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We find that firms with insider sales executed under Rule 10b5-1 plans exhibit a higher likelihood of meeting or beating analysts' earnings expectations (MBE). This relation between MBE and plan sales is more pronounced for the plan sales of chief executive officers (CEOs) and chief financial officers (CFOs) and is nonexistent for other key insiders. The market reactions to firms that successfully meet or beat expectations are relatively positive compared with their peers that fail to do so. One interpretation of our results is that CEOs and CFOs who sell under these plans may be more likely to engage in strategic behavior to meet or beat expectations in an effort to maximize their proceeds from plan sales. However, readers should exercise caution in making inferences, because the potential presence of limit order transactions makes it difficult to unambiguously determine the direction of causality of the relation we document.

Key words: insider trading; meet or beat expectations; Securities Exchange Act of 1934; Rule 10b5-1; planned trade
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1. Introduction

In 2000, to help resolve conflicting judicial views on insider trading, the U.S. Securities and Exchange Commission (SEC) enacted Rule 10b5-1, which also affords certain protections to insiders who make ex ante commitments to sell their firms' shares in the future. Because the ex ante decision helps mitigate potential allegations of trading on the basis of nonpublic information, it is argued that sales under these Rule 10b5-1 plans (as opposed to selling outside the scope of such plans) reduce the risk of litigation. Jagolinzer (2009) finds that Rule 10b5-1 plan sales ("plan sales") tend to occur following positive stock performance and tend to precede negative stock performance, suggesting that despite the precommitment that managers make months or years earlier, they are able to earn abnormal returns from such plan sales. Jagolinzer (2009) interprets these findings as being consistent with strategic behavior from managers. However, if such strategic behavior is indeed taking place, it is not clear what precise mechanism managers are exploiting to achieve these abnormal returns.

In this study, we examine whether firms whose managers have plan sales are more likely to meet or beat analysts' earnings expectations (MBE) in the immediate period preceding plan sales. Muth (2009) and Veliotis (2010) argue that, because the courts have ruled that selling under plans reduces litigation risk, insiders have relatively higher incentives to manage

earnings up in anticipation of these upcoming sales. In a related study, McVay et al. (2006) examine the relation between insider sales and the occurrence of MBE but do not distinguish between plan sales versus other types of insider sales (because their sample predates Rule 10b5-1). This distinction is the key element required to make inferences about any potential association between plan sales and MBE.

Using a unique database that discerns between plan sales and nonplan sales during 2003–2010, we find that firms with plan sales executed subsequent to quarterly earnings announcements exhibit an average 31% higher likelihood of MBE than firm-quarters with no such insider sales. One interpretation of this finding is that firms' ability to meet or beat expectations may contribute to the abnormal returns that Jagolinzer (2009) documents in his study. When we disaggregate the plan sales to discern between those of chief executive officers (CEOs) and other key executives within the firm, we find the increase is significantly related to the plan sales of CEOs and chief financial officers (CFOs), whereas no relation exists for the plan sales of other key insiders. This evidence suggests that only the top executives—the CEO and CFO—may be exploiting the protection of Rule 10b5-1 through the use of MBE. Moreover, this finding sheds light on the potential direction of causality in the documented relation: because the CEO and CFO arguably have more control over the reported accounting earnings and overall firm performance than other key

insiders, perhaps the anticipation of subsequent plan sales provides incentives for them to act strategically to achieve the MBE event.

However, there exist significant caveats with this interpretation. Specifically, the direction of causality is not unambiguous because of the potential for 10b5-1 plans to include limit order transactions. In §6, we discuss and address this issue at length and perform several additional tests to mitigate these concerns. However, our tests are not unambiguous. The reader should therefore exercise caution in making inferences about strategic MBE behavior from our findings.

Notwithstanding this significant caveat, our study contributes to a growing literature that examines managers' potential strategic behavior related to insider trades. The SEC, academics, and the business press have become concerned about potential exploitation of plans by insiders, especially in light of Jagolinzer's (2009) findings of abnormal returns from plan sales (similarly, Henderson et al. 2012). However, Jagolinzer leaves open the question of how (or through what channels) such abnormal returns are achieved. Our study suggests that MBE may be one such channel that managers use. Our study also extends the work of McVay et al. (2006), which finds a positive relation between overall insider sales and the MBE phenomenon but does not make the important distinction between plan sales and nonplan sales. Our study contributes to the literature by documenting that the relation between plan sales and MBE is significantly positive—and approximately 147% larger in magnitude than the similar relation between nonplan sales and MBE.

2. Hypothesis Development

2.1. Insider Trading and Rule 10b5-1 Plans

Trading by insiders with nonpublic information has long been regulated by the federal securities laws. The primary vehicle has been Rule 10b-5, the antifraud provision promulgated under authority that Congress granted to the SEC in Section 10(b) of the Exchange Act of 1934.[1] However, the antifraud provisions of Rule 10b-5 are not limited to insider trading based on nonpublic information. For example, Rule 10b-5 forbids certain fraudulent statements and other misstatements, including erroneous financial statements. However, to find a manager liable under Rule 10b-5, the plaintiff must show *scienter* (i.e., culpable state of mind), which is often supported by showing circumstantial evidence, such as gains on stock sales. Thus, insiders' stock sales can serve as a primary violation

of Rule 10b-5 (e.g., if sold while in possession of information the market does not have) or as an indication of *scienter* in a Rule 10b-5 case alleging, for example, misrepresentations by the insider or his reporting firm.

In 2000, to help resolve conflicting judicial views on trading on insider information, the SEC added Rule 10b5-1 to define illegal insider trading as "on the basis of" nonpublic information even if the information was not used in the decision to trade. However, Rule 10b5-1(c) also provides an affirmative defense for transactions under a trading plan that meets its requirements. The affirmative defense is available if, at a time when the insider had no material nonpublic information, the insider commits to the future trades that otherwise might then be subject to insider trading charges. Veliotis (2010) provides details of more than 30 court decisions that have taken insider-friendly views of 10b5-1 plan sales, including how the presence of a plan reduces or eliminates evidentiary value regarding *scienter* related to plan sales in cases alleging wrongs by insiders other than insider trading, such as misrepresented content (e.g., financial statements).

Experts have long recommended that plan-selling insiders add a footnote to their SEC Form 4 insider sale filing indicating that their trade was under a plan. Informing the public that a sale was made under a plan may help mitigate potential concerns that the sale represents a signal of trouble within the firm (e.g., Horwich 2007). Furthermore, such disclosure may also assist in preempting litigation or securing judicial notice of the plans at the critical motion-to-dismiss stage of litigation (e.g., Horwich 2007, Bochner and Hakala 2001, Henderson et al. 2012). However, experts do not necessarily suggest that insiders provide details of their plans beyond the mere existence of the plan. As noted by Henderson et al. (2012), disclosing extensive details (e.g., the prices at which the plan sales will occur) may lead to investors front-running the stock. Indeed, Jagolinzer (2009) concludes that plan details are rarely disclosed. Besner and Jensen (2007, p. 19) similarly conclude: "Even though insiders are more frequently disclosing the use of Rule-10b5-1 trading plans, they rarely, if ever, disclose the details of these trading plans." (Our comprehensive search of insider plan data—as well as that of our data provider, J3 Information Services Group—further corroborates this paucity of detail.)

With their increasing popularity, plans have come under attack from the business press (e.g., Burnett 2004, Brulliard 2005, Sasseen 2006, Lamarre 2009, Reynolds 2009), as well as legal academics (e.g., Horwich 2007, Huskins 2007, Whalen 2007, Cioppa 2009, Muth 2009, Veliotis 2010). Even the SEC has indicated that it will investigate plan usage. For

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[1] Insider trading based on nonpublic information may also lead to actions under the Insider Trading Sanctions Act of 1984 or the Insider Trading and Securities Fraud Enforcement Act of 1988.

instance, former SEC Director of Enforcement, Linda Thomsen, states that plans may be "abused in various ways to facilitate trades based on inside information. We're looking at this—hard" (Thomsen 2007).

Many of these critiques cite Jagolinzer (2009). Jagolinzer (2009) finds that plan-selling insiders earn higher abnormal returns than nonplan-selling insiders (similarly, Robbins 2010, Henderson et al. 2012). This provides evidence consistent with the view that insiders may be engaging in strategic trade-related behavior outside the scope of anything originally intended under Rule 10b5-1(c). For instance, insiders may be adopting plans when in possession of non-public information that will affect stock prices when the future plan sales occur, a clear failure to comply with Rule 10b5-1(c). Other strategic behavior is more subtle and may not directly violate Rule 10b5-1(c). For instance, insiders may be selectively terminating plans. Also, managers may accelerate the announcement of good news to occur before plan sales; conversely, they may delay the announcement of bad news to occur after plan sales. More generally, they may distort the content or context of disclosures, thus managing the market's expectations in a particular direction. Last, managers may meet or beat market expectations of performance by managing the firm's actual reported performance.

2.2. Rule 10b5-1 Plans and Insiders' Incentives to Meet or Beat Expectations

Any event that involves managers' stock being traded provides managers with incentives to influence investor perception of firm value (e.g., Dechow and Schrand 2004)—namely, to increase stock prices (or avoid price declines) before the manager sells his shares (e.g., Park and Park 2004, Huddart and Louis 2011). In 2006, citing Enron as an example, the U.S. Department of Justice testified that many fraud defendants were officers or directors who engaged in elaborate schemes to not only improve their firm's appearance to investors, but also to enrich themselves at investors' expense by selling shares at inflated prices (Tenpas 2006).

One significant way that managers can affect firm value is through earnings management. Dechow et al. (1996) indicate that insider trading is a significant motivation for earnings management in SEC enforcements. Beneish (1999) finds that in cases involving SEC enforcement actions alleging fraudulent reporting, managers are more likely to sell during the period for which earnings are overstated and before the market learned of the SEC enforcement action. Similarly, Park and Park (2004) find that quarterly discretionary accruals, a widely used proxy for earnings management, are higher when insider sales occur shortly after quarterly earnings are announced (similarly, Huddart

and Louis 2011). McVay et al. (2006) find that insider selling occurring in the period immediately following earnings announcements increases the likelihood of meeting or barely exceeding consensus analysts' forecasts.

These trading-related incentives are mitigated by managers' desire to reduce litigation risk (e.g., Beneish et al. 2012). For instance, Ke et al. (2003) examine firms that exhibit a string of consecutive quarterly earnings increases. They find that when such firms experience a break in this string of increases, managers do not seem to engage in any abnormal insider trading in the quarters that precede this break. Similarly, Huddart et al. (2007) find that the level of insider trades that occur in the 20 days before quarterly earnings announcements is relatively low, suggesting that insiders avoid such sales because of the potential litigation risk of such closely timed sales. Beneish and Vargus (2002) find the persistence of income-increasing accruals is lower in years in which there are abnormal insider sales, whereas such accruals are higher in years when there are abnormal insider purchases. Such patterns suggest managers' sensitivities to litigation risks related to earnings management and insider sales.

The above discussion suggests that (i) managers may engage in strategic behavior to increase their stock sale proceeds, but (ii) such behavior is tempered by or balanced against potential litigation risks. One of the main advantages of selling stock under a 10b5-1 plan is that it reduces such litigation risk. As detailed in §2.1, insiders may view the plan as shielding them from litigation, as it is more difficult for potential plaintiffs to allege illegal trading or to cite the trading as evidence of requisite *scienter* state of mind in litigation related to misrepresentation.

If selling under a plan reduces litigation risk, then insiders with upcoming plan sales may be more motivated to engage in strategic behavior to prop up the stock price in advance of the planned sale. Even without the litigation protection afforded by plans, larger pending stock sales imply that managers have more incentive to boost their companies' stock prices before they sell (Huddart and Louis 2011). Similarly, Veliotis (2010) concludes that insiders with prearranged selling plans, even before Rule 10b5-1(c), had incentives to maximize stock price on the day a sale occurred. Now the existence of 10b5-1 plan protection may serve to further incentivize insiders to maximize sales proceeds on the day the plan sales are consummated. Last, plans can override firm-specific trading blackout windows otherwise enforced by the firm, thus affording more opportunity, especially in the key time around earnings announcements (e.g., Henderson et al. 2012, Rains and Day 2012).

Muth (2009) and Veliotis (2010) argue that one way to increase stock price is to meet or beat analysts'

consensus earnings expectations. This is because meeting or beating such expectations is more likely to increase stock prices, but missing such expectations is more likely to decrease stock prices (e.g., Bartov et al. 2002, Skinner and Sloan 2002). McVay et al. (2006) examine precisely this phenomenon as it relates to insider trades but do not make the key distinction between plan sales and nonplan sales (because their sample predates Rule 10b5-1). Moreover, the incentives to meet or beat expectations may be higher because the ex ante precommitted date of the sale is known ahead of time (Muth 2009, Veliotis 2010). In this sense, plan sales provide a setting similar to prior studies that find firms are more likely to manage earnings down before a fixed stock option grant in an effort to reduce the stock price and thus the option's exercise price (e.g., McAnally et al. 2008, Baker et al. 2003, Balsam et al. 2003).

This discussion supports our main empirical prediction: The firms of insiders who sell stock under 10b5-1 plans shortly after earnings announcements are more likely to meet or beat earnings expectations.

3. Sample and Research Design

3.1. Insider Trade Data

Since June 30, 2003, insiders have been required to electronically file Form 4 to disclose trades of their firms' stock. Though these forms are searchable at EDGAR and are accessible via hyperlinks at several websites, Thompson Financial's Insider Trading database and other machine-readable data sources do not separately identify trades executed under Rule 10b5-1 plans. We collect insider trading data from j3sg.com, owned by J3 Information Services Group, a well-known insider-trading data services provider (e.g., Hogan 2008, 2011). Its database makes the explicit distinction between voluntarily-disclosed 10b5-1 plan transactions versus nonplan transactions, which are identified by analyzing each insider's Form 4 footnote disclosure. The voluntary nature of the disclosure may potentially introduce bias or noise into our plan versus noplan partitioning variable. We discuss this further in §7.

Following prior work (e.g., Beneish and Vargus 2002, Beneish et al. 2012), we obtain data only for trades coded "sales" or "purchases" on Form 4, as these reflect cash transactions; we ignore quarterly trades of less than 100 shares. We collect all insider trade data for CEO, CFO, chief operating officer (COO), president, and chair positions, as these positions are most likely to exhibit significant influence over financial reporting. Following Park and Park (2004), we drop firm quarters that have mixed trades (e.g., CFO sales and CEO purchases); we also drop firm quarters with solely insider purchasing (which

are very rare under plans during our sample period; Jagolinzer 2009). In untabulated robustness tests, we relax these data restrictions (see §5).

3.2. Sample Selection

The final sample consists of 16,214 observations with the required data from J3 Information Services Group's database, Compustat, and I/B/E/S. The sample selection criteria begin with all firm quarters for firms with at least one appearance in J3 Information Services Group's insider trading database from June 2003 to December 2010. The sample is then reduced by data requirements from I/B/E/S and Compustat. Specifically, all firms must have at least two quarterly analyst earnings per share (EPS) estimates from I/B/E/S, so that we can compute our meet-or-beat proxies. We include all firms that meet or beat or miss consensus analyst forecasts by 5 cents or less. All firms must also have available data from the quarterly Compustat database. To increase comparability with prior studies, we retain only calendar-year firms (e.g., McVay et al. 2006). We exclude firms in regulated industries (SIC codes 4000, 6000, 9000) or those incorporated outside the United States because such firms and their insiders may have other incentives and restraints under regulation. We exclude firms with revenues or total assets under $1 million during any quarter of our sample period or the 12 months before. In untabulated robustness tests, we relax these data restrictions (see §5).

3.3. Research Design

Our main empirical prediction is that insiders with sales that are voluntarily disclosed as occurring under 10b5-1 plans may have relatively higher incentives to increase the firm's stock price before the sales date and may therefore engage in activities that increase the likelihood of meeting or beating analysts' expectations. To test this prediction, we design an empirical model that estimates the probability of meeting or beating expectations and whether plan sales are associated with this probability. Similar to prior studies that examine earnings patterns prior to an event (e.g., Teoh et al. 1998, Aboody and Kasznik 2000), we use ex post realized outcomes as a proxy for ex ante intent. For instance, McVay et al. (2006) use the actual realization of insider sales as a proxy for managers' ex ante anticipation.

Specifically, we estimate the following logistic model, similar to that of McVay et al. (2006).[2]

$$MBE_t = \beta_0 + \beta_1 P\text{-}SALES_t + \beta_2 NP\text{-}SALES_t$$
$$+ \beta_3 P\text{-}SALES_{t-1} + \beta_4 NP\text{-}SALES_{t-1}$$
$$+ \beta_5 SIZE_t + \beta_6 MTB_t + \beta_7 LEVRG_t$$

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[2] All continuous variables are winsorized at the 1% level.

$$+ \beta_8 ROA_t + \beta_9 LOSS_t + \beta_{10} RET_t$$

$$+ \beta_{11} RET_{t+1} + \beta_{12} VOL_t$$

$$+ \text{fixed industry effects} + \text{fixed year effects}$$

$$+ \text{fixed quarter effects} + \varepsilon,$$

where *MBE* equals 1 if EPS beats consensus analyst forecasts by 0–5 cents and *MBE* equals 0 if EPS misses consensus by 5 cents or less (consensus forecasts are calculated as the mean of all the most recent forecast estimates made by each analyst before the firm's earnings announcement date); *P-SALES* equals the dollar value of insider sales during the quarter made under 10b5-1 plans/prior period firm market value;[3] *NP-SALES* equals the dollar value of insider sales during the quarter not made under 10b5-1 plans/prior period firm market value; *SIZE* equals the log(total assets); *MTB* equals the market value of equity/book value of equity; *LEVRG* equals the long-term debt/total assets; *ROA* equals the net income/lagged total assets; *LOSS* equals 1 if net income is less than 0, and equals 0 otherwise; *RET* equals the value-weight market-adjusted returns during the quarter; and *VOL* equals the average daily volume during the quarter.

Our main prediction is that β_1, the estimated coefficient for *P-SALES*, is significantly positive. Our meet-or-beat measure, *MBE*, is motivated from prior studies. Dechow et al. (2010) suggest that earnings are more likely to be managed when firms just meet or beat an external target such as consensus analysts' forecasts. We examine firms that meet, beat, or miss consensus forecast by five cents or less. Because there is no complete theoretical model that establishes the proper range of the MBE criteria, we choose a fairly wide range of 5 cents (e.g., Dhaliwal et al. 2004). In our tables, we present the results of robustness tests for narrower ranges of meet-or-beat, as well.

As discussed in §3.1, the distinction between sales made under 10b5-1 plans (*P-SALES*) and sales not made under plans (*NP-SALES*) is based on voluntary disclosures made by the insider and provided by J3 Information Services Group. Similar to McVay et al. (2006), quarter *t*'s insider sales transactions (both plan and nonplan) are measured from the day after quarter *t*'s earnings announcement to the day before the subsequent earnings announcement. For example, if the earnings for the quarter ending June 30 are announced on August 1, we examine the insider sales that occur from August 2 to the day before the next

quarterly earnings announcement. These insider sales are compared to the meet-or-beat event that occurs on August 1 because managers are potentially more likely to engage in behavior that increases the likelihood of a meet-or-beat event immediately preceding their sales transaction.

We include several control variables to mitigate concerns regarding potential correlated omitted variables and to increase comparability with prior studies (e.g., McVay et al. 2006). We include lagged insider sales to control for steady-state differences in insider sales across firms (e.g., McVay et al. 2006). *LEVRG* is a proxy for closeness to violating debt covenants, which may increase attempts to increase earnings (e.g., McAnally et al. 2008). *RET* and *ROA* are proxies for firm performance. Firms with higher performance are potentially more likely to meet or beat analyst forecasts (e.g., McVay et al. 2006). *LOSS* is a proxy for accounting losses; firms experiencing losses may be more concerned about avoiding net losses than about missing analyst forecasts. We include *SIZE*, *MTB*, and *VOL* as further controls for economic forces that are potentially correlated with firm size, firm growth opportunities, and the possibility that insider sales simply mirror overall trading levels in the firm's stock (similarly, Balsam et al. 2003, Ke et al. 2003, Park and Park 2004). Last, we include industry, year, and quarter fixed effects to control for potential industry-wide or time-specific effects, as well as fourth-quarter incentives (e.g., Brown and Pinello 2007).

4. Main Results

4.1. Descriptive Statistics

Table 1 provides descriptive statistics. The final sample is comprised of 16,214 firm-quarter observations, of which 66.65% meet or beat analyst consensus estimates (*MBE* equals 1), and the remaining 33.35% do not (*MBE* equals 0). Panel A shows that all quarterly insider sales (*A-SALES*), which is the total of nonplan and plan sales, represent an average 0.08% of the firm's market value. Nonplan sales (*NP-SALES*) are on average 0.05% of market value, while plan sales (*P-SALES*) are 0.02% of market value. These averages are understated because many observations exhibit zero sales. Untabulated results reveal that, for the sample of nonzero sales, the average *A-SALES* is 0.44% of market value; in raw dollars, the average is $5.3 million. Similarly, the average *P-SALES* is 0.33% of market value, or $3.7 million in raw dollars. The average *NP-SALES* is 0.42% of market value, or $5.3 million in raw dollars. In untabulated results, we find that the mean three-day market reaction to earnings announcements that meet or beat expectations is 0.9% (the median market reaction is 0.8%; the 75th percentile reaction is 5.6%). This

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[3] Prior literature has not converged on an appropriate summary statistic of insider trading, and each measure has its own limitations (McVay et al. 2006). For example, Beneish et al. (2012) and Beneish and Vargus (2002) use net shares sold scaled by shares outstanding. Our approach is similar in effect. In untabulated robustness tests, we examine several alternative measures (see §5).

Table 1   Descriptive Statistics

					Panel A: Pooled sample		
Variable	*n*	Mean	10%	25%	50%	75%	90%
MBE	16,214	0.6665	0	0	1	1	1
A-SALES	16,214	0.0008	0	0	0	0.0001	0.0021
P-SALES	16,214	0.0002	0	0	0	0	0.0002
NP-SALES	16,214	0.0005	0	0	0	0	0.0010
SIZE	16,214	6.41	4.37	5.15	6.27	7.53	8.72
MTB	16,214	3.25	1.08	1.60	2.48	3.93	6.43
LEVRG	16,214	0.1747	0.0000	0.0012	0.1307	0.2880	0.4299
ROA	16,214	0.0098	−0.0207	0.0033	0.0142	0.0259	0.0413
LOSS	16,214	0.2017	0	0	0	0	1
RET	16,214	0.0155	−0.2103	−0.1018	−0.0018	0.1104	0.2576
VOL	16,214	1,029,377	47,798	128,021	334,357	902,232	2,401,890

	Panel B: Differences in means between meet-or-beat versus missed expectations firms		
		Mean	
Variable	MBE = 0	MBE = 1	*t*-statistic
A-SALES	0.0005	0.0010	−13.69
P-SALES	0.0001	0.0003	−9.08
NP-SALES	0.0003	0.0006	−11.89
SIZE	6.34	6.45	−3.98
MTB	3.02	3.37	−6.06
LEVRG	0.1897	0.1671	7.17
ROA	0.0024	0.0134	−16.18
LOSS	0.2770	0.1640	16.03
RET	−0.0348	0.0406	−22.12
VOL	931,835	1,078,194	−4.37
n	5,408	10,806	

Notes. This table presents descriptive statistics for each of the variables used in the study. The sample is comprised of all firm-quarters with available J3 Information Services Group, Compustat, and I/B/E/S data, from the 2003–2010 period. We exclude firms in regulated industries and firms with noncalendar year ends. See §§3.1 and 3.2 for further details about the sample. All continuous variables are winsorized at the 1% level. *MBE* equals 1 if EPS beats consensus analyst forecasts by 0–5 cents, *MBE* equals 0 if EPS misses consensus by 5 cents or less; *A-SALES* equals all key insider sales during the quarter; *P-SALES* equals key insider sales during the quarter made under 10b5-1 plans/prior period firm market value; and *NP-SALES* equals key insider sales during the quarter not made under 10b5-1 plans/prior period firm market value. For each *SALES* variable, the quarter is defined as the day after quarter *t*'s earnings announcement to the day before the subsequent earnings announcement. *SIZE* equals log (total assets); *MTB* equals market value of equity/book value of equity; *LEVRG* equals long-term debt/total assets; *ROA* equals net income/lagged total assets; *LOSS* equals 1 if net income is less than 0, *LOSS* equals 0 otherwise; *RET* equals value-weight market-adjusted returns during the quarter; and *VOL* equals average daily volume during the quarter.

translates to an average $0.146 increase in stock price (the median price increase is $0.060; the 75th percentile increase is $0.910). Conversely, an announcement that fails to meet or beat expectations is met with a mean (median) −2.4% (−1.9%) market reaction and a mean (median) $−0.472 ($−0.210) price decline. In further untabulated results, we find the overall median 90-day abnormal returns subsequent to an insider sale are −2.2%. For those firms that have plan sales, the median 90-day abnormal returns subsequent to an insider sale are −1.7%.

In Panel B of Table 1, we find the meet-or-beat (*MBE* equals 1) sample exhibits a higher level of all types of insider sales. For instance, *P-SALES* are on average 0.03% for meet-or-beat firms, whereas it is 0.01% for firms that miss consensus estimates (*t*-statistic equals −9.08). *NP-SALES* are similar: 0.06% for the meet-or-beat firms and 0.03% for the firms

that miss estimates (*t*-statistic equals −11.89). Meet-or-beat firms tend to be less leveraged (*LEVRG*), have higher levels of earnings (*ROA*), and are less likely to report an accounting loss (*LOSS*). Meet-or-beat firms also exhibit higher stock returns (*RET*), higher growth opportunities (*MTB*), and higher trading volumes (*VOL*). We control for each of these firm characteristics in our main empirical tests.

In Table 2, we present Pearson and Spearman correlations. Both types of correlations yield qualitatively similar inferences, so we only comment on the Pearson correlations. Similar to the tests of differences in means in Table 1, we find a positive and statistically significant correlation among *MBE* and *A-SALES*, *NP-SALES*, and *P-SALES*. The correlations are, however, economically fairly weak, with correlation coefficients in the 6%–9% range. For instance, the correlation between *MBE* and *P-SALES* is 0.064 (*p*-value = 0.000).

Table 2   Pearson and Spearman Correlations

	MBE	A-SALES	NP-SALES	P-SALES	SIZE	MTB	LEVRG	ROA	LOSS	RET	VOL
MBE		0.094	0.081	0.064	0.031	0.048	−0.057	0.133	−0.133	0.172	0.033
		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
A-SALES	0.134		0.852	0.505	−0.107	0.088	−0.053	0.090	−0.074	0.195	−0.058
	(0.000)		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
NP-SALES	0.103	0.798		0.042	−0.082	0.074	−0.034	0.081	−0.074	0.173	−0.048
	(0.000)	(0.000)		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
P-SALES	0.086	0.594	0.083		−0.071	0.062	−0.057	0.052	−0.033	0.095	−0.037
	(0.000)	(0.000)	(0.000)		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
SIZE	0.032	0.027	0.061	−0.019		−0.029	0.348	0.185	−0.249	−0.039	0.547
	(0.000)	(0.001)	(0.000)	(0.015)		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
MTB	0.088	0.203	0.154	0.135	−0.009		−0.072	0.149	−0.074	0.054	0.079
	(0.000)	(0.000)	(0.000)	(0.000)	(0.239)		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
LEVRG	−0.059	−0.054	−0.017	−0.074	0.457	−0.105		−0.082	0.005	−0.012	0.046
	(0.000)	(0.000)	(0.026)	(0.000)	(0.000)	(0.000)		(0.000)	(0.529)	(0.131)	(0.000)
ROA	0.162	0.156	0.144	0.069	0.140	0.398	−0.122		−0.674	0.012	0.083
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)		(0.000)	(0.122)	(0.000)
LOSS	−0.133	−0.108	−0.106	−0.038	−0.256	−0.151	−0.036	−0.695		0.008	−0.060
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)		(0.286)	(0.000)
RET	0.196	0.175	0.167	0.071	0.002	0.079	−0.002	0.035	−0.027		−0.010
	(0.000)	(0.000)	(0.000)	(0.000)	(0.763)	(0.000)	(0.830)	(0.000)	(0.001)		(0.220)
VOL	0.053	0.074	0.057	0.069	0.681	0.237	0.168	0.160	−0.102	0.008	
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.285)	

Notes. This table presents Pearson and Spearman correlations (above and below the diagonal, respectively) for each of the variables used in the study. *MBE* equals 1 if EPS beats consensus analyst forecasts by 0–5 cents, *MBE* equals 0 if EPS misses consensus by 5 cents or less; *A-SALES* equals all key insider sales during the quarter/prior period firm market value; *P-SALES* equals key insider sales during the quarter made under 10b5-1 plans/prior period firm market value; *NP-SALES* equals key insider sales during the quarter not made under 10b5-1 plans/prior period firm market value; *SIZE* equals log (total assets); *MTB* equals market value of equity/book value of equity; *LEVRG* equals long-term debt/total assets; *ROA* equals net income/lagged total assets; *LOSS* equals 1 if net income is less than 0, *LOSS* equals 0 otherwise; *RET* equals value-weight market-adjusted returns during the quarter; and *VOL* equals average daily volume during the quarter. The *p*-values are in parentheses.

MBE is positively correlated with performance measures (*ROA*, *RET*, inverse *LOSS*). With a correlation coefficient of 0.042 (*p*-value = 0.000), plan sales and nonplan sales are not correlated with each other in an economically significant manner; it is rare for the same individual insider to sell shares under a plan as well as outside a plan in a given quarter.

4.2.   Main Empirical Results

In Table 3, we present the results of estimating our main logistic regression, where we regress the probability of meet-or-beat consensus forecasts on the level of plan and nonplan insider sales (*P-SALES* and *NP-SALES*). All test statistics are adjusted for double-clustering to correct for cross-sectional and time-series correlation in regression residuals (e.g., Cameron and Trivedi 2005, Gow et al. 2010).

In Model 1, we estimate the main model for all insider sales (*A-SALES*) without disaggregating between plan and nonplan. The estimated coefficient for *A-SALES* is significant (55.556, *p*-value = 0.000), suggesting that insider sales are positively related to the likelihood of MBE. This result is consistent with the work of McVay et al. (2006), which does not disaggregate the type of insider sale that is taking place. In disaggregating the total insider sales into its plan

(*P-SALES*) and nonplan (*NP-SALES*) components, we begin by showing each component separately in Models 2 and 3. The results show that both types of sales are positively related to MBE.

Model 4 is the main result of our paper. In Model 4, we include both plan and nonplan insider sales (*P-SALES* and *NP-SALES*) in the same model, which is essentially a disaggregation of all insider sales into those sales that are made under 10b5-1 plans versus those that are not. The coefficient for *P-SALES* is positive and statistically significant (94.175, *p*-value = 0.000). The coefficient for *NP-SALES* is also positive and significant (64.183, *p*-value = 0.000), though less so. The estimated coefficients for *P-SALES* and *NP-SALES* are statistically different from each other at the 1% level. These estimated coefficients suggest a 147% difference between plan versus nonplan sales. As discussed in §4.1, given a firm has plan sales, the average *P-SALES* is 0.0033. Applying this average to the estimated coefficient suggests that the likelihood of *MBE* is higher by 31.1% (= 94.175 ∗ 0.0033) relative to firm-quarters where no plan sales occur, which suggests that the correlation between plan sales and the likelihood of *MBE* is economically significant. Similarly, for nonplan sales, the average *NP-SALES* for firms reporting a nonzero figure is 0.0042, suggesting

Table 3   Logistic Regression of MBE on Plan and Nonplan Insider Sales

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
	All sales	No plan sales	Plan sales	Full model	Quintile ranked	High vs. low
Intercept	0.138	0.154	0.206	0.136	−0.669	0.346
	(0.333)	(0.210)	(0.088)	(0.349)	(0.000)	(0.006)
A-SALES$_t$	55.556					
	(0.000)					
NP-SALES$_t$		64.850		64.183	0.163	0.317
		(0.000)		(0.000)	(0.000)	(0.000)
P-SALES$_t$			99.061	94.175	0.180	0.317
			(0.000)	(0.000)	(0.000)	(0.000)
A-SALES$_{t-1}$	27.173					
	(0.001)					
NP-SALES$_{t-1}$		32.131		30.630	0.046	0.064
		(0.006)		(0.004)	(0.071)	(0.221)
P-SALES$_{t-1}$			36.010	36.938	0.060	0.112
			(0.190)	(0.172)	(0.114)	(0.115)
SIZE	0.053	0.050	0.043	0.052	0.032	0.044
	(0.000)	(0.002)	(0.002)	(0.000)	(0.035)	(0.003)
MTB	0.007	0.008	0.008	0.006	0.004	0.011
	(0.216)	(0.117)	(0.142)	(0.241)	(0.443)	(0.051)
LEVRG	−0.336	−0.339	−0.331	−0.331	−0.290	−0.301
	(0.004)	(0.003)	(0.005)	(0.005)	(0.016)	(0.016)
ROA	3.518	3.628	3.694	3.494	3.548	3.811
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
LOSS	−0.460	−0.460	−0.478	−0.459	−0.460	−0.462
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
RET$_t$	1.810	1.837	1.871	1.801	1.800	1.907
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
RET$_{t+1}$	0.126	0.134	0.130	0.123	0.131	0.135
	(0.149)	(0.189)	(0.143)	(0.119)	(0.187)	(0.127)
VOL	0.000	0.000	0.000	0.000	0.000	0.000
	(0.858)	(0.861)	(0.896)	(0.886)	(0.885)	(0.885)
Fixed year effects	Yes	Yes	Yes	Yes	Yes	Yes
Fixed quarter effects	Yes	Yes	Yes	Yes	Yes	Yes
Fixed industry effects	Yes	Yes	Yes	Yes	Yes	Yes
Pseudo R^2	0.095	0.094	0.092	0.096	0.099	0.101
n	16,214	16,214	16,214	16,214	16,214	16,214

Notes. This table presents results from estimation of the main model (Model 4), which is the following logistic regression: $MBE_t = \beta_0 + \beta_1 P\text{-}SALES_t + \beta_2 NP\text{-}SALES_t + \beta_3 P\text{-}SALES_{t-1} + \beta_4 NP\text{-}SALES_{t-1} + \beta_5 SIZE_t + \beta_6 MTB_t + \beta_7 LEVRG_t + \beta_8 ROA_t + \beta_9 LOSS_t + \beta_{10} RET_t + \beta_{11} RET_{t+1} + \beta_{12} VOL_t +$ fixed industry effects + fixed year effects + fixed quarter effects $+ \varepsilon$. Model 5 is estimated using the quintile ranked values of *SALES* variables (ranked 0–4). Model 6 is estimated using a high versus low (i.e., above/below median) indicator variable for each *SALES* variable (ranked 0 or 1). *MBE* equals 1 if EPS beats consensus analyst forecasts by 0–5 cents, *MBE* equals 0 if EPS misses consensus by 5 cents or less; *A-SALES* equals all key insider sales during the quarter/prior period firm market value; *P-SALES* equals key insider sales during the quarter made under 10b5-1 plans/prior period firm market value; *NP-SALES* equals key insider sales during the quarter not made under 10b5-1 plans/prior period firm market value; *SIZE* equals log (total assets); *MTB* equals market value of equity/book value of equity; *LEVRG* equals long-term debt/total assets; *ROA* equals net income/lagged total assets; *LOSS* equals 1 if net income is less than 0, *LOSS* equals 0 otherwise; *RET* equals value-weight market-adjusted returns during the quarter; and *VOL* equals average daily volume during the quarter. The *p*-values are in parentheses.

a 26.9% ($= 64.183 * 0.0042$) higher likelihood of MBE relative to no such sales. Last, we find that the estimated coefficient for lagged *P-SALES* is consistently statistically insignificant in all the estimated models. This is consistent with prior-period planned sales having no association with current period MBE.

In Models 5 and 6, to mitigate potential concerns of nonnormal distributions of the insider sales variables, we replace the continuous measures of all insider sales variables with quintile-ranked dummy variables (Model 5) and above/below-the-median indicator variables (Model 6). Inferences are similar when such ranked variables are used. For instance, in Model 6, the estimated coefficient for *P-SALES* is 0.317 (*p*-value = 0.000), suggesting that observations with values of *P-SALES* above the median (i.e., nonzero *P-SALES*) are 31.7% more likely to meet or beat earnings.

Overall, the results in Table 3 are consistent with our main empirical prediction: The firms of insiders

who sell stock under Rule 10b5-1 plans shortly after earnings announcements are more likely to meet or beat earnings expectations. One possible interpretation of this finding is that managers with plan sales may be engaging in strategic ex ante behavior during the quarter to increase the likelihood of meeting or beating expectations, with the ultimate goal of increasing their stock sale proceeds. However, there exist significant caveats in interpreting the potential direction of causality in this documented relation, so we advise caution in making inferences from these findings. We extensively discuss and address these caveats in §6.

5. Robustness Tests and Other Tests

We perform several robustness tests to ensure that our results are not sensitive to our specification choices. For instance, in untabulated tests, we re-estimate our main model for the sample that includes quarterly trades of fewer than 100 shares, as well as including firm-quarters that have mixed trades; inferences are unchanged, with the estimated coefficient for *P-SALES* remaining a positive and statistically significant 129.3 (p-value $= 0.008$). We also reestimate all tests using different scalars for our insiders sales variables, specifically, scale by lagged total assets, as well as outstanding common shares; we also examine the natural log of sales and the square root of sales; inferences are qualitatively unchanged. Last, we reestimate our meet-or-beat proxy, *MBE*, using the median (instead of the mean) of each analyst's most recent forecast as the consensus; the estimated coefficient for *P-SALES* remains positive and statistically significant (133.4, p-value $= 0.004$). Similarly, when *MBE* is defined as the mean and/or median of only the three most recent forecasts, the estimated coefficient for *P-SALES* remains positive and statistically significant (128.1, p-value $= 0.011$).

The following subsections describe further robustness tests, as well as other tests we perform to further enhance our understanding of the relation between MBE and plan sales.

5.1. Narrowing the MBE Range

Because there is no complete theoretical model that establishes the proper range of the meet-or-beat criteria, we chose 5 cents as our meet-or-beat range to allow for a less-restrictive sample selection process (e.g., Dhaliwal et al. 2004). In Table 4, we present results from robustness tests where we consider narrower ranges of the MBE specification. Specifically, Model 1 presents results when we consider a 4-cent MBE range; each successive model presents progressively smaller MBE ranges. Results in Table 4 suggest that the statistical significance of the estimated *P-SALES* coefficients begins to decrease when the

Table 4   Robustness Tests Using Narrower MBE Ranges

	Model 1	Model 2	Model 3	Model 4
	4 cents	3 cents	2 cents	1 cent
Intercept	0.205	0.260	0.431	0.962
	(0.123)	(0.074)	(0.013)	(0.000)
P-SALES$_t$	92.943	105.400	71.467	19.868
	(0.007)	(0.009)	(0.050)	(0.744)
NP-SALES$_t$	59.733	57.115	46.331	42.237
	(0.000)	(0.000)	(0.019)	(0.051)
P-SALES$_{t-1}$	38.896	25.405	38.249	22.094
	(0.178)	(0.509)	(0.339)	(0.662)
NP-SALES$_{t-1}$	29.313	23.550	11.686	−5.348
	(0.015)	(0.141)	(0.412)	(0.904)
Other control variables	Yes	Yes	Yes	Yes
Fixed year effects	Yes	Yes	Yes	Yes
Fixed quarter effects	Yes	Yes	Yes	Yes
Fixed industry effects	Yes	Yes	Yes	Yes
Pseudo R^2	0.085	0.073	0.053	0.030
n	14,416	12,178	9,101	5,145

Notes. This table presents results from estimation of the main model using narrower definitions of the meet-or-beat criteria. *MBE* equals 1 if EPS beats consensus analyst forecasts by 0–X cents, *MBE* equals 0 if EPS misses consensus by less than X cents. For instance, in Model 1, the meet-or-beat criteria is 4 cents (i.e., $X = 4$). *A-SALES* equals all key insider sales during the quarter/prior period firm market value; *P-SALES* equals key insider sales during the quarter made under 10b5-1 plans/prior period firm market value; and *NP-SALES* equals key insider sales during the quarter not made under 10b5-1 plans/prior period firm market value. Control variables are estimated but not tabulated. The p-values are in parentheses.

MBE range is reduced to 2 cents; the coefficient is 71.467 (p-value $= 0.050$). However, the economic significance of the coefficients is still quite large. We conclude from this set of tests that our findings are fairly robust to alternative specifications of MBE.

5.2. Variation Across Different Executive Levels (CEO, CFO, Other)

CEOs, CFOs, chairs, and other key executives may have varying levels of perceived litigation risk. For instance, the Sarbanes–Oxley Act of 2002 requires CEOs and CFOs to certify financial statements (Section 906) and repay certain compensation if a restatement occurs (Section 304). However, COOs and other executives do not fall under this requirement. Similarly, there may exist varying levels of ability and opportunity to affect the likelihood of meeting or beating expectations. For instance, the CFO has a higher degree of control over the accruals process (e.g., Oberholzer-Gee and Wulf 2012), whereas the CEO may have a higher degree of control over firm-wide voluntary and required disclosures that are made to the general public, or can make "real" earnings management decisions (e.g., through the cutting of R&D programs; Cohen et al. 2008). Conversely, other key insiders may have relatively less ability and opportunity to take such actions. For these reasons,

Table 5 Insider Sales of CEO, CFO, and Other Key Insiders

	Model 1	Model 2	Model 3	Model 4
CEO P-SALES	164.00			145.00
	(0.000)			(0.011)
CEO NP-SALES	87.11			72.52
	(0.000)			(0.000)
CFO P-SALES		513.40		332.30
		(0.004)		(0.065)
CFO NP-SALES		249.60		139.40
		(0.020)		(0.088)
OTHER P-SALES			3.50	−13.76
			(0.998)	(0.643)
OTHER NP-SALES			42.39	29.18
			(0.013)	(0.077)
Control variables	Yes	Yes	Yes	Yes
Fixed year effects	Yes	Yes	Yes	Yes
Fixed quarter effects	Yes	Yes	Yes	Yes
Fixed industry effects	Yes	Yes	Yes	Yes
Pseudo R^2	0.095	0.092	0.090	0.096
n	16,214	16,214	16,214	16,214

Notes. This table presents excerpted results from estimating the main model separately for each of three distinct types of key insider: the CEO, CFO, and other (chair, COO or president). Only the coefficients for the contemporaneous *SALES* variables are presented. *MBE* equals 1 if EPS beats consensus analyst forecasts by 0–5 cents, *MBE* equals 0 if EPS misses consensus by 5 cents or less; *P-SALES* equals key insider sales during the quarter made under 10b5-1 plans/prior period firm market value; and *NP-SALES* equals key insider sales during the quarter not made under 10b5-1 plans/prior period firm market value. Control variables are estimated but not tabulated. The *p*-values are in parentheses.

we next examine the plan and nonplan sales separately for the CEO, CFO, and other key insiders (i.e., chair, COO, and president).

In Table 5, we present results of estimating the main model when disaggregating the insider sales by executive. Though the full model is estimated, for brevity, we present only the results for the sales variables. Models 1–3 present results for CEO, CFO, and other executives, respectively. Model 4 presents all executives in one estimation. Inferences are similar across these estimations, so we discuss Model 4's results. We find that the relation between CEO plan sales and MBE probability is statistically and economically significant (145.00, *p*-value = 0.011). Similar to the results discussed in §4.2, we again apply the average *P-SALES* of 0.0033. Applying this average to the estimated coefficient suggests that the likelihood of *MBE* increases by 47.9% (= 145.00 ∗ 0.0033), which then suggests that the correlation between plan sales and the likelihood of MBE is particularly strong when isolating the CEO plan sales. A disaggregation of the CFO plan sales reveals a similar correlation with MBE, with an estimated coefficient on plan sales of 332.30 (*p*-value = 0.065). Last, the estimated coefficient for other insiders is not statistically significant (−13.76, *p*-value = 0.643); regardless of statistical

significance, its economic significance is also much smaller. Overall, we find that the relation between MBE and the plan sales of CEOs and CFOs is economically and statistically significant, whereas the relation with the plan sales of other key insiders is not.

5.3. Controlling for Accounting Accruals

Next, we include proxies for accounting accruals in our main estimation. Including accruals helps shed light on whether the accruals process is contributing to the probability of meeting or beating expectations. Similar to prior studies, we disaggregate earnings into three components: operating cash flows (*OCF*), nondiscretionary accruals (*NDACC*), and discretionary accruals (*DACC*). The *NDACC* and *DACC* components are constructed from a conventional performance-adjusted modified Jones model (e.g., Kothari et al. 2005); in untabulated tests, we also examine performance-matched accruals.

We present results of this investigation in Table 6. In Model 1, we present the disaggregation of earnings into operating cash flows (*OCF*) and total accruals (*TACC*). Both components are statistically significant, suggesting that both components contribute to the likelihood of *MBE*. In Model 4, we disaggregate *TACC* further into its discretionary (*DACC*)

Table 6 Main Model, Controlling for Accruals

	Model 1	Model 2	Model 3	Model 4
Intercept	−0.107	−0.139	−0.138	−0.082
	(0.444)	(0.428)	(0.490)	(0.712)
TACC	5.101			
	(0.000)			
DACC		1.482		4.447
		(0.000)		(0.000)
NDACC			1.187	5.605
			(0.030)	(0.000)
OCF	5.776	2.776	1.856	5.505
	(0.000)	(0.000)	(0.000)	(0.000)
P-SALES$_t$	95.277	89.208	91.426	88.376
	(0.000)	(0.014)	(0.19)	(0.011)
NP-SALES$_t$	67.431	66.146	66.584	63.642
	(0.000)	(0.000)	(0.000)	(0.000)
Control variables	Yes	Yes	Yes	Yes
Fixed year effects	Yes	Yes	Yes	Yes
Fixed quarter effects	Yes	Yes	Yes	Yes
Fixed industry effects	Yes	Yes	Yes	Yes
Pseudo R^2	0.089	0.085	0.084	0.091
n	15,141	15,141	15,141	15,141

Notes. This table presents results from estimating the main model, with inclusion of controls for total accruals (*TACC*), discretionary accruals (*DACC*), non-discretionary accruals (*NDACC*), and operating cash flows (*OCF*). *TACC* equals net income minus operating cash flows. *DACC* is estimated using the performance-adjusted modified Jones model. *NDACC* equals *TACC* minus *DACC*. Control variables are estimated but not tabulated. We exclude ROA from this model because the accruals and cash flows are a disaggregation of *ROA*. The *p*-values are in parentheses.

and nondiscretionary (*NDACC*) components. Results show that all three components of earnings contribute to the likelihood of *MBE*. Specifically, the coefficient for *DACC* is positive (4.447, *p*-value = 0.000), the coefficient for *NDACC* is positive (5.605, *p*-value = 0.000), and the coefficient for *OCF* is positive (5.505, *p*-value = 0.000). This result suggests that all three components of earnings play a role in the likelihood of MBE. More importantly, we note that inclusion of these disaggregated components does not change the economic or statistical significance of our *P-SALES* variable (88.376, *p*-value = 0.011).

5.4. Potential "Repeated Game"?

We have documented an empirical relation between insiders' 10b5-1 plan sales and the probability of meeting or beating earnings expectations. Though there exist significant caveats and limitations (which we discuss in §6), one interpretation of this result is that managers are strategically affecting the probability of MBE, either through ex post realized earnings or ex ante management of expectations, or both. For instance, Matsumoto (2002) finds that firms meet or beat earnings through both ex post earnings management as well as ex ante expectations management (similarly, Bartov et al. 2002, Kasznik and McNichols 2002, Kross et al. 2011). In this section, we examine whether such a strategy is executed in the context of a repeated game. Does MBE this quarter affect the probability of MBE in the next quarter?

To examine this question, we include the lagged *MBE* variable in our main regression model. Results are presented in Table 7. Results indicate that prior-period *MBE* is positively and significantly related to current-period *MBE*. Depending on the specification, the estimated coefficient for the lagged *MBE* variable ranges from 0.506 to 0.571. For instance, in Model 1 of Table 7, the estimated coefficient for the lagged *MBE* is 0.571 (*p*-value = 0.000). These results suggest that meeting or beating expectations in one quarter tends to increase the chances of doing so in the subsequent quarter. This is consistent with several prior studies that find a nontrivial number of firms that are consistently able to beat market expectations, quarter after quarter. For instance, Kross et al. (2011) find that 18.1% of firms are able to meet or beat expectations for four consecutive quarters. This suggests that many firms are "winning" this repeated game.

There are two additional empirical findings from Table 7 worth discussing. First, we include lagged values of the components of net income to assess the extent to which prior-period accruals affect current-period MBE. Results are presented in the full Model 4 of Table 7. We find that, once the contemporaneous values are controlled for, the lagged values of discretionary accruals (*DACC*), non-discretionary accruals

Table 7   Including Lagged MBE: Is MBE a Repeated Game?

	Model 1	Model 2	Model 3	Model 4
Intercept	−0.531	−0.385	−0.683	−0.564
	(0.000)	(0.076)	(0.000)	(0.025)
MBE_{t-1}	0.571		0.518	0.506
	(0.000)		(0.000)	(0.000)
$DACC_{t-1}$		0.623	−0.092	−1.427
		(0.332)	(0.974)	(0.222)
$NDACC_{t-1}$		0.506	0.111	−1.948
		(0.761)	(0.924)	(0.155)
OCF_{t-1}		1.798	1.244	−2.499
		(0.000)	(0.062)	(0.038)
$DACC_t$				3.941
				(0.000)
$NDACC_t$				5.739
				(0.000)
OCF_t				6.026
				(0.000)
$P\text{-}SALES_t$	115.200	114.700	126.500	114.900
	(0.000)	(0.029)	(0.011)	(0.020)
$NP\text{-}SALES_t$	66.486	75.676	67.359	56.811
	(0.000)	(0.000)	(0.000)	(0.030)
$P\text{-}SALES_{t-1}$	32.552	13.795	4.928	−0.758
	(0.399)	(0.650)	(0.888)	(0.998)
$NP\text{-}SALES_{t-1}$	19.031	36.693	21.828	18.801
	(0.128)	(0.009)	(0.158)	(0.309)
Other control variables	Yes	Yes	Yes	Yes
Fixed year effects	Yes	Yes	Yes	Yes
Fixed quarter effects	Yes	Yes	Yes	Yes
Fixed industry effects	Yes	Yes	Yes	Yes
Pseudo R^2	0.105	0.072	0.093	0.107
n	12,387	9,097	6,984	6,370

Notes. This table presents excerpted results from estimating the main model with inclusion of lagged values for *MBE*, *DACC*, *NDACC*, and *OCF*. *MBE* equals 1 if EPS beats consensus analyst forecasts by 0–5 cents, *MBE* equals 0 if EPS misses consensus by 5 cents or less; *TACC* equals net income − operating cash flows. *DACC* is estimated using the performance-adjusted modified Jones model. *NDACC* equals *TACC* minus *DACC*. Prior-quarter values of each of these variables is included in the model; *A-SALES* equals all key insider sales during the quarter/prior period firm market value; *P-SALES* equals key insider sales during the quarter made under 10b5-1 plans/prior period firm market value; *NP-SALES* equals key insider sales during the quarter not made under 10b5-1 plans/prior period firm market value. Control variables are estimated but not tabulated. We exclude ROA from this model because the accruals and cash flows are a disaggregation of ROA. The *p*-values are in parentheses.

(*NDACC*), and operating cash flows (*OCF*) all have negative estimated coefficients (and are not always statistically significant). These negative coefficients are smaller in magnitude than their current-period peer variables. For instance, the lagged *DACC* coefficient is −1.427 (*p*-value = 0.222) and is about 40% the absolute magnitude of the current period *DACC* of 3.941. Similar findings exist for *NDACC* and *OCF*: the lagged *NDACC* (*OCF*) coefficient is approximately 34% (41%) of the absolute magnitude of the current period *NDACC* (*OCF*). Because of the nature of the accrual process—the fact that accruals must reverse

in subsequent periods—these negative coefficients for the lagged variables are somewhat mechanical. Nonetheless, these findings do provide some additional context to the notion of actions from prior periods affecting the actions of the current period.

The second empirical finding of Table 7 worth noting is the inclusion of the lagged planned sales variable ($P\text{-}SALES_{t-1}$) in our models. As discussed in §3.3, we include lagged insider sales to control for steady-state differences in insider sales across firms and to increase comparability with prior studies (e.g., McVay et al. 2006). In Table 7, we find that the estimated coefficient for lagged $P\text{-}SALES$ is statistically insignificant, suggesting that prior-period planned sales do not have an association with current period MBE. Specifically, we find the p-value for lagged $P\text{-}SALES$ is 0.998 in Model 4. The sign of the estimated coefficient also fluctuates between positive and negative. Indeed, we find that the estimated coefficient for lagged $P\text{-}SALES$ is consistently statistically insignificant in all the tables presented. This is consistent with prior-period planned sales having no association with current period MBE.

6. Caveat: Role of Limit Order Transactions

One interpretation of our findings is that managers with 10b5-1 plan sales are behaving strategically by affecting the likelihood of meeting or beating earnings expectations, with the goal of increasing stock prices through the MBE event and therefore increasing their stock sale proceeds. However, there exists a significant caveat with this interpretation, so caution is warranted in making inferences. Specifically, the direction of causality is not necessarily clear because plan sales potentially include *limit order transactions*. In 10b5-1 plans, insiders can include limit order instructions, which explicitly specify a minimum price or floor that the stock price must meet for the sale to be triggered (e.g., "sell 1,000 shares only if stock price reaches at least $20"). When plans include limit orders, it is more difficult to assign strategic motives to the insider, because trade execution depends on market conditions (specifically, the stock price) at the time of the trade. Thus, if there is a high occurrence of limit orders within the sample of plan sales we examine, the positive relation between MBE and plan sales we document may simply indicate that more limit order transactions were triggered in the period following MBE.

The possibility of this latter, mechanical result is a concern that is shared with other empirical examinations of insider trading in isolating the direction of causality (e.g., McVay et al. 2006). Namely, does the sale reflect *active*, strategic behavior by the insider to

enhance sales proceeds (e.g., taking steps to increase the likelihood of MBE)? Or does the sale reflect a *passive* response to market conditions that are not necessarily in the insider's control and thus less likely to be strategically attained (e.g., a sale triggered by a plan limit order)? However, even if 10b5-1 plans include limit order instructions, *because such limit orders are only triggered if the stock price is sufficiently high*, insiders may still possess the incentive to increase stock prices leading up to their plan sales to achieve this trigger price.[4] Nonetheless, the bottom line is that it is difficult to disentangle insiders' strategic behavior from mechanical limit order triggers that follow positive stock returns. This discussion addresses the significant caveat that exists in interpreting our results and inferring the direction of causality.

To help address this potential concern, we perform several additional tests. First, we identify all the trades that have disclosed the presence of a limit order in the footnotes of the filed Forms 4. We find that 1.07% of our sample includes key words related to limit orders.[5] This corroborates the findings of prior studies that document the scarcity of details in 10b5-1 plan disclosures (e.g., Jagolinzer 2009, Henderson et al. 2012). In untabulated tests, we reestimate our empirical model with the inclusion of a *LIMIT ORDER* dummy variable. The estimated coefficient for the *LIMIT ORDER* dummy is statistically insignificant (-0.325, p-value $= 0.667$). More important, its inclusion does not change any of the inferences of our results related to plan sales. We also include interaction terms for *LIMIT ORDER* with each of our four insider sales variables; all interaction terms are statistically insignificant and our main inferences are unchanged. Finally, we exclude *LIMIT ORDER* observations from our sample altogether and estimate our main model for the remaining observations; inferences are qualitatively unchanged. Specifically, the estimated coefficient for $P\text{-}SALES$ remains positive and statistically significant (95.646, p-value $= 0.000$) and is again statistically larger than the estimated coefficient for $NP\text{-}SALES$. This first set of tests thus attempts to control for or purge our sample of

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[4] In this sense, any presence of limit order transactions arguably creates a less worrisome concern relative to prior insider trading studies like McVay et al. (2006). For example, McVay et al. identify a passive seller as *deciding to sell* after the MBE event. In contrast, a limit order plan seller is on record as having formed the desire to sell *before* the MBE event, thereby providing an incentive to ex ante behave in a strategic manner to achieve the trigger and to maximize the proceeds.

[5] Key words included variations of the following terms: limit, target, automatic, price floor, specified price, minimum, subject to price, predetermine, and preset. As noted elsewhere, firms disclose few details about their 10b5-1 plans, which makes it difficult to discern the presence of limit orders.

limit orders, thus mitigating concerns of the causality running in the opposite direction.

In further untabulated tests, we examine the potential differences between those observations with limit orders and those observations without and find that limit order firms are statistically different from their non-limit-order peers in three ways. We find limit order firms are more likely to (i) belong to high-technology industries, (ii) exhibit relatively smaller firm size, and (iii) have relatively higher levels of insider sales. In an effort to purge our sample of any limit order transactions that our key word search was not capturing, we exclude all three subsets of firms from our sample and again reestimate our main model.[6] Once again, our inferences are unchanged. Specifically, the estimated coefficient for *P-SALES* remains positive and statistically significant (7513.6, p-value $= 0.0481$).

Next, we revisit the evidence discussed in §5.2, regarding the plan sales of CEOs and CFOs relative to those of other key insiders. McVay et al. (2006, p. 581) argue that if the relation between insider sales and MBE is "merely a result of passive responses to performance, we expect the result to [also] hold for non-managers." In their study, they find that the sales of nonmanagers (e.g., directors and large stockholders) are not related to MBE. Similarly, in Table 5, we find that the relation between plan sales and MBE is economically and statistically significant for CEOs and CFOs (who arguably have more control/power over the MBE outcome), but the relation is not significant for other key insiders (who arguably have less control over MBE). This evidence further mitigates concerns of the potential reversed causality.

Taken together, we believe our evidence suggests that limit order transactions are unlikely to drive our main empirical results. Nonetheless, we cannot unambiguously rule out this possibility. The reader should therefore exercise caution in interpreting our results and making inferences based on them.

7.   Conclusion

Our study contributes to the growing literature that examines issues surrounding manager behavior under Rule 10b5-1 plans. Jagolinzer (2009) finds that plan sales transactions earn abnormal returns; however, he does not present the precise mechanisms through which such abnormal returns may be achieved. Our study complements the study of Jagolinzer (2009) by documenting one particular mechanism that managers may potentially use to achieve these abnormal returns—namely, meeting or

beating analysts' earnings expectations. In another study, McVay et al. (2006) find that aggregate insider sales are positively related to the probability of MBE; however, they do not make the important distinction between plan and nonplan sales. Our study complements the study of McVay et al. (2006) by disaggregating insider sales into its plan versus nonplan sales components. We document that plan sales exhibit up to 147% of the potential magnitude on the probability of MBE relative to nonplan sales.

Market participants may find our findings of relevance. Specifically, market participants have long sought to infer price-relevant information from insider trades (Ke et al. 2003), but have often interpreted 10b5-1 plan sales to be of diminished signaling value because such sales are presumably outside the insiders' control (e.g., Cooke 2002, Sasseen 2006, Welsch 2007). However, our findings suggest that such plan sales may potentially provide information about strategic managerial behavior that could be exploited for abnormal returns, particularly surrounding earnings announcement dates. Our findings may also be informative to regulators in their ongoing investigation of 10b5-1 plans. For instance, to the extent that the SEC is concerned with the plans being "abused in various ways to facilitate trades based on inside information," our evidence suggests that the MBE phenomenon may be one of the tools that certain insiders are exploiting.

Several significant caveats exist when interpreting our empirical results. First, the public disclosure of a 10b5-1 plan is a voluntary act. Like all voluntary disclosures, the decision to disclose may be driven by unmodeled economic forces. The voluntary nature of the disclosure may therefore potentially introduce bias or noise into our plan versus noplan partitioning variable. Another important caveat is the empirical fact that the specific details of 10b5-1 plans are rarely disclosed. Because of this paucity of disclosed details, we are unable to satisfactorily confirm the existence or nonexistence of certain features of the plan sales. For instance, our examination of the transactions reveals that very few firms disclose details about limit order instructions. We perform several tests (discussed in §6) to mitigate concerns related to unidentified limit order transactions. Last, when considering the MBE phenomenon, we have not specifically examined the other side of the equation—the managing of ex ante expectations. It is possible that firms are beating expectations by simply "walking down" the market's expectations to a level that is easily achieved. To the extent that this possibility is not modeled in our current study, our results related to accrual components should be interpreted with caution, as there is the possibility of a correlated omitted variables problem. Future studies may examine the voluntary disclosure patterns of firms that engage in plan sales

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[6] We exclude all high-technology firms, all firms with firm size lower than the median firm size, and all firms with insider sales higher than the median sales.

to determine whether such disclosures are indeed lowering market expectations. Similarly, there may be other methods that firms may use to beat expectations. For instance, the act of real earnings management through the cutting of R&D expenditures could conceivably contribute to the MBE phenomenon.

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