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SEC Rule 10b5-1 and Insiders' Strategic Trade

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The U.S. Securities and Exchange Commission enacted Rule 10b5-1 to deter insiders from trading with private information, yet also protect insiders' preplanned, non-information-based trades from litigation. Despite its requirement that insiders plan trades when not privately informed, the rule appears to enable strategic trade. Participating insiders' sales systematically follow positive and precede negative firm performance, generating abnormal forward-looking returns larger than those earned by nonparticipating colleagues. The observed association does not appear to be explained by market transaction disclosure response, "predictable" reversion following positive performance, or general periodic price declines. There is evidence, however, that a substantive proportion of randomly drawn plan initiations are associated with pending adverse news disclosures. There is also evidence that early sales plan terminations are associated with pending positive performance shifts, reducing the likelihood that insiders' sales execute at low prices. Collectively, this suggests that, on average, trading within the rule does not solely reflect uninformed diversification.

Key words: insider trading; Securities Exchange Act of 1934; diversification trade; planned trade

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1. Introduction

This study examines whether insiders strategically trade within the safe harbor provided by the U.S. Securities and Exchange Commission (SEC) Rule 10b5-1.¹ Rule 10b5-1, enacted in October 2000, provides an affirmative legal defense against civil and criminal penalties to insiders who preplan trades when they do not possess material nonpublic information. The defense is provided to allow insiders enhanced trade opportunity for uninformed diversification (U.S. Securities and Exchange Commission 2007a, b). Certain rule features, such as an option to early-terminate trade plans, a change in when the possession-of-information standard is assessed, and the opportunity for trades to execute during otherwise restricted trade windows, however, may allow insiders to trade strategically and earn abnormal trade rents while under enhanced legal protection.² This analysis should inform investors, firms, and regulators regarding how insiders utilize 10b5-1 trading

plans, which may have investment, governance, and regulatory policy implications.

Evidence suggests there is an association between Rule 10b5-1 participation and abnormal trade returns, indicating that trading within the rule does not solely reflect uninformed diversification. Specifically, participants' sales, the bulk of Rule 10b5-1 trade, tend to follow price increases and precede price declines, generating statistically significant forward-looking abnormal returns. There is also evidence that 10b5-1 plan initiations are associated with subsequent adverse news disclosure and that early sales plan termination is associated with positive firm performance.

The observed association between 10b5-1 sales and negative future returns does not appear to be due to a number of alternative explanations. Abnormal returns on participants' trades are significantly larger than abnormal returns on trades by nonparticipants at the same firms, suggesting that these returns are not the result of omitted firm-, industry-, or market-level factors. There is no evidence of a negative market response to disclosure of 10b5-1 transaction filings with the SEC. There is no evidence of a "predictable" price reversion (DeBondt and Thaler 1985) following sustained price increases in either a large cross section of nonsample firms or in the pre-10b5-1 returns history for the sample firms. There is also no evidence that results are driven by bear markets during the analysis window.

Collectively, results suggest that trade within Rule 10b5-1 does not reflect pure diversification and indicates that some insiders may avail themselves of

¹ Strategic trade is defined as trade executed nonrandomly to enhance trade gains or mitigate holding losses. Strategic trade is not necessarily illegal because some trade strategies technically comply with regulation and illegal trade must surpass some unobserved regulatory materiality threshold.

² These features may, in fact, encourage insiders to trade when they might not have otherwise. For example, Glen Meakem, chairman and CEO of FreeMarkets, Inc., sold \$3,000,000 of stock in 2001 within a Rule 10b5-1 trading plan where the final trade occurred five days before the company lowered earnings guidance for the year. "It's fair to assume that if the rule had not been adopted, he might have thought twice before selling so much stock in advance of an earnings report" (Lane 2001, p. 11).

unintended strategic loopholes. This strategic trade potential highlights the difficulty in designing regulation that mitigates insiders' information advantage when trading.³ If limiting strategic trade is optimal, regulators and firms might consider enhancing monitoring of or imposing constraints on 10b5-1 plan use. Results also suggest that participants' trade predicts future market performance. Outside investors, therefore, might consider 10b5-1 trade signals as a means to develop profitable trading strategies. Finally, results suggest that a predictable relationship exists between regulation that lowers insiders' trade risk and their trade behavior.^{4, 5}

This paper proceeds as follows: Section 2 provides background information about SEC Rule 10b5-1. Section 3 presents the hypotheses. Section 4 presents the sample. Section 5 presents results. Section 6 concludes the paper and discusses future research ideas.

2. Rule 10b5-1

The SEC released Rule 10b5-1 in October 2000, in part to deter insiders from trading while in possession of material nonpublic information. The rule specifically makes trading while in possession of material nonpublic information illegal across all jurisdictions. Prior to the rule, the SEC enforced this possession standard but some courts instead enforced a use standard.⁶ The SEC enacted the rule to effectively eliminate the use

standard because it is "highly doubtful that a person who knows inside information relevant to the value of a security can completely disregard that knowledge when making the decision to purchase or sell that security. . . . Indeed, even if the trader could put forth purported reasons for trading other than awareness of the inside information, other traders in the marketplace would clearly perceive him or her to possess an unfair advantage" (U.S. Securities and Exchange Commission 2000, paragraph III.A.1).

The SEC implemented relief within the rule, recognizing that the possession standard limits insiders' ability to trade for diversification. The rule provides an affirmative defense against litigation to insiders who preplan trades when they do not possess material nonpublic information. This safe harbor does not prevent a party from initiating a lawsuit against insiders, but it does provide insiders a defense "which, if found to be credible, will negate criminal or civil liability, even if it is proven that the defendant committed the alleged acts" (Quinlivan and Phelps 2001, Legal Information Institute 2008).

To qualify for the affirmative defense, insiders must: (1) enter into an explicit contract to purchase or sell firm securities; (2) transfer trade execution authority to an uninformed third party (for example, a broker); or (3) provide an uninformed broker an explicit written algorithm for trade execution. Within these constraints, the rule provides considerable plan structure flexibility regarding, for example, plan time length, trade volume, trade execution dates, and the use of market or limit orders. There are, therefore, numerous plan permutations available to insiders, ignoring further firm- or plan administrator-imposed restrictions. The appendix provides one plan structure example.⁷

Insiders may find trading within the rule costly because the rule limits their ability to influence trades after plans have been initiated. The rule expressly prohibits insiders' subsequent influence over whether specific planned trades may execute. Insiders may, however, selectively terminate their plans before they are scheduled to expire or selectively execute additional trades outside of their plans. These selective acts may compromise the rule's legal protection or trigger a negative market response. The SEC suggests that "[t]ermination of a plan . . . could affect the availability of the Rule 10b5-1(c) defense for prior

³ There is some evidence that regulation limits insiders' profitable trade opportunities. Insiders appear reluctant to trade profitably before forthcoming news events (Givoly and Palmon 1985), earnings announcements (Park et al. 1995), and management earnings forecasts (Penman 1982, Noe 1999), and insiders also appear to reduce profitable trade before takeover announcements (Seyhun 1992) and before negative earnings surprises (Garfinkel 1997) in response to regulation and case law that increases penalties for illegal insider trading.

⁴ Jaffe (1974) and Seyhun (1992) do not find evidence that regulation that increases insider trading enforcement and penalties had a decreasing effect on insider trading volume and profitability. So there is some ex ante ambiguity regarding the association between regulatory litigation risk and insiders' trade behavior.

⁵ Reported results derive from a sample of voluntarily disclosed Rule 10b5-1 participants. It is not clear how these results generalize to 10b5-1 trade behavior at nondisclosure firms because strategic trade may be correlated with disclosure choice. Firm-level choices (such as decisions to enact or disclose 10b5-1 plans) should not influence within-sample reported results, however, because potential firm-level choice bias is differenced away with a within-firm matched-pair research design.

⁶ For example, *United States v. Adler*, 137 F.3d 1325 (11th Cir. 1998) and *United States v. Smith*, 155 F.3d 1325 (9th Cir. 1998) supported the use standard. For trading to be deemed illegal, these courts required proof that an insider actually used material nonpublic information in his possession as a basis for his decision to trade. The use standard thereby allowed an insider in these jurisdictions to avoid legal jeopardy by credibly demonstrating that possession of nonpublic information did not influence his decision to

trade. Usually, this argument requires the insider to demonstrate some tangible need for the proceeds from the equity transaction (for example, a house purchase).

⁷ The example shown in the appendix may not represent a "typical" plan because it is voluntarily disclosed. Plan details are rarely disclosed. Publicly disclosed plans may differ from those not disclosed because disclosure may enhance plan commitment and monitoring.

plan transactions if it calls into question whether the plan was 'entered into in good faith' (U.S. Securities and Exchange Commission 2001, paragraph 15(b)). A roundtable of corporate attorneys suggests that trading outside of an existing plan, particularly to hedge or negate positions within the plan, will likely jeopardize the plan's legal protection.⁸ And there is anecdotal evidence that the market reacts negatively to a failure to comply with a preannounced trade commitment.⁹

Some 10b5-1 use is not observable because the SEC allows firms to choose who participates within the rule and whether participation is disclosed.¹⁰ The SEC tabled a proposal, initiated in April 2002, to mandate 8-K (and possibly Form 4) disclosure of insiders' enrollment in 10b5-1 trading plans.¹¹ Some firms, however, choose to voluntarily disclose participation in 10b5-1 plans, which provides the opportunity to identify the sample for this study.

3. Hypotheses

It is not possible to directly observe the relationship between insiders' trades and insiders' nonpublic information, so one must draw inferences regarding this relationship from ex post realizations of trade returns (e.g., Jaffe 1974) and the timing of trades relative to material information disclosure events (e.g., Karpoff and Lee 1991, Seyhun 1992, Seyhun and Bradley 1997, Noe 1999).

3.1. Abnormal Returns

One should not observe abnormal trade returns if participants comply with the rule's proscription that trades be planned absent private information.¹² The strength of the rule's legal defense relies on the notion that insiders will, in good faith, not plan trade when they possess material nonpublic information. In fact, for the legal defense to hold, the burden of proof rests with insiders to show they have complied with the

rule (Quinlivan and Phelps 2001). Therefore, it is possible that there is no association between participants' trades and abnormal returns.

However, one might observe abnormal trade returns if some elements of the rule allow participants to trade strategically. This is possible if (1) insiders believe other provisions of the rule inadvertently reduce litigation risk for informed trade; (2) the rule opens otherwise restricted trade opportunities; (3) the rule allows insiders to manipulate the timing or content of information disclosures subsequent to plan initiation; or (4) the rule allows participants to selectively terminate their trading plans at times when participants possess nonpublic information.

The rule may, inadvertently, reduce informed trade litigation risk because the rule applies the possession standard at the initiation date of the plan, not at the execution dates for trades within the plan. This shift forward makes it more difficult for shareholders or the SEC to link possession of information to execution of abnormally profitable trades.¹³

The rule opens otherwise restricted trade opportunities because some firms allow plan trades to execute within "blackout windows," such as prior to earnings announcements, where trading by insiders is normally forbidden.^{14, 15} Furthermore, the SEC allows 10b5-1 trades to execute during pension fund blackout windows.¹⁶ This may provide an incentive and enhance the opportunity for participants to trade during periods when they have a distinct information advantage.

The rule may provide participants the opportunity to manipulate the timing or content of disclosure related to material information obtained subsequent to faithful plan initiation. This is because the rule does not require an insider to abstain from trade if she obtains material nonpublic information after she has initiated her trading plan. Therefore, insiders with existing plans can disclose subsequently obtained

⁸ "Electronic Roundtable on Rule 10b5-1." [Cited: May 29, 2003.] <http://www.realcorporatelawyer.com/ElectronicRoundtable10b5-1.html>.

⁹ Healthon/WebMD's price fell 37% after the market discovered that two prominent insiders failed to comply with their publicly announced commitment to purchase shares (Simons 2000).

¹⁰ Typically, the board chooses whether to amend insider trade policy to allow 10b5-1 trade. Then firms generally delegate the decision of whether to trade within 10b5-1 to the insider. A few firms mandate trade through 10b5-1 to reduce litigation risk and reduce stock price sensitivity to insider trade signals. However, most firms value insider trade flexibility, consistent with Roulstone (2003).

¹¹ "Form 8-K Disclosure of Certain Management Transactions," SEC Release No. 33-8090, April 12, 2002.

¹² Systematic abnormal trade returns are generally indicative of insiders' information advantage (Finnerty 1976).

¹³ An example can illustrate this point. An insider sells shares the day before her firm releases news that triggers a large stock price decline. Without 10b5-1, courts evaluate whether she possessed material nonpublic information regarding the news release on the transaction date. Because of close proximity, there is a greater probability that courts will link the transaction with possession. However, if the transaction was planned six months earlier within the rule, courts must now assess whether she possessed material nonpublic information regarding the news release at the plan initiation date. Because of the distance between events, it will be more difficult for courts to link the transaction with possession.

¹⁴ Firms' use of the rule as a substitute for blackout windows was confirmed through discussion with several firms' corporate attorneys and a review of several firms' publicly disclosed insider trading policies.

¹⁵ See Jeng (1999), Bettis et al. (2000), and Roulstone (2003) for discussion about firm-imposed blackout windows.

¹⁶ Rule 101(c) of Regulation BTR, 17 CFR 245.101(c).

material nonpublic information when it maximizes planned trade profits.¹⁷

Finally, the SEC allows participants to terminate plans before events or changes in firm performance that might negatively affect their trade returns. Although this may affect participants' ability to successfully invoke the rule's legal defense, termination by insiders who possess nonpublic information is not technically illegal.¹⁸

3.2. Trade Strategies

There are several trade strategies that might allow 10b5-1 participants to generate positive abnormal returns.¹⁹ Participants, for example, might plan trade in anticipation of pending firm news events if they assess a lower probability that outsiders will discern possession of information at plan initiation. Participants might also modify the timing or content of news announcements to increase returns on previously planned trades. In these cases, one should observe greater sales trade preceding negative firm events and greater purchase trade preceding positive firm events.²⁰ In addition, if insiders plan 10b5-1 trade based on short-term information, then one should observe higher trade returns for trades executed in closest proximity to the plan initiation date. Participants might also terminate their trade plans prior to events or price patterns that would otherwise reduce their trade returns. In this case, one should observe sales plan terminations occurring before positive shifts in returns.

4. Sample

Rule 10b5-1 participants are identified from voluntary disclosure in SEC Form 4 and 8-K filings and in business press newswire releases. Table 1, panel A shows that 3,426 insiders from 1,241 firms are identified from Form 4, 8-K, and business wire disclosures between October 2000 and December 2005. Most

observations derive from Form 4 disclosures, thereby weighting the sample to periods that follow mandatory Form 4 electronic filing (May 7, 2003). Panel A shows little overlap between Form 4 and 8-K or business wire disclosure. Therefore, the sample size is increased by appending insider and firm observations from firms that disclosed participation through means other than Form 4.²¹

Because the sample is drawn from firms that voluntarily disclose 10b5-1 participation, some inference issues arise. Specifically, there may be systematic differences between firms that voluntarily disclose 10b5-1 participation and firms that do not (in governance characteristics, for example), which may impact how participants trade within their plans.²² Therefore, it is not clear whether results of this study can be generalized beyond the observed sample. Within-sample inference problems that might arise from firm-level selection bias, however, are mitigated through a within-firm research design.

Table 1 provides descriptive statistics for the disclosure firms (panel B), their insiders (panel C), and insiders' trade activity (panel D). Panel B of Table 1 shows that disclosure firms are smaller (lower assets, sales, and market value of equity), on average, than firms in the S&P 500 index, yet are larger than those listed on the Nasdaq exchange. Most disclosure firms are listed on Nasdaq (59.2%) and the New York Stock Exchange (35.0%). Some disclosure firms are ranked in the Fortune 500 (12.1%) or are included in the S&P 500 (13.6%). Rule 10b5-1 use is distributed across virtually all industry classifications with modest clustering in industries that Rogers and Stocken (2005) show to have greater general levels of litigation risk (e.g., biotechnology and electronics).

Panel C of Table 1 shows that most 10b5-1 participants are top-level managers. There is some lower-level management representation within this group (for example, Corporate Secretary), so the rule

¹⁷ Aboody and Kasznik (2000) show evidence that firms strategically modify news disclosure timing to lower employee option grant exercise prices.

¹⁸ The SEC explicitly states that the act of terminating a plan while aware of material nonpublic information does not result in liability under §10(b) and Rule 10b-5 because these regulations strictly apply in connection with the purchase or sale of a security. Therefore, a purchase or sale of a security must be present for liability to attach. See U.S. Securities and Exchange Commission (2001, paragraph 15).

¹⁹ Most 10b5-1 trades are sales transactions. Positive returns, in this context reflect insiders' ability to avoid negative returns by selling before price declines.

²⁰ It is not possible to empirically disentangle the two strategies because specific plan details are generally not publicly disclosed. An analysis similar to Aboody and Kasznik (2000) would require the ability to isolate an expected transaction date.

²¹ Specifically, all open-market transactions (from Thomson Financial Insider Trading database) that occur within the 350-calendar-day window subsequent to an 8-K or business wire disclosure of 10b5-1 plan commencement are appended. This assumes that all transactions during this window, which reflects the average disclosed trading plan length (Table 1, panel D), are pursuant to the insiders' 10b5-1 plan. Results are similar when analyses are estimated solely on the Form 4 disclosure sample.

²² Some firms choose to not allow 10b5-1 participation because they govern insider trades through alternative means (Jagolinzer et al. 2008) or because they are uncertain about the validity of the affirmative defense (phone conversation anecdote). Some firms also choose not to disclose details of insiders' 10b5-1 participation because of concerns regarding investor response (phone conversation anecdote). Sixty-eight of 378 Nasdaq-listed survey respondents chose to not disclose insider 10b5-1 participation between October 20, 2000 and December 31, 2002, suggesting that nondisclosed participation is substantive.

Table 1 Descriptive Statistics

Panel A									
Disclosure vehicle			Firms		Insiders				
Form 4 only			870		2,802				
Form 4 and 8-K/business wire			342		850				
8-K/business wire only			333		1,034				
Disclosed observations			1,545		4,686				
Observations missing returns data			(304)		(1,260)				
Sample observations			1,241		3,426				
Panel B									
Firm attributes	Sample		S&P 500		Nasdaq				
	Mean	Median	Mean	Median	Mean	Median			
Assets (\$ mill.)	5,543.96	391.57	36,039.65	8,921.88	934.76	165.38			
Sales (\$ mill.)	1,914.66	277.75	11,868.07	5,375.51	460.30	71.20			
MVE (\$ mill.)	2,731.52	377.59	16,005.83	6,349.34	697.69	93.37			
Mkt./Book	2.68	1.74	2.73	2.28	3.77	1.40			
NI/Assets	−0.07	0.02	0.04	0.04	−0.10	0.01			
NI/MVE	−0.005	0.02	0.01	0.04	1.52	0.01			
Panel C									
Demographics	<i>n</i>	Officer (%)	Director (%)	O & D (%)	Chmn. (%)	CEO (%)	Pres. (%)	CFO (%)	Secy. (%)
Sellers	3,312	56	14	30	11	28	15	11	4
Purchasers	114	28	31	40	15	25	18	4	5
Panel D									
Trade details					Sales		Purchases		
Average disclosed trading plan length in days (<i>n</i> = 811)					350.07		n/a		
Average number of transactions per insider					35.32		5.94		
Average total value transacted per insider (\$ mill.)					5.482		0.323		

Notes. (1) Firm attributes are computed from Compustat for the fiscal year ending 2002. Specifically, Assets are Compustat data6, Sales are Compustat data12, MVE is Compustat (data24 * data25), Mkt./Book is MVE scaled by Compustat data216, NI/Assets is Compustat data172 scaled by data6, and NI/MVE is Compustat data 172 scaled by MVE. (2) Insider demographics include any position an insider held between 2001 and 2005. O, Officer; D, Director; Chmn., Chairman; Pres., President; Secy., Secretary; mill., million.

does not appear to be exclusively available to top management.

Panels C and D of Table 1 show that 10b5-1 trades are predominantly sales. This is consistent with insiders using the rule to protect sales because insiders' sales are subject to greater litigation risk relative to insiders' purchases.²³ Specifically, the average total dollar volume of sales is almost 17 times that of purchases during the period. There are also approximately 29 sellers for every one purchaser.

5. Empirical Results

5.1. Abnormal Returns

Figure 1, panels A and B provide graphs of the average cumulative market-adjusted return preceding

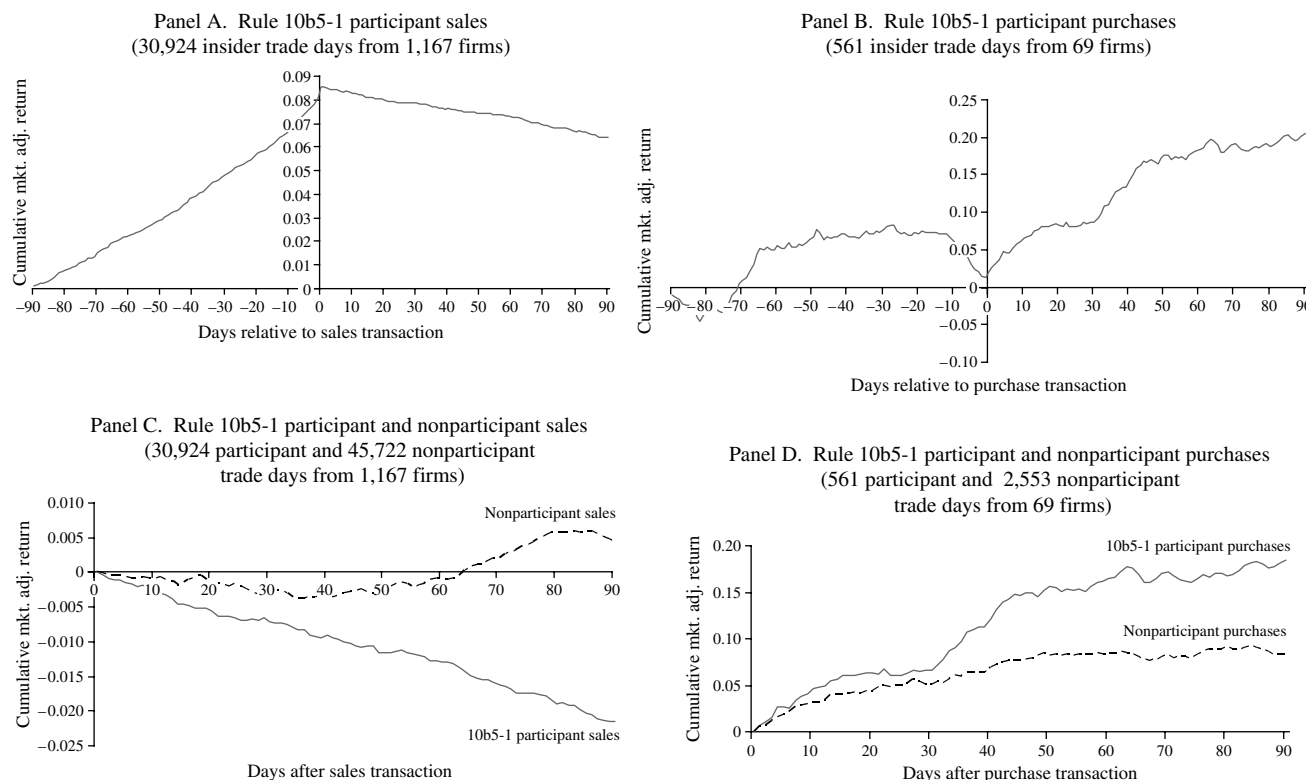
and following the sample 10b5-1 sales and purchase insider trade days. Daily market-adjusted returns are computed by subtracting the value-weighted Center for Research on Security Prices (CRSP) portfolio return from the firm's raw return.²⁴ Both panels show a discernable kink in the returns pattern, centered on the trade execution date. These returns patterns are similar in nature to those observed in studies that infer strategic behavior related to employee option grants (e.g., Yermack 1997, Aboody and Kasznik 2000, Lie 2005). Specifically, sales transactions appear to follow systematic run-ups and precede systematic declines.²⁵

²³ Johnson et al. (2007) show that insiders' net purchase volume (i.e., purchase minus sales volume) is inversely associated with the probability that a firm will be named as a 10b5 class-action suit defendant.

²⁴ Results are similar when firm returns are adjusted for the return to the equally weighted CRSP portfolio, the equally weighted Nasdaq portfolio, and the equally weighted S&P 500 firm portfolio.

²⁵ The sales cumulative adjusted return (CAR) pattern differs markedly from the general insider sales CAR pattern presented in Jeng et al. (2003, Figure 2). Jeng et al. (2003) show that CARs

Figure 1 Cumulative Market-Adjusted Return in Relation to 10b5-1 Transactions



Notes. (1) *Cumulative Mkt Adj Return* is the cross-sectional mean of each insider trade day's cumulative adjusted return. (2) Each insider trade day's cumulative adjusted return is computed as $CAR_t = \sum_{d=start}^t (R_t - R_{VWCRSP})_d$, where R_t is the firm's daily return; R_{VWCRSP} is the daily return to the CRSP value-weighted portfolio; *start* denotes the beginning CAR estimation date, which is day 90 for panels A and B and day 0 for panels C and D; and t denotes a specific day relative to the transaction execution date.

Purchase transactions appear to precede systematic run-ups.

Patterns in panels A and B support the notion that selected trades appear strategically timed; however, they do not, by themselves, necessarily relate to Rule 10b5-1 use. To obtain better inference regarding Rule 10b5-1, panels C and D compare 10b5-1 trade returns to a baseline set of trade returns for same-firm insiders who transact outside of the rule between 2001 and 2005. Panel C shows a marked after-trade pattern difference between the 10b5-1 sales (solid line) and sales executed outside of the rule (dashed line). Specifically, only sales executed within 10b5-1 appear to systematically anticipate pending firm performance declines. Panel D, however, does not show a marked difference across trader types for the first 30 days of postpurchase performance and generally shows that all traders' purchases tend to anticipate price increases.²⁶

To provide further evidence regarding the association between 10b5-1 trade and returns, one-, three-, and six-month future buy and hold market-adjusted

returns are reported for each insider trade day. Buy and hold returns are estimated to assess potential trade gains from the insiders' personal perspective (Barber and Lyon 1997).²⁷ Specifically, *MktAdjBHR* is computed as $BHR_w - VWBHR_w$, where BHR_w is the trade's w -month buy and hold return, $VWBHR_w$ is the w -month buy and hold return to the CRSP value-weighted portfolio, and w is a subscript for the one-, three-, or six-month return horizons, respectively.²⁸

Table 2 presents a comparison of 10b5-1 participants' sales- and purchase-related *MktAdjBHR* to *MktAdjBHR* generated by nonparticipants from the same firm. Comparing participants' returns to nonparticipants' returns during a similar period provides some control for firm-, industry-, and macro-level

subsequent to insiders' sales transactions between 1975 and 2006 are flat and approximate 0% for up to 100 days.

²⁶ Lakonishok and Lee (2001) document that insiders' purchases are generally associated with future positive returns performance.

²⁷ Several papers (e.g., Barber and Lyon 1997, Kothari and Warner 1997, Mitchell and Stafford 2000) document bias in buy and hold return estimates over long horizon windows. To mitigate potential bias in return estimates, short-horizon window (i.e., one- and three-month) buy and hold returns are reported as are alternative abnormal returns estimates in subsequent analyses.

²⁸ Sen (2008) demonstrates that dollar-weighted average buy and hold return estimates presented in prior versions of this paper may exhibit bias if there are 10b5-1 plan limit orders. The simple average buy and hold return estimates presented herein are not subject to this bias.

Table 2 Market Adjusted Buy and Hold Returns

Panel A									
Sales transactions	Horizon	Participant			Nonparticipant			Difference	
		<i>n</i>	Mean	<i>t</i> -stat.	<i>n</i>	Mean	<i>t</i> -stat.	Mean	<i>t</i> -stat.
<i>PriorRet</i>	1 month	30,924	0.028	36.72	45,722	0.063	74.06	−0.035	−30.65
<i>MktAdjBHRet</i>	1 month	30,924	−0.007	−11.12	45,722	−0.004	−5.64	−0.003	−3.67
<i>MktAdjBHRet</i>	3 month	30,924	−0.022	−18.84	45,722	−0.007	−5.58	−0.015	−9.46
<i>MktAdjBHRet</i>	6 month	30,924	−0.036	−21.85	45,722	−0.003	−1.73	−0.033	−13.88

Panel B									
Purchase transactions	Horizon	Participant			Nonparticipant			Difference	
		<i>n</i>	Mean	<i>t</i> -stat.	<i>n</i>	Mean	<i>t</i> -stat.	Mean	<i>t</i> -stat.
<i>PriorRet</i>	1 month	561	−0.033	−5.04	2,553	0.013	2.92	−0.046	−5.81
<i>MktAdjBHRet</i>	1 month	561	0.063	7.54	2,553	0.047	12.22	0.016	1.75
<i>MktAdjBHRet</i>	3 month	561	0.182	10.77	2,553	0.100	15.34	0.082	1.73
<i>MktAdjBHRet</i>	6 month	561	0.142	9.39	2,553	0.117	12.35	0.025	1.39

Notes. (1) *MktAdjBHRet* is the market-adjusted buy and hold trade return for insider transaction days between 2001 and 2005. It is computed as $BHR_w - VWBHR$, where BHR_w is the trade's w -month buy and hold return, and $VWBHR$ is the w -month buy and hold return to the CRSP value-weighted index. (2) *PriorRet* is the insider's *MktAdjBHRet* for the one-month period preceding transaction execution. (3) The sample derives from 74 firms (114 participating insiders) with purchase observations and 1,167 firms (3,312 participating insiders) with sales observations between 2001 and 2005. n denotes the number of insider transaction days.

variables that may otherwise influence participants' trade returns.

Table 2, panel A documents the one-month buy and hold return, *PriorRet*, that precedes insiders' sales. On average, both participants and nonparticipants observe statistically positive price movement before sales trades execute. Panel A also reports one-, three-, and six-month horizon buy and hold return estimates for both groups. For all three return horizons, the mean *MktAdjBHRet* is statistically more negative (difference = 0.3%, 1.5%, and 3.3% for one-, three-, and six-month horizons, respectively) for 10b5-1 participants than for nonparticipants from the same firms. This is consistent with the plot in Figure 1, panel C, which shows that 10b5-1 sales have a greater association than nonparticipating sales with future returns declines.

Table 2, panel B reports returns related to insiders' purchase transactions. Evidence indicates that purchases by both trader types precede price increases, confirming the plots in Figure 1, panels B and D. Also consistent with Figure 1, panel D, evidence does not statistically indicate that 10b5-1 purchases better predict future positive returns relative to nonparticipant purchases. This suggests that insiders may not generally regard purchases before price increases as high-risk transactions.

Insider characteristics associated with self-selection into trader groups could influence the *MktAdjBHRet* results documented in Table 2. To control for self-selection, *MktAdjBHRet* is regressed in a second-stage regression that includes a dichotomous partitioning variable for 10b5-1 participation and an inverse

Mills ratio computed from a first stage probit regression that estimates the decision to participate in a 10b5-1 program.²⁹ Inclusion of the inverse Mills ratio does not affect the statistically negative association between 10b5-1 participation and *MktAdjBHRet* computed over all three horizons (results not tabulated).

5.1.1. Alternative Abnormal Returns Estimates.

Inferences regarding the association between 10b5-1 participation and returns may be confounded by distributional biases in buy and hold returns (Barber and Lyon 1997, Kothari and Warner 1997, Mitchell and Stafford 2000). To mitigate the risk of abnormal returns bias, cross-sectional firm month and calendar-time portfolio time series excess returns are estimated to control for factors shown by Fama and French (1993) and Carhart (1997) to explain returns.

For the first analysis, the following cross-sectional regression is estimated for firm month observations that follow sales or purchase transaction months by one to six months.

$$(R_j - R_f) = a_0 + a_1(R_{mkt} - R_f) + a_2SMB + a_3HML + a_4MOM + \varepsilon. \quad (1)$$

R_j is the monthly firm return, R_f is the monthly risk-free interest rate (one-month treasury bill rate); R_{mkt} is the monthly value-weighted market average return;

²⁹ The probit regression (results not tabulated) finds that participation is associated more with the CEO and President officer positions, greater firm holdings, greater stock-based compensation, and greater prior period sales frequency.

Table 3 Four-Factor Post-Trade Abnormal Returns

Panel A												
	Cross section						Portfolio time series					
	Participant		Nonparticipant		Difference		Participant		Nonparticipant		Difference	
	Coeff.	t-stat.	Coeff.	t-stat.	Coeff.	t-stat.	Coeff.	t-stat.	Coeff.	t-stat.	Coeff.	t-stat.
Sales												
a_0	−0.003	−2.35	0.003	2.59	−0.006	−3.64	−0.007	−2.28	0.005	1.93	−0.012	−2.98
$R_{mkt} - R_f$	1.240	16.78	1.158	24.61			1.300	13.51	1.064	13.58		
<i>SMB</i>	0.777	7.36	0.748	14.69			0.911	8.15	0.866	9.16		
<i>HML</i>	−0.207	−2.10	−0.106	−1.19			−0.414	−3.03	−0.052	−0.48		
<i>MOM</i>	−0.014	−0.21	−0.077	−2.10			−0.096	−1.00	−0.157	−2.44		
Month obs.						54,659						88
R^2						0.170						0.931
Panel B												
	Cross section						Portfolio time series					
	Participant		Nonparticipant		Difference		Participant		Nonparticipant		Difference	
	Coeff.	t-stat.	Coeff.	t-stat.	Coeff.	t-stat.	Coeff.	t-stat.	Coeff.	t-stat.	Coeff.	t-stat.
Purchases												
a_0	−0.001	−0.22	0.011	4.75	−0.010	−4.35	0.011	1.66	0.012	4.05	−0.001	−0.265
$R_{mkt} - R_f$	1.016	2.70	0.990	14.88			0.918	2.83	0.854	9.85		
<i>SMB</i>	1.086	2.46	0.834	9.73			0.466	1.34	1.176	11.24		
<i>HML</i>	1.037	1.89	0.180	1.93			−0.385	−0.82	0.272	2.29		
<i>MOM</i>	−0.877	−3.79	−0.283	−5.35			−0.424	−1.37	−0.473	−6.64		
Month obs.						19,326						63
R^2						0.167						0.916

Notes. (1) Regression of $(R_j - R_f) = a_0 + a_1(R_{mkt} - R_f) + a_2SMB + a_3HML + a_4MOM + \varepsilon$, where R_j is the monthly firm return; R_f is the monthly risk-free interest rate (one-month treasury bill rate); R_{mkt} is the monthly value-weighted market average return; *SMB* is the monthly size factor mimicking return (Fama and French 1993); *HML* is the monthly book-to-market factor mimicking return (Fama and French 1993); *MOM* is the monthly momentum factor mimicking return (Carhart 1997). (2) Panel A reflects firm months that follow sales and panel B reflects firm months that follow purchases by one to six months. (3) Post-trade firm months are selected for 10b5-1 participants and nonparticipants from the same firms between 2001 and 2005. (4) Cross-section tests are estimated across all post-trade firm months and standard errors are adjusted by firm and calendar month double clusters (Gow et al. 2008, Petersen 2008). (5) For portfolio time-series tests (Mitchell and Stafford 2000), calendar month portfolio returns are computed when at least 15 firms are available. (6) Stacked regressions are estimated to provide coefficient difference test statistics.

SMB, *HML*, and *MOM* are the monthly size, book-to-market, and momentum mimicking factor returns (Fama and French 1993, Carhart 1997), respectively. Post-trade firm months are selected for 10b5-1 participants and nonparticipants from the same firms between 2001 and 2005. Standard errors are adjusted for potential cross-sectional and temporal correlation by firm and calendar month double clusters (Gow et al. 2008, Petersen 2008). Stacked regressions are estimated to provide coefficient difference test statistics across 10b5-1 participant and nonparticipant samples.

For the second analysis, the following portfolio time series regression is estimated for one to six month post-transaction calendar months in which at least 15 post-trade firm month observations are available to compute a portfolio month return.

$$(R_p - R_f) = a_0 + a_1(R_{mkt} - R_f) + a_2SMB + a_3HML + a_4MOM + \varepsilon. \quad (2)$$

R_p is the calendar month average portfolio return and all other variables are as described for Equation (1).

Post-trade firm months are selected for 10b5-1 participants and nonparticipants from the same firms between 2001 and 2005. Stacked regressions are estimated to provide coefficient difference test statistics across 10b5-1 participant and nonparticipant samples.

Table 3 reports results for estimating Equations (1) and (2) for firm months that follow both sales (panel A) and purchase (panel B) transactions. Panel A shows evidence consistent with Table 2 and Figure 1, that postsale monthly abnormal returns are negative for 10b5-1 participants (cross section $a_0 = -0.003$, t -statistic = −2.35; portfolio $a_0 = -0.007$, t -statistic = −2.28) and are more negative than postsale monthly abnormal returns for nonparticipants (cross section difference = −0.006, t -statistic = −3.64; portfolio difference = −0.012, t -statistic = −2.98).³⁰ Panel B does not provide evidence that 10b5-1 purchase

³⁰ The estimated excess returns appear substantive when considering that there is little evidence of an association between insiders' sales and subsequent negative firm performance in recent studies (e.g., Lakonishok and Lee 2001, Jenter 2005).

transactions are associated with returns that are more positive than returns that follow nonparticipants' purchase transactions. Collectively, cross-sectional firm month and calendar-time portfolio analyses support evidence of a systematic association between 10b5-1 sales and negative future performance, suggesting that sales within Rule 10b5-1 do not solely reflect uninformed diversification.³¹

5.2. Alternative Hypotheses

At least three alternative hypotheses may, in part, explain the observed association between 10b5-1 sales and subsequent negative abnormal returns. The first hypothesis suggests that a negative association might develop if the market responds negatively to Form 4 disclosure of insiders' sales transactions. The second hypothesis suggests that a negative association might develop if 10b5-1 sales plans include graduated limit orders and "predictable" mean reversion occurs subsequent to fulfillment of the limit orders (DeBondt and Thaler 1985). The third hypothesis suggests that a negative association might develop if trades execute randomly across general bear market periods.

5.2.1. Market Response to 10b5-1 Sales Disclosure. The market might respond negatively to insiders' sales transactions if the market suspects the transactions indicate insiders' private information or if the market infers that insiders have unwound a previously optimal level of equity incentives. To examine whether the market responds negatively to 10b5-1 sales transactions, the three-day cumulative abnormal return, centered on the Form 4 transaction disclosure date, is estimated for 23,340 sales transaction days executed by 10b5-1 participants between 2001 and 2005.³² The mean three-day response (raw return minus raw return to the value-weighted CRSP portfolio) is 0.21% (t -statistic = 6.80), which does not suggest that the market responds negatively, on average, to Form 4 disclosures of 10b5-1 sales.

³¹ For sensitivity, an additional cross-section analysis is estimated using a benchmark return procedure similar to the procedure described in Sen (2008) that is based on Daniel et al. (1997). Specifically, a monthly benchmark portfolio return, R_{bin} , is computed by sorting firms by market value of equity decile, then book-to-market ratio quintile, then prior one-year momentum return quintile. The average return in each of the 250 sort bins is then used as the benchmark for the post-trade firm month return in the following regression: $(R_j - R_{bin}) = a_0$. Excess return estimates and firm and calendar month double cluster adjusted t -statistics are consistent with estimates reported in Table 3 (10b5-1 participant sales $a_0 = -0.003$, t -statistic = -1.92; nonparticipant sales $a_0 = 0.002$, t -statistic = 1.78; difference t -statistic = -3.82).

³² Form 4s must be electronically filed within two days of transaction execution. If transaction execution authority has been delegated to a third party (as is the case for some 10b5-1 plans), the third party must notify the insider of trade execution within two days. The Form 4 must then be electronically filed within two days of insider notification.

5.2.2. "Predictable" Mean Reversion Subsequent to Price Run-Ups. If typical 10b5-1 sales transactions are executed subject to limit order instructions, then it is possible that the associated subsequent price decline reflects "predictable" mean reversion that "naturally" occurs after a sustained run-up in returns (which, presumably, would trigger the limit order sales).³³ To examine whether the potential exists for "predictable" mean reversion following sustained price increases, post-run-up returns are estimated for nonsample firms that observe a similar one-month prior price increase between 2001 and 2005, and for sample firms that observe a similar one-month prior price increase between 1997 and September 2000 (before Rule 10b5-1 enactment).³⁴ If post-run-up mean reversion is "predictable," then one would expect to observe similar magnitude reversion in the alternative samples.

Table 4 presents results for the analysis of "predictable" mean reversion in the alternative samples. By design, the one-month *PriorRet* estimate of 2.8% approximates the observed buy and hold performance preceding insiders' 10b5-1 sales (Table 2). In contrast to the results in Table 2, however, the subsequent *AbnRet* estimates are not statistically negative for either alternative sample. This casts doubt that one might expect "predictable" mean reversion of the observed magnitude following similar sustained price increases.

5.2.3. Random Trade During General Bear Markets. If the sample analysis window reflects a general bear market period, then it is possible that reported results reflect spurious correlation. To examine this possibility, industry-specific calendar-time portfolio abnormal returns (Mitchell and Stafford 2000) are estimated across the entire sample period, the first and second halves of the sample period, and for each year of the sample period. In all cases, results (untabulated) do not provide evidence of systematic negative abnormal returns within any two-digit industry classification, suggesting that a general bear market does not describe the selected time period.

5.3. Trade Patterns

The previous analyses indicate that 10b5-1 participants, on average, generate abnormal trade returns

³³ It is not possible to discern whether 10b5-1 plans share a common structure because there is no mandate to disclose 10b5-1 plan terms. It is possible, however, that a number of plans observed in the sample contain instructions to execute sales subject to meeting limit order thresholds. Several of the few publicly disclosed explicit trading plans delineate graduated limit order sales thresholds, where instructions dictate greater sales volume after meeting higher price thresholds.

³⁴ Results are similar when firms are selected based on similar three-month run-up returns.

Table 4 Alternative Hypothesis: “Predictable” Mean Reversion

	Window	Nonsample CRSP 2001–2005			Sample 1997–Sept. 2000		
		<i>n</i>	Mean	<i>t</i> -stat.	<i>n</i>	Mean	<i>t</i> -stat.
<i>PriorRet</i>	1 month	1,167	0.028	275.20	1,167	0.028	277.32
<i>AbnRet</i>	1 month	1,167	0.006	1.71	1,167	−0.001	−0.29
<i>AbnRet</i>	3 month	1,167	0.022	3.64	1,167	0.005	0.62
<i>AbnRet</i>	6 month	1,167	0.048	5.43	1,167	0.026	1.99

Notes. (1) Out-of-sample estimation of buy and hold returns after observing price increases. (2) A sample draw pool is identified from all firm-day observations that observe a one-month prior buy and hold abnormal return (*PriorRet*) of no less than 2.4% and no more than 3.2%. A sample of 1,167 firm-day observations is randomly drawn from the sample draw pool to compute cross-sectional averages and *t*-statistics for *AbnRet*, which is the buy and hold abnormal trade return during the window. *AbnRet* is computed as the firm's buy and hold raw return minus the buy and hold return to the CRSP value-weighted index. This procedure is iterated 1,000 times and the average of the 1,000 cross-sectional averages is reported.

from sales transactions, suggesting that there may be strategic trade within the rule. In this section, 10b5-1 trade patterns are examined to better discern how insiders may generate the documented abnormal returns. Trade volume immediately before earnings announcements is first analyzed to determine whether trades appear to anticipate pending earnings news. The association between specific trades' abnormal returns and the timing of these trades relative to plan initiation is then analyzed to determine whether participants appear to initiate plans with short-term private information. The association between 10b5-1 plan initiation and subsequent longer-term news disclosure is then examined to determine whether participants' trades appear to anticipate the pending news. Finally, the association between firm returns and early sales plan termination is examined to discern whether insiders appear to terminate plans to prevent sales at lower prices.

5.3.1. Trade Patterns Before Earnings Announcements. Prior research shows that insiders are typically reluctant to trade before pending information releases (e.g., Givoly and Palmon 1985, Noe 1999, Jagolinzer and Roulstone 2008) due to litigation concerns or firm-imposed trade restrictions. If Rule 10b5-1 reduces insiders' litigation risk expectations, then insiders might be more inclined to initiate trade before pending information releases. To examine 10b5-1 trade immediately before earnings announcements, the following Tobit regression is estimated:

$$\text{PercVol}_{ijq} = b_0 + b_1 \text{Part10b5-1}_i + b_2 \text{NegEarningsResp}_{jq} + b_3 (\text{Part10b5-1} * \text{NegEarningsResp})_{ijq} + \varepsilon_{ijq}, \quad (3)$$

where *PercVol* is the dollar volume of firm equity sold by the insider during the 20-trading-day window preceding a quarterly earnings announcement scaled by the firm's prior quarter market value of equity; *Part10b5-1* is a dichotomous variable that equals one if an insider's trades execute within a Rule 10b5-1

plan and is zero otherwise; *NegEarningsResp* is a dichotomous variable that equals one if the firm's three-day market response to its quarterly earnings announcement (the firm's three-day raw return, centered on the Compustat quarterly announcement date, minus the three-day raw return to the CRSP value-weighted portfolio) is negative and is zero otherwise; and *i*, *j*, and *q*, are subscripts denoting insider, firm, and quarter, respectively. If participating insiders tend to sell greater volume before negative earnings news, then the coefficient for *Part10b5-1 * NegEarningsResp* should be positive.

Table 5 provides results of the Tobit estimation for both sales and purchase transactions. For sales transactions, Equation (3) is estimated for 3,312 participants and 9,546 nonparticipants from 1,167 firms that have an average of 17.74 quarterly earnings announcement dates between 2001 and 2005 with available data from Compustat (the quarterly earnings announcement date) and CRSP (prices). For purchase transactions, Equation (3) is estimated for 114 participants and 449 nonparticipants from 74 firms that have an average of 16.33 quarterly earnings announcement dates between 2001 and 2005 with available data. Regression *t*-statistics are corrected for firm-level clusters in accordance with Rogers (1993). Both panels show that 10b5-1 participants are more apt than nonparticipants to initiate sales and purchases in short windows immediately before earnings announcements. The 0.0118 (*t*-statistic = 6.91) coefficient estimate for sales transactions suggests that the marginal probability of observing sales trade before earnings increases by 3.2% if the trader participates in Rule 10b5-1.³⁵ Relatedly, the expected increase in trade volume conditional on observing sales trade is 0.129% of market value of equity greater for 10b5-1 participants than for nonparticipants. Collectively,

³⁵ See McDonald and Moffitt (1980) and Roncek (1992) for discussion of how to interpret Tobit regression coefficient estimates.

Table 5 Volume Before Earnings Announcements

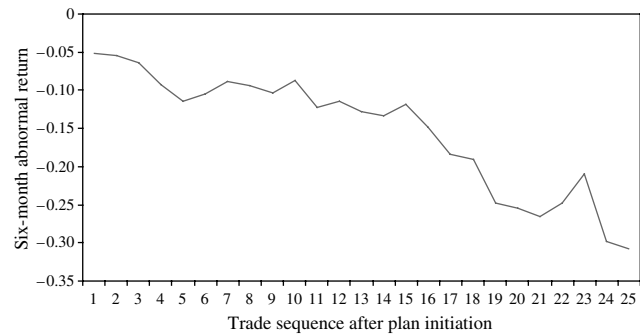
	Sales transactions		Purchase transactions	
	Coeff.	t-stat.	Coeff.	t-stat.
Intercept	−0.0420	−6.73	−0.0033	−2.66
Part10b5-1	0.0118	6.91	0.0004	1.93
NegEarningsResp	0.0004	0.60	−0.0003	−1.72
Part10b5-1 * NegEarningsResp	−0.0003	−0.33	−0.0003	−1.26
Left-censored observations	224,205		8,938	
Uncensored observations	3,911		246	
Pseudo R ²	0.462		0.001	

Notes. (1) Tobit estimation of the percentage of firm equity traded within a 20-trading-day window immediately before earnings announcements. (2) $PercVol_{ijq} = b_0 + b_1 Part10b5-1_i + b_2 NegEarningsResp_{jq} + b_3 (Part10b5-1 * NegEarningsResp)_{ijq} + \varepsilon_{ijq}$, where $PercVol$ is the dollar volume of firm equity sold by the insider during the 20-trading-day window preceding a quarterly earnings announcement scaled by the firm's prior quarter market value of equity; $Part10b5-1$ is a dichotomous variable that equals one if an insider's trades executed within a Rule 10b5-1 plan and is zero otherwise; $NegEarningsResp$ is a dichotomous variable that equals one if the firm's three-day market response to its quarterly earnings announcement is negative and is zero otherwise; the firm's three-day market response is computed as the firm's three-day raw return, centered on the Compustat quarterly announcement date, minus the three-day raw return to the CRSP value-weighted portfolio for the same period; and i , j , and q , are subscripts denoting insider, firm, and quarter, respectively. (3) t -statistics are corrected for firm-level clusters (Rogers 1993).

this suggests that the rule appears to relax litigation constraints to trade in short windows that precede earnings announcements, which are periods that are frequently otherwise restricted from trade (Jeng 1999, Bettis et al. 2000, Roulstone 2003, Jagolinzer and Roulstone 2008).

Table 5 does not show evidence that Rule 10b5-1 participants increase the probability of trade or the magnitude of trade volume before earnings news that the market perceives to be negative. The coefficient estimate for $Part10b5-1 * NegEarningsResp$ is neither statistically positive for sales nor statistically negative for purchases. Therefore, there is no systematic evidence of strategic trade in relation to the sign of the earnings news.

5.3.2. Relative Trade Timing and Abnormal Returns. To examine further whether participants plan trade when they have short-term private information, Figure 2 plots each trade's six-month buy and hold abnormal return as a function of its relative sequence from the 10b5-1 plan start date.³⁶ Figure 2 includes all trades by participants who disclosed 10b5-1 participation through 8-K or newswire release and who initiated at least five trades within the 350-day period following this disclosure. If participants plan trades with short-term information, one would expect to see

Figure 2 Abnormal Trade Returns in Proximity to 10b5-1 Plan Initiation Date

Notes. (1) The figure plots the mean abnormal trade returns for sales trades in relation to their proximity to the 10b5-1 plan initiation date. (2) The figure is plotted for all 10b5-1 participant observations that disclosed plan initiation dates and then executed at least five trades within the 350 days subsequent to plan initiation disclosure. (3) *Six-month abnormal return* is the mean buy and hold abnormal return computed as a trade's six-month buy and hold return minus the six-month buy and hold return to the CRSP value-weighted index. (4) *Trade sequence* is a transaction's timing rank relative to other transactions executed by the insider during the 350 day window subsequent to plan initiation disclosure (e.g., sequences 1, 2, and 3, denote the insider's first, second, and third trades, respectively, subsequent to plan initiation disclosure).

decay in abnormal returns as the sequence of trades gets farther along. For sales, this would suggest the largest negative future return is associated with the sale closest to plan initiation. Figure 2 provides evidence inconsistent with this hypothesis. Specifically, Figure 2 shows the largest negative future returns are, instead, associated with trades executed farther away from the 10b5-1 announcement date. This pattern may reflect that insiders are hesitant to place high-profit trades in close proximity to the plan start date because insiders' litigation risk is increasing in proximity.³⁷

The pattern in Figure 2 may be affected by a potential association between abnormal trade returns and the number of trades executed by an insider during the period. For example, insiders who trade more frequently might generate more negative abnormal trade returns. To control for this, $AbnRet$, the trade's six-month buy and hold return minus the six-month buy and hold return to the value-weighted CRSP portfolio, is regressed on the numerical timing of the trade in relation to other trades executed in the year and the total number of trades executed by an insider during the year. Regression results (untabulated) support the pattern in Figure 2, after controlling for the number of transactions during the period.

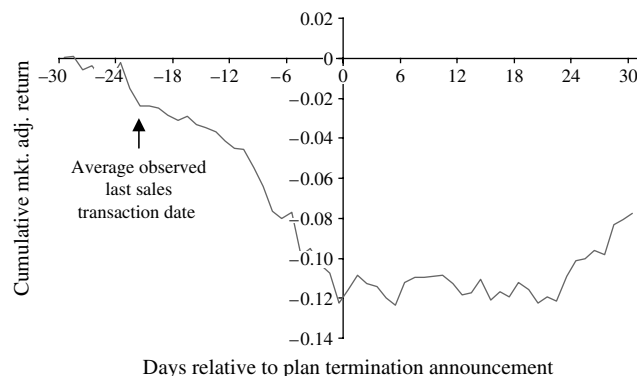
³⁶ The 10b5-1 announcement surrogates for the actual plan start date when the start date is not disclosed.

³⁷ As noted in §3, courts and regulators apply the possession-of-material-information standard regarding legality of trade at the 10b5-1 plan initiation date. Therefore, if a materially profitable trade is observed in close proximity to the plan initiation date, it increases the likelihood that the trade or the plan may be perceived as illegal.

5.3.3. Rule 10b5-1 Plan Initiation and Subsequent Adverse News Events. Evidence, to this point, suggests that 10b5-1 abnormal returns are not associated with shorter-term information. To better assess the type of information that might underlie documented returns patterns, 60 plan announcements are randomly drawn from the pool of 8-K and newswire disclosures to discern whether an association exists between plan initiation and pending longer-term news disclosures. Table 6 delineates the 60 randomly drawn observations, their industry affiliation, and the number of days that transpire between initiation, and a subsequent potentially adverse news event. To gauge whether there are subsequent adverse news events, Lexis-Nexis businesswire news summaries are examined for reports of adverse news during the 180-day calendar period that follows plan initiation. For 19 firms (32%), there does not appear to be adverse news within this period, denoted by “n/a” for the number of days. For 41 firms (68%), however, potentially adverse news is identified for which three-day raw and market-adjusted returns are computed.³⁸ Eight of the selected event market-adjusted returns are positive; however, many randomly selected plan initiations precede materially negative news. On average, plan initiation precedes adverse news events (that exhibit a mean market-adjusted return of -9.9%) by 72.2 days. This suggests that an association between plan initiation and pending adverse news disclosure exists, identifying a potential source for the documented abnormal trade returns.

5.3.4. Price Patterns and Early Plan Termination. Another potential source for documented abnormal trade returns patterns may be selective early termination of sales plans in anticipation of positive returns. To examine the association between price patterns and plan terminations, Figure 3 plots the average cumulative adjusted return for a sample of 54 firms for which there is public disclosure of early sales plan termination.³⁹ Figure 3 shows a noticeable kink in the cumulative adjusted return at date 0, when sales plans were announced to be terminated early. Prior to termination, returns appear negative. Immediately after termination, returns appear to reverse, beginning a gradual climb upward.⁴⁰ An analysis of news

Figure 3 Cumulative Market-Adjusted Returns and Early 10b5-1 Plan Termination



Notes. (1) The figure plots cumulative market-adjusted (mkt. adj.) returns relative to a 10b5-1 plan termination announcement date. (2) *Cumulative adjusted return* is the cross-sectional mean of each firm's cumulative adjusted return, computed as $CAR_t = \sum_{d=-33}^t (R_{it} - R_{VWCSP})_d$, where R_{it} is the firm's daily return; R_{VWCSP} is the daily return to the CRSP value-weighted portfolio; and t denotes a specific day relative to the plan termination announcement. (3) The figure is estimated for 54 observed 10b5-1 early plan terminations.

disclosures during the 90 days subsequent to early plan termination (untabulated) shows that 46% of the observations precede positive news events. This compares with only 11% (7%) of terminations preceding negative (ambiguous) news events.⁴¹ This pattern is consistent with insiders timing sales plan termination to avoid sales that execute at low price points.⁴² It is interesting to note that, for this sample of observed sales plans, the average last observed sales transaction is executed 21 days prior to the termination announcement, which appears to avoid the subsequent returns decline.

6. Conclusions and Future Research

The evidence documented in this study collectively points to some level of general strategic trade by participants in Rule 10b5-1. There is evidence that participants' sales, on average, generate abnormal trade returns, that a substantive proportion of selected 10b5-1 plan initiations are associated with pending adverse news disclosure, and that participants

³⁸ Potentially adverse news, for example, includes lower quarterly earnings guidance, missing earnings expectations, accounting inquiries, and analyst downgrades.

³⁹ There is no requirement to disclose plan terminations, so the sample size of observed terminations is inherently small.

⁴⁰ Statistically, firms exhibit average raw and market-adjusted buy and hold returns of -10.4% and -10.6% over the 30 days preceding termination. After termination, firms' exhibit raw and market-adjusted buy and hold returns of 10% and 4.8% over the next six

months, which are statistically greater than pre-termination returns (t -statistic = 3.25, 2.74 respectively).

⁴¹ Positive news events include disclosures of “best ever” quarterly profit, “first ever” quarterly profit, FDA or Canadian authority drug approval, new listing on a major exchange, and share repurchases. Negative news events include revenue recognition scrutiny and lowered earnings or revenue guidance. Ambiguous news events include senior management resignation or turnover. No discernable news events are identified for 36% of observations.

⁴² Prices may also increase in response to the termination announcement. If so, however, one would expect to see an immediate price jump subsequent to the announcement rather than the gradual price increase that is observed.

Table 6 Rule 10b5-1 Plan Initiation and Subsequent News

Draw	Industry	Days after plan init.	Adverse news summary	Three-day raw ret. (%)	Three-day Mkt. Adj. Ret. (%)
1	Crude petroleum and natural gas	n/a	None observed	n/a	n/a
2	Special trade contractor	147	Lowered qrtly. earnings guidance	−24.3	−25.3
3	Beverages	108	Weakened sales	−2.5	−0.9
4	Greeting cards	62	Plant closure announcement	1.0	0.4
5	Periodicals	n/a	None observed	n/a	n/a
6	Drugs	77	Suspending drug trials	−34.9	−35.8
7	Drugs	n/a	None observed	n/a	n/a
8	Drugs	173	Suspending drug trials	−42.7	−40.0
9	Drugs	n/a	None observed	n/a	n/a
10	Drugs	58	Qrtly. earnings below estimates	−1.4	−1.4
11	Drugs	60	Qrtly. earnings below estimates	−12.0	−12.0
12	Drugs	34	Drug trial delay	−25.5	−26.2
13	Petroleum refining	n/a	None observed	n/a	n/a
14	Blast furnace and basic steel products	73	Credit rating downgrade	−2.5	−3.5
15	Ordnance and accessories	89	Firm associated with mishap	−3.8	−4.2
16	Computer and office equipment	39	Weakened sales	−3.9	−4.5
17	Computer and office equipment	n/a	None observed	n/a	n/a
18	Construction and related machinery	n/a	None observed	n/a	n/a
19	Computer and office equipment	87	Qrtly. earnings below estimates	−43.9	−43.1
20	Communications equipment	171	Forthcoming charge for legal settlement	0.5	3.1
21	Electronic components and accessories	n/a	None observed	n/a	n/a
22	Electronic components and accessories	n/a	None observed	n/a	n/a
23	Communications equipment	73	Qrtly. earnings below estimates	−18.2	−17.4
24	Electronic components and accessories	16	Forthcoming impairment charge	−12.9	−12.2
25	Medical instruments and supplies	n/a	None observed	n/a	n/a
26	Measuring and controlling devices	50	Analyst downgrade	5.0	2.7
27	Medical instruments and supplies	n/a	None observed	n/a	n/a
28	Railroads	n/a	None observed	n/a	n/a
29	Trucking and courier service	n/a	None observed	n/a	n/a
30	Telephone communication	41	SEC inquiry and restatement of prior financials	−2.8	−4.0
31	Women's clothing stores	65	Review of accounting practices	2.6	1.4
32	Eating and drinking place	62	Qrtly. earnings below estimates	−8.8	−8.0
33	Eating and drinking place	10	Union boycott	−3.1	−4.1
34	Eating and drinking place	130	Qrtly. earnings below estimates	0.4	−1.7
35	Misc. shopping goods store	33	Late qrtly. filing; weakened sales	−25.5	−24.2
36	Commercial bank	n/a	None observed	n/a	n/a
37	Nondepository institution	153	Lowered qrtly. earnings guidance	−8.1	−8.3
38	Security and commodity broker	95	Qrtly. earnings below estimates	−6.8	−8.9
39	Fire, marine and casualty insurance	n/a	None observed	n/a	n/a
40	Miscellaneous investing	63	Pending restatement due to accounting error	−0.7	−0.9
41	Computer and data processing service	n/a	None observed	n/a	n/a
42	Computer and data processing service	n/a	None observed	n/a	n/a
43	Computer and data processing service	98	Network security breach	0.8	1.4
44	Personnel supply service	80	Named defendant in class action suit	2.0	0.8
45	Computer and data processing service	98	Lowered qrtly. earnings guidance; analyst downgrade	−7.2	−6.4
46	Computer and data processing service	133	Forthcoming charge for accounting error	−4.7	−5.2
47	Computer and data processing service	n/a	None observed	n/a	n/a
48	Computer and data processing service	6	Acctg. investigation; lawsuit; execs. placed on leave	−17.4	−15.3
49	Computer and data processing service	3	Pending delisting	−20.9	−23.7
50	Computer and data processing service	41	Qrtly. earnings below estimates	−6.5	−5.7
51	Computer and data processing service	73	Named defendant in class action suit	1.0	−1.4
52	Computer and data processing service	57	Restructuring	−5.6	−6.2
53	Computer and data processing service	69	Acctg. investigation	−14.1	−7.8
54	Advertising	18	Analyst downgrade	−0.9	0.6
55	Computer and data processing service	21	Analyst downgrade	9.7	7.5
56	Misc. health and allied service	21	Medical treatment deemed ineffective	−45.8	−42.7
57	Educational service	n/a	None observed	n/a	n/a
58	Research and testing service	55	Auditor resignation	−8.5	−9.6
59	Research and testing service	87	Qrtly. earnings below prior quarter	−4.0	−5.5
60	Management and public relations	133	Qrtly. revs. below estimates	−7.8	−7.7
Mean		72.2		−9.9	−9.9

Notes. (1) The table documents adverse news disclosures that are observed within 180 days subsequent to randomly drawn Rule 10b5-1 initiation (init.) disclosures. (2) Adverse news disclosures are identified through a Lexis-Nexis business wire search. (3) Three-day raw and market-adjusted returns (Mkt. Adj. Ret.; raw return minus the raw return to the value-weighted CRSP portfolio over the same window) are reported for the adverse news disclosure dates. Qrtly., quarterly; acctg., accounting; revs., revenues; execs., executives.

terminate sales plans before positive shifts in firm returns.

It is important to note that evidence described in this study is not necessarily indicative of illegal behavior. Regulators generally consider many factors when determining whether particular trade patterns appear to violate insider trading laws. Perhaps the most important factor is that of materiality, and it is not clear that the patterns and returns described herein are material enough to warrant regulatory concern. The evidence in this study should still provide interesting inferences for those who debate whether insiders should be allowed to earn even small abnormal trade returns (in other words, trade returns that are below legally enforceable materiality thresholds yet are still tangible), and whether insiders should be able to abstain from trade when they have private information (e.g., Fried 2003).⁴³ The evidence should also provide some interesting inferences for those who monitor insider trading patterns in an attempt to predict pending firm performance.

This study leaves open the question of how 10b5-1 participants are able to generate abnormal trade returns. There is some evidence that suggests participants terminate plans before price increases, which provides a partial explanation for the association between observed sales and future price declines. However, abnormal returns could also result if participants plan trade when they possess nonpublic information or if participants alter the timing or content of disclosures once trades have already been planned. Given current disclosure rules, it is not possible to empirically disentangle these potential strategies. Future research might examine this more thoroughly, particularly if new disclosure rules are implemented that provide more detailed data.

There are still some interesting questions to address regarding the market effects of disclosing participation within Rule 10b5-1. The rule presents one of the few instances where firms provide ex ante information regarding pending insider trades. It might be useful to examine how the market responds to 10b5-1 announcements and to what degree these announcements impact insiders' trade returns. If these announcements reduce insiders' profits, it would be interesting to then examine why firms voluntarily disclose this information when there is no current mandate for this disclosure.

⁴³ The argument against allowing insiders to earn any abnormal trade returns is based in information property rights (summarized in Bainbridge 2001). For example, in *Diamond v. Oreamuno*, 248 N.E.2d 910, 912 (N.Y. 1969), the court ruled that an agent "who acquires special knowledge or information by virtue of a . . . fiduciary relationship with another . . . must account to his principal for any profits derived therefrom."

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Appendix. Sales Plan Excerpt

SALES PLAN dated November 14, 2001 (this "Sales Plan") between The Estate of Michael Chowdry, represented by Linda Chowdry and John S. Blue, acting jointly as Trustees of the Trust (collectively the "Seller") and Morgan Stanley & Co. Incorporated ("Morgan Stanley"), acting as agent for Seller.

Recitals

1. This Sales Plan is entered into between Seller and Morgan Stanley for the purpose of establishing a trading plan that complies with the requirements of Rule 10b5-1(c)(1) under the Securities Exchange Act of 1934, as amended (the "Exchange Act").

2. Seller is establishing this Sales Plan in order to permit the orderly disposition of a portion of Seller's holdings of the Common Stock, par value \$0.01 per share (the "Stock"), of Atlas Air Worldwide Holdings, Inc. (the "Issuer").

Implementation of the Plan

1. Seller hereby appoints Morgan Stanley to sell shares of Stock pursuant to the terms and conditions set forth below. Subject to such terms and conditions, Morgan Stanley hereby accepts such appointment.

2. Morgan Stanley is authorized to begin selling Stock pursuant to this Sales Plan on November 15 (date of 3rd Q 10-Q and shall cease selling Stock on the earliest to occur of (i) the date on which Morgan Stanley is required to suspend or terminate sales under the Sales Plan pursuant to paragraph D.1 below; (ii) the date on which Morgan Stanley receives notice of the death of Linda Chowdry; (iii) the date on which the Issuer or any other person publicly announces a tender or exchange offer with respect to the Stock or a merger, acquisition, reorganization, recapitalization, or comparable transaction affecting the securities of the Issuer as a result of which the Stock is to be exchanged or converted into cash and/or shares of another company; (iv) the date on which Morgan Stanley receives notice of the commencement or impending commencement of any proceedings in respect of or triggered by Seller's bankruptcy or insolvency;

(v) the date that the aggregate number of shares of Stock sold pursuant to this Sales Plan reaches 1,500,000 shares; or (vi) November 15, 2002 (the "Plan Sales Period").

3. (a) During the Plan Sales Period, Morgan Stanley shall sell 125,000 shares of Stock for the account of Seller during each 30 calendar day period, the timing of each sale to be determined by Morgan Stanley in its sole discretion.

4. Morgan Stanley shall not sell Stock hereunder at any time when (i) Morgan Stanley, in its sole discretion, has determined that a market disruption, banking moratorium, outbreak or escalation of hostilities or other crisis or calamity that could, in Morgan Stanley's judgment, impact sales of the Stock has occurred; or (ii) Morgan Stanley, in its sole discretion, has determined that it is prohibited from doing so by a legal, contractual, or regulatory restriction applicable to it or its affiliates or to Seller or Seller's affiliates (other than any such restriction relating to Seller's possession or alleged possession of material nonpublic information about the Issuer or the Stock); or (iii) Morgan Stanley has received notice from the Seller that during the Plan Sales Period, a legal, contractual, or regulatory restriction that is applicable to Seller or Seller's affiliates, including, without limitation, any restriction related to a merger or acquisition or a stock offering requiring an affiliate lock-up, would prohibit any sale pursuant to the Sales Plan (other than any such restriction relating to Seller's possession or alleged possession of material nonpublic information about the Issuer or its securities); or (iv) Morgan Stanley has received notice from Seller to terminate the Sales Plan in accordance with paragraph D.1 below.

5. (a) Seller agrees to deliver the Stock to be sold pursuant to this Sales Plan (the "Plan Shares") into an account at Morgan Stanley in the name of and for the benefit of Seller (the "Plan Account") prior to the commencement of sales under this Sales Plan. (b) Morgan Stanley shall withdraw Stock from the Plan Account in order to effect sales of Stock under this Sales Plan. Morgan Stanley agrees to notify Seller promptly if at any time during the Plan Sales Period the number of shares of Stock in the Plan Account is less than the number of Plan Shares remaining to be sold pursuant to this Sales Plan. Upon such notification, Seller agrees to deliver promptly to the Plan Account the number of shares of Stock necessary to eliminate this shortfall. (c) To the extent that any Stock remains in the Plan Account after the end of the Plan Sales Period or upon termination of this Sales Plan, Morgan Stanley agrees to return such Stock promptly to the Issuer's transfer agent for relegending to the extent that such Stock would then be subject to transfer restrictions in the hands of the Seller.

6. Morgan Stanley shall in no event effect any sale under this Sales Plan if the Stock to be sold is not in the Plan Account.

7. Morgan Stanley may sell Stock on any national securities exchange, in the over-the-counter market, on an automated trading system or otherwise. Seller agrees that if Morgan Stanley is a market maker in the Stock at the time that any sale is to be made under this Sales Plan, Morgan Stanley may, at its sole discretion, purchase the Stock from Seller in its capacity as market maker. Morgan Stanley shall sell the Stock under ordinary principle of best execution at the then prevailing market price.

8. Morgan Stanley shall promptly notify the Seller in writing of any sales made by Morgan Stanley pursuant to this Sales Plan.

Termination

1. This Sales Plan may not be terminated prior to the end of the Plan Sales Period, except that: (i) upon three days prior written notice sent to Morgan Stanley's compliance office by overnight mail and by facsimile at the address and fax number set forth in paragraph G.4 below, it may be suspended or terminated by Seller at any time: (a) if legal or regulatory restrictions applicable to Seller or Seller's affiliates (other than any such restrictions relating to Seller's possession or alleged possession of material nonpublic information about the Issuer or the Stock) would prevent Morgan Stanley from selling Stock for Seller's account during the Plan Sales Period; or (b) if Seller is not aware of any material nonpublic information concerning the Issuer or its securities and delivers to Morgan Stanley a certificate of Seller dated as of the date of the notice representing that as of the date thereof, Seller is not aware of any material nonpublic information concerning the Issuer or its securities.

2. Seller agrees that Morgan Stanley will execute this Sales Plan in accordance with its terms and will not be required to suspend or terminate any sales of the Stock unless Morgan Stanley has received notice from Seller in accordance with paragraph C.4 or D.1 above at least three days prior to the date on which this Sales Plan is to be suspended or terminated.

3. This Sales Plan may be amended by Seller only upon the written consent of Morgan Stanley and receipt by Morgan Stanley of a certificate signed by Seller certifying that the representations and warranties of Seller contained in this Sales Plan are true at and as of the date of such certificate as if made at and as of such date.

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