize returns. Strategic timing of sales allows insiders to take advantage of their insights and achieve higher returns compared to average market conditions. During periods of low trading volume, the impact of each individual's selling becomes more significant, attracting attention and potentially signaling stronger conviction, resulting in higher returns. Conversely, higher insider trading volume, reflecting broader selling participation, dilutes the impact of specific insider sales, leading to more average or lower returns. Increased selling activity during high trading volume may also involve insiders selling for reasons unrelated to private information.

Furthermore, we find that higher stock return volatility is associated with higher insider purchase returns, while a negative relationship exists between insider purchase returns and the change in stock return volatility. This can be explained as follows: Firstly, a decrease in return volatility indicates a more stable and less volatile market, limiting opportunities for insiders to exploit mispriced securities or market inefficiencies. Secondly, insiders are less successful in generating abnormal returns when market conditions become more predictable or when uncertainty levels decrease. Conversely, we observe that high stock return volatility is associated with lower insider sale returns, and there is a positive relationship between insider sale returns and the change in stock return volatility. This suggests that insiders in firms with low but increasing equity risk are more inclined to exploit earnings information to benefit from their stock sales.

In our robustness tests, we incorporate corporate governance-related variables to account for the influence of other managerial characteristics on executive pay disparity, and utilize the CEO pay slice as an alternative measure of executive pay disparity. The coefficients in our robustness models maintain the same sign, statistical significance, and similar magnitude as those in our main results.

We believe we are the first to provide evidence of the relationship between executive pay disparity and insider trading prior to corporate earnings disclosures. Our results are consistent with the arguments of [Bebchuk et al. \(2011\)](#) and [Kale et al. \(2009\)](#). In particular, [Bebchuk et al. \(2011\)](#) show that a large degree of executive pay disparity suggests the high entrenchment of an incumbent CEO, weakening the board. We complement their study by showing that insiders are more likely to exploit optimistic future earnings news for their purchases before the good news disclosure in firms with high pay disparity. In contrast, [Kale et al. \(2009\)](#) and [Ali and Hirshleifer \(2017\)](#) argue that a high executive pay disparity represents a larger incentive for other executives competing for the CEO position

to leave the board, improving overall board quality and reducing opportunism. We find a negative relationship between executive pay disparity and insider sale returns before the bad earnings news disclosure, that is higher pay decreases insider returns.

In addition to the theoretical contributions, we believe that this study offers several practical implications for corporate governance, policymakers, and investors. Understanding the link between executive pay disparity and insider trading returns provides actionable insights for companies wishing to refine executive compensation structures. Specifically, companies can mitigate potential conflicts of interest and reduce the risk of opportunistic insider trading by aligning compensation practices more closely with long-term shareholder value. For policymakers and regulators, the findings underscore the need to develop regulatory frameworks that promote fairness and transparency in executive compensation. Such frameworks could help enhance market integrity and reduce imbalances that might lead to unfair trading advantages. Lastly, investors too can benefit by using executive pay disparity as a signal of insider behavior that may influence stock performance. By recognizing these dynamics, investors can make more informed strategic investment decisions, particularly by excluding firms where compensation inequality might indicate potential insider trading risk. These practical insights have the potential to improve decision-making across various domains, ultimately fostering more stable and transparent financial markets.

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