DO SEC'S 10B5-1 SAFE HARBOR RULES NEED TO BE REWRITTEN?

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We examine the profitability of insider trading under SEC Rule 10b5-1 plans. The plans do work to prevent some informed trading. However, on average, insider trading under the safe harbor plans appears to be motivated by material non-public information. We propose some policy changes to tighten the rule and enable separation of informed and uninformed insider trading.

I.   INTRODUCTION

Section 10(b) of the Securities Exchange Act of 1934 and Securities and Exchange Commission ("SEC") Rule 10b-5 make it unlawful for corporations to use any manipulative scheme or to engage in omission of any material fact in connection with the purchase or sale of any security around the time of company filings.[1] The SEC has used this as a statutory hook to prohibit illegal insider trading.[2] Since October 2000, SEC Rule 10b5-1 has provided an exception to this rule by allowing insiders to set up trading plans in advance of actual trading.[3] Since planned trades are set up in advance of subsequent trading, they allow insiders to buy and sell shares despite possessing material non-public information at the time of the trade while providing an affirmative safe harbor defense against allegations of illegal insider trading. However, these plans are not foolproof. Both

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[1] 15 U.S.C. § 78j (2012); 17 C.F.R. § 240.10b5 (2014).

[2] *See, e.g.*, Cady, Roberts & Co., 40 S.E.C. 907 (1961).

[3] 17 C.F.R. § 240.10b5-1 (2014). We will also refer to Rule 10b5-1 as the "safe harbor rule."

finance and legal experts suspect that significant loopholes exist in the design and execution of these plans and that the plans are being abused to hide more informed insider trading.[4]

One potential concern with Rule 10b5-1 is that executive insiders can possess material non-public information at the time they set up these trading plans.[5] If true, such possession would undermine the entire foundation for the SEC Rule, which rests on a requirement that executive insiders set up the plans before the executive insider becomes aware of such information. A second concern is that executive insiders can incorporate their material non-public information into the plans' trading formulas, or that they can subsequently cancel or modify their existing 10b5-1 plans or set up additional new plans as they come into material non-public information.[6] If so, these plans would not provide substantive constraints on insider trading activity. A third concern is that since executive insiders do not need to disclose either the existence or the details of the plan under the current rules, regulatory agencies cannot verify that insiders are actually complying with their own specific plan

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[4] Alan D. Jagolinzer, *SEC Rule 10b5-1 and Insiders' Strategic Trade*, 55 MGMT. SCI. 224, 224–25, 235–36 (2009); M. Todd Henderson et al., *Hiding in Plain Sight: Can Disclosure Enhance Insiders' Trade Returns?* 2, 3, 20 (Coase-Sandor Working Paper Series in Law & Econ., Working Paper No. 411, 2012), http://chicagounbound.uchicago.edu/cgi/viewcontent.cgi?art icle=1646&context=law_and_economics [http://perma.cc/2DNF-85Z2]. *See also* Linda Chatman Thomsen, Director, Div. of Enf't, U.S. Sec. & Exch. Comm'n, Opening Remarks Before the 15th Annual NASPP Conference (Oct. 10, 2007) (manuscript at 2–3), http://www.sec.gov/news/speech/ 2007/spch101007lct.htm [http://perma.cc/82GL-9Z8E].

[5] Jean Eaglesham & Rob Barry, *Trading Plans Under Fire: Despite 2007 Warning, Experts Say Loopholes Remain for Corporate Insiders*, WALL ST. J. (Dec. 13, 2012), http://www.wsj.com/articles/SB100014241 27887324296604578177734024394950 [http://perma.cc/3UFR-LWPA].

[6] *See id.*

rules instead of improvising over time based on subsequent material non-public information.[7]

Previous studies have reported that insider trading by those with 10b5-1 plans show significant abnormal profitability consistent with concerns that these plans are not used to execute liquidity-motivated transactions only.[8] In this Article, we provide additional evidence on the profitability of insider trading with 10b5-1 plans, offer more detailed analyses of the reasons for profitability of insider trading, and provide specific policy prescriptions to prevent using these plans to hide profitable transactions.

Our results indicate that the initial transactions from the plans show significant abnormal profitability, indicating that many plans are set up at a time when insiders possess material non-public information. Second, our results suggest that irregularities in trading patterns—both irregular trading intervals as well as irregular trading volumes—are associated with greater abnormal profitability. This finding is consistent with the concern that insiders could be modifying, canceling, or setting up new plans which deviate from their original planned trades after they subsequently acquire material non-public information.

To prevent abuse of the SEC's safe harbor rule, we propose that 10b5-1 plans satisfy four additional constraints. First, we propose that the first trade from a proper plan must be scheduled no less than six months after the plan is filed. This rule will increase the likelihood that even if the plan is set up when insiders possess material non-public information, the scheduled trades will not be able to exploit insiders' informational advantages. Second, we propose that if the plan is modified or a new plan is created, the six-

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[7] *See id. See also* Jane Sasseen, *The SEC is Eyeing Insider Stock Sales*, BLOOMBERG BUSINESSWEEK (Mar. 18, 2007), http://www.bloom berg.com/bw/stories/2007-03-18/the-sec-is-eyeing-insider-stock-sales [http://perma.cc/B7RV-GQ98].

[8] Jagolinzer, *supra* note 4, at 228–30; Henderson et al., *supra* note 4, at 13–17, 19.

month rule must apply anew to any subsequent planned trades. Third, we propose that the SEC repeal its permission regarding prices, formulas, and computer programs and insist that safe harbor plans' trading decisions cannot be conditioned on future stock price or market conditions. Instead, insiders must simply submit the number of shares to be purchased or sold and the dates of these proposed transactions. Fourth, we propose that the details of safe harbor plans must be disclosed publicly so that both the SEC and investors can verify that the executives are actually complying with their own proposed rules.

The remainder of the Article is organized as follows: Part II presents the background and existing literature examining insider trading within Rule 10b5-1. Part III describes the data, provides the summary statistics, and presents our method. Part IV presents the main results regarding the effects of Rule 10b5-1 on insider-trading behavior and returns. Part V discusses the policy implications of our findings. Part VI presents our conclusions.

II. BACKGROUND AND LITERATURE REVIEW

A. Background

The SEC created Rule 10b5-1 in October 2000 to allow insiders to better diversify their holdings by providing an affirmative legal defense for trades that are pre-planned at a time when insiders did not have material, non-public information.[9] The affirmative defense provides that any insider who prearranged a trading plan for future trades will not be liable for insider trading even if she is aware of the material non-public information at the time trades are executed, as long as she was not aware of this information at the time she arranged the trading plan.[10]

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[9] *See* Thomsen, *supra* note 4.

[10] *See id.*

In order for a plan to qualify as safe harbor, the SEC has mandated three specific conditions. First, insiders must have entered into a binding contract to purchase or sell a security and provided written instructions to do so prior to becoming aware of material non-public information. Second, insiders must either specify the amount, price, and date of trade, or provide a formula, algorithm, or a computer program to determine those parameters. Such formula, algorithm, or computer program cannot permit the insider to exercise subsequent influence on the execution of these trades. Third, insiders must demonstrate that all such purchases and sales must have occurred pursuant to the plan.[11]

The SEC reasons that, by constraining insiders to follow pre-planned rules, insiders would be relieved from the burden of having to defend against allegations of abusing their subsequent informational advantages. Thus, trading plans under Rule 10b5-1 should lead to reduced litigation risk. Firms may also prefer to disclose insiders' trades within Rule 10b5-1 to reduce legal risk.[12]

From a logical perspective, the SEC's three safe harbor requirements are quite problematic. The current rules allow insiders to provide a formula, an algorithm, or a computer program to generate trades. The SEC's rules also allow

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[11] 17 C.F.R. § 240.10b5-1(c)(1)(i) (2014). Planned trades do not affect insiders' transactions outside the plan. Trades outside the plan do not have the safe harbor presumption.

[12] Henderson et al., *supra* note 4, at 13–17, 19. Henderson et al. argue that firms may voluntarily disclose information about insiders' planned trades because disclosure of Rule 10b5-1 trades seems to increase legal protection. Their study shows that the decision to disclose 10b5-1 trading plans is more common for firms with higher overall litigation risk (measured by firm-specific volatility) and with greater potential for strategic trade by insiders. The decision to disclose is more common for firms with more financially sophisticated boards, larger institutional ownership, and greater analyst following. However, there can also be risks on the other side as well, namely entering into a plan and not carrying out all of the associated transactions due to changes in circumstances, since fewer than twenty-five percent of sales transactions are tagged with 10b5-1 designation.

insiders to condition their trading decisions on the market price of the stock. Taken together, these conditions give insiders wide latitude to fully incorporate their material non-public information right into the safe harbor plan's trading formula.

Some examples will be useful. Figure 1 shows a hypothetical trading plan, A, where the current stock price is $100 and the trading plan calls for no sales unless the stock price exceeds $125, and then planned sales ramp up rapidly. This plan would be consistent with insiders' material, non-public information which indicates that the stock price is not likely to fall, it is likely to remain between $100 and $120, and that any price at or over $120–$125 is likely to contain significant overvaluation and thus presents a good selling opportunity.
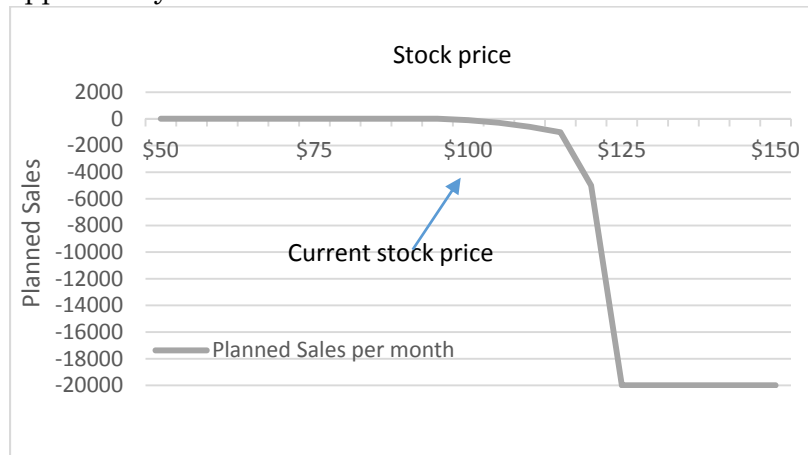
Figure 1. Plan A Proposed Sales

Figure 2 shows another hypothetical trading plan, B. Assume that current stock price is again $100 and the plan now calls for no sales if the stock prices equal or exceed $100, and then planned sales ramp up rapidly if the price falls significantly below $100. This price-quantity relation in this plan would suggest that insiders are worrying about a significant price decline that is likely to be permanent.
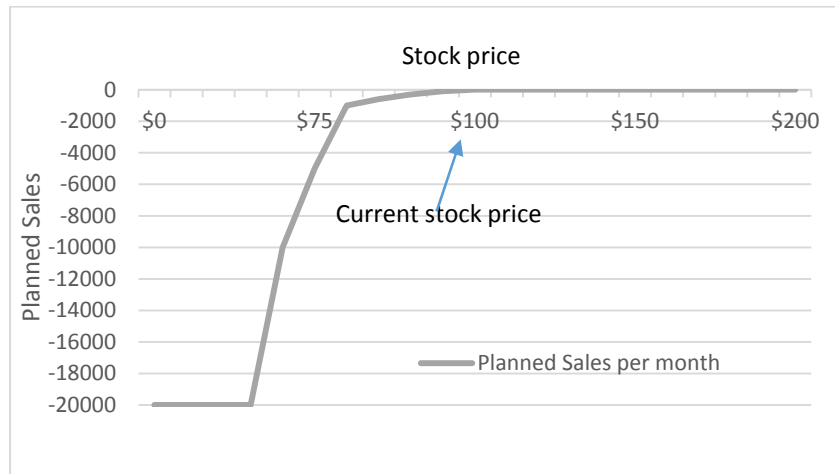
Figure 2. Plan B Proposed Sales

Figure 3 shows another hypothetical trading plan, C. Assume that current stock price is still $100 and the plan now calls for no purchases if the stock prices equal or exceed $100, and then planned purchases ramp up rapidly if the price falls significantly below $85–$90. This price-quantity relation in this plan would suggest that insiders possess but have not yet made public some significant negative information. This negative information is likely to be temporary and its effects are expected to be reversed at a later date. By setting up a trading plan that triggers increased purchases below a limit price of $85–$90, insiders set themselves up for exploiting their negative information.
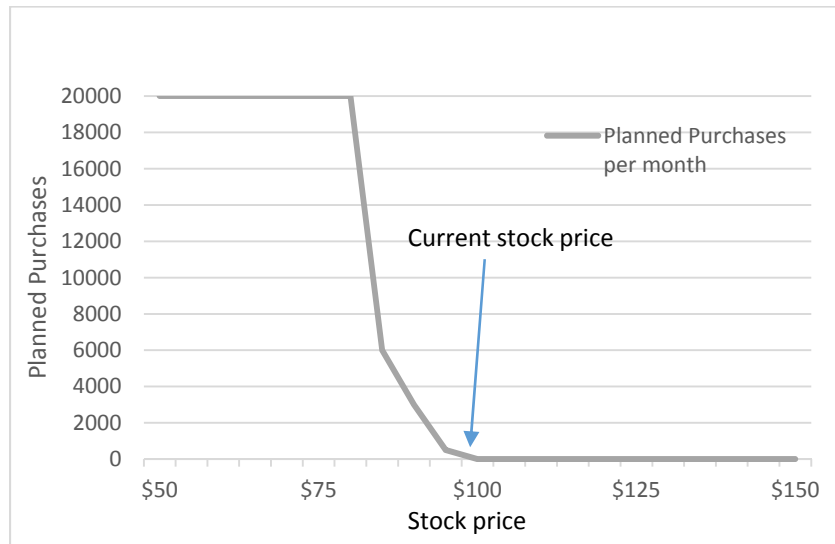
Figure 3. Plan C Proposed Purchases

Next, Figure 4 shows another hypothetical trading plan, D. The plan now calls 20,000 shares to be purchased per month if the stock prices equal or fall below $100. If the price kicks up significantly above $100, and then planned purchases taper off. At a price of $125 or above, the planned purchases stop. The price-quantity relation in this plan would suggest that insiders possess but have not made public some significant positive information. This positive information is likely to increase the stock prices up to 25% but not much beyond 25%. By setting up a trading plan that shuts off purchases at a limit price of $125, insiders set themselves up for exploiting their limited, positive information.
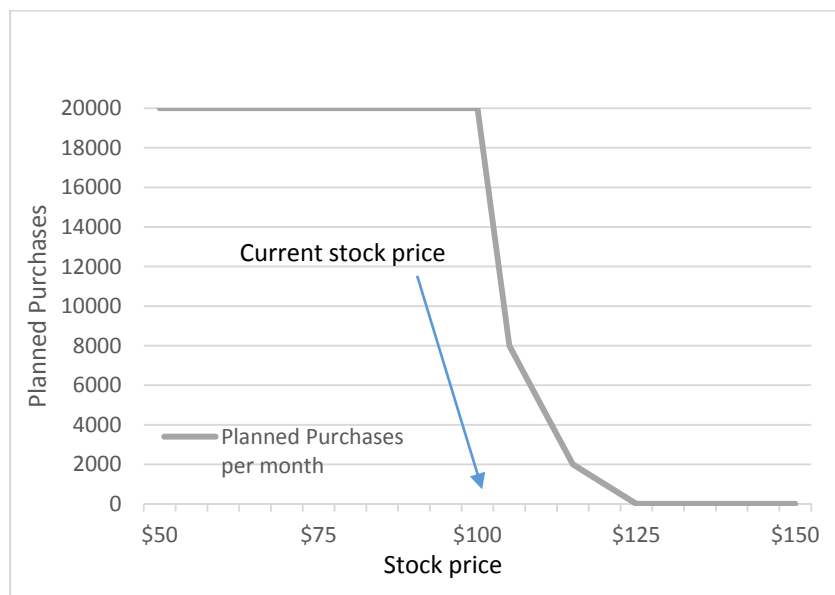
Figure 4. Plan D Proposed Purchases

Finally, assume that insiders switched from plan C to plan B above. This switch would be consistent with material non-public information as well. The switch would indicate that insiders now worry that their material, non-public negative information is likely to be permanent instead of temporary, and they can exploit this new information by switching plans to sell shares instead of buying shares, if prices fall.

We could easily add more examples. As all of these simple examples amply illustrate, it becomes easier to exploit material non-public information if the trading plans allow a limit price, formula, an algorithm, or a computer program. A computer program could perform a sophisticated valuation analysis and initiate buying and selling quantities and prices based on estimated undervaluation and overvaluation of an insider's stock price. In contrast, a liquidity-motivated plan should call for the same dollar amount or the same number of shares to be bought or sold at regular intervals without any reference to the stock price. These simple examples

demonstrate that the SEC's logical approach to safe harbor plans is misguided.

B.   Literature Review

Insider trading within Rule 10b5-1 was first examined from an empirical perspective in 2009.[13] In his paper on insiders' strategic trades, Jagolinzer collected data from voluntary disclosures in SEC Form 4-K and 8-K filings and in business press newswire releases between October 2000 and December 2005. The evidence suggests that trading within the rule still reflects informed, material non-public information.[14]

A closely related study by Rogers finds that firms voluntarily disclose higher-quality financial information prior to insiders' sales to limit their litigation risk.[15] The author contrasts a sample preceding Rule 10b5-1 with a post-Rule 10b5-1 sample.[16] Henderson et al. also report that insider trading litigation is costly; firms spend an average of $2.2 million defending against insider trading allegations.[17]

Costs and penalties imposed in insider trading litigation have increased over time. For instance, in 2014, the total monetary penalties resulting from SEC enforcement actions was over $42 million.[18] Furthermore, insiders who were sentenced to imprisonment were on average sentenced to just under twenty-four months of imprisonment.[19]

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[13] *See, e.g.*, Jagolinzer, *supra* note 4; Henderson et al., *supra* note 4.

[14] *See* Jagolinzer, *supra* note 4, at 227, 237.

[15] Jonathan L. Rogers, *Disclosure Quality and Management Trading Incentives*, 46 J. ACCT. RES. 1265, 1282–83 (2008).

[16] *Id.* at 1272.

[17] Henderson et al., *supra* note 4, at 4 n.5.

[18] *See* MORRISON FOERSTER LLP, INSIDER TRADING ANNUAL REVIEW (2014), http://www.mofo.com/~/media/Files/ClientAlert/2015/02/150211 InsiderTradingAnnualReview.pdf [http://perma.cc/JX98-9ZLU] (hand collected data totaling disgorgement, prejudgment interest, and civil penalty payments from 2014 SEC insider trading enforcement actions).

[19] *Id.* at 17–23.

The increasing popularity of 10b5-1 plans makes sense from a litigation perspective. Henderson et al. suggest that the reduction in litigation risk that comes with disclosure under the rule creates opportunities for so-called loopholes; these allow insiders to trade strategically by tagging their more informed trades as 10b5-1 trades.[20]

A recent paper by Jonathan Millian analyzes whether plan characteristics are consistent with routine trading, which is determined by examining the length of insiders' sales plans.[21] In this study, Millian measures the length of sales plans by both the number of trades executed and the length of a sales plan in number of calendar days. The author documents a significant relationship between the length of a plan and abnormal returns following sales under that plan.[22] Unlike earlier studies, the evidence suggests that the insiders who use Rule 10b5-1 to increase the legal protection for their information-motivated trades are generally trading on short-term earnings information.[23]

Other studies focus on whether insiders misrepresent disclosure content to optimize the payoff from their stock sales,[24] and whether insiders who have sales plans are more likely to meet or beat analysts' earnings expectations in the immediate period preceding planned sales.[25] The evidence

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[20] *See* Henderson et al., *supra* note 4, at 20.

[21] *See* Jonathan A. Millian, *Insider Sales Based on Short-Term Earnings Information: The Use of Short-Term Rule 10b5-1 Plans*, REV. QUANTITATIVE FIN. & ACCT. (Dec. 2014) (forthcoming) (manuscript at 2), http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2276217 [http://perma.cc/JF4K-XTWF].

[22] *Id.* at 2–3, 17–18.

[23] *Id.* at 17–18.

[24] *See generally* Stanley Veliotis, *Rule 10b5-1 Trading Plans and Insiders' Incentive to Misrepresent*, 47 AM. BUS. L.J. 313 (2010).

[25] *See* John Shon & Stanley Veliotis, *Insiders' Sales Under Rule 10b5-1 Plans and Meeting or Beating Earnings Expectations,* 59 MGMT. SCI. 1988 (2013).

seems to suggest that insiders strategically time public disclosure.[26]

In contrast, other studies conclude that the SEC's safe harbor rule does constrain some informed insider trading.[27] For instance, studying a sample of insider sales reported to the SEC between January 2003 and June 2006, Rik Sen shows evidence of only *insignificant* abnormal returns following planned sales.[28] Sen's results suggest selection biases may influence the findings of these papers.[29]

We extend this research in a number of significant ways. First, to guard against time-specific variations, our data set is comprehensive: we collect all reported 10b5-1 trades from 2003 to 2013. Second, we use the calendar time portfolio approach to measure abnormal returns in order to guard against potential selection biases. Third, we test for specific hypotheses regarding the source of the profitability of insider trades. Specifically, we test whether profitability arises because of the possibility that insiders possess material non-

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[26] *Id.* at 1995–96.

[27] Rik Sen, Are Insider Sales Under 105b-1 Plans Strategically Timed? (June 2008) (unpublished manuscript)*,* http://w4.stern.nyu.edu/finance/docs/pdfs/Seminars/083f-sen.pdf [http://perma.cc/57ZQ-P65Z].

[28] *Id.* at 1–2, 10–11, 19.

[29] *Id.* at 13–17. According to Rik Sen, the event studies utilizing methodologies that neither eliminate issues related to cross sectional dependence, nor control for returns on stocks with similar characteristics, nor take into account that the events might be endogenous when computing abnormal returns, may result in downward biased estimates of abnormal returns following planned sales. These biases tend to give both a lower weight to a planned sale if followed by a positive abnormal return and a higher weight if followed by a negative abnormal return. One way to mitigate these biases is to use a calendar-time portfolio approach where the benchmark is a matching portfolio of stocks (as of the most recent planned sale date) with similar characteristics. Sen also suggests that an equally weighted calendar-time portfolio method could help to mitigate these biases. Alternatively, a simple event study methodology that includes only the first planned sale for each firm in each calendar month could eliminate the mentioned biases, since including only the first planned sale eliminates sales by multiple insiders in the same firm around the same time.

public information at the time they set up the plans, or whether subsequent modifications contribute to the profitability of planned trades. We also investigate insider profitability by firm size, type of insiders, and trade volume. Finally, we examine the time-series evolution of 10b5-1 trades between 2003 and 2013.

III. DATA AND METHOD

A. Data

Insider trading data are obtained from the SEC and include a total of 1,530,792 insider transactions from all publicly held firms between January 2003 and December 2013, a total of 2769 calendar days. The SEC mandated electronic filings of insider trading activity in May 2003.[30] Between 2000 and 2003, very few transactions were tagged with a 10b5-1 designation. Consequently, we exclude the period prior to May 2003.

Our dataset contains transactions for an average of 14,211 insiders in 3875 firms for each year between 2003 and 2013. This Article focuses only on open market transactions, since prior research shows these to be the most informative transactions.[31] All other transactions, such as private sales and purchases and exercises of options, gifts, and conversions, are excluded from the study. The daily stock returns are obtained from the files for Center for Research in Security Prices ("CRSP").

We exclude transactions with missing values and transactions without corresponding price and return data from CRSP. Additional checks on firms, prices, dates, shares,

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[30] Mandated Electronic Filing and Website Posting for Forms 3, 4 and 5, 68 Fed. Reg. 25,788 (May 13, 2003) (to be codified at 17 C.F.R. pts. 230, 232, 239, 240, 249, 250, 259, 260, 269, 274).

[31] *See* H. Nejat Seyhun, Investment Intelligence from Insider Trading 2, 32 (1998).

and 10b5-1 observations are performed.[32] As a result, we exclude an additional 300,000 transactions containing apparent data errors. Our final dataset contains 1,530,792 transactions.

Finally, we separate insider trades between purchases and sales. We discuss the results separately because insider purchases are more likely motivated by private information, whereas insider sales may be driven by multiple motivations, e.g., diversification, information exploitation, and personal liquidity shocks.[33]

Table 1 provides descriptive statistics for 10b5-1 and non-10b5-1 transactions (Panel A) and transaction value (Panel B) grouped by firm size. We define three firm size groups: small firms are defined as those with market values of less than $1 billion, medium firms are those with market values between $1 billion and $5 billion, and large firms are those with market values equal to or greater than $5 billion.

Panel C shows the number of transactions and transaction value grouped by insider type. We identify five classes of insiders: members of the board of directors, officers, top executives, large shareholders who own more than 10% of any equity class in the firm, and other insiders. Directors are those who hold only a position on the board of directors, and officers are those who hold executive office. If a director is also an executive of the firm, then we include her within the top executives group as well. This classification allows overlap and thus our subgroups will not be an independent partition of the data. Others are those insiders who do not belong to any of the four groups described above.

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[32] For instance, we also exclude all transactions where trading volume exceeded outstanding shares or the daily trading volume as reported by CRSP. We exclude all transactions where the reported stock prices exceeded the maximum trading price on that day as reported by CRSP.

[33] *See* Josef Lakonishok & Inmoo Lee, *Are Insider Trades Informative?*, 14 REV. FIN. STUD., 79, 109 (2001); A. Can Inci, Biao Lu & H. Nejat Seyhun, *Intraday Behavior of Stock Prices and Trades around Insider Trading*, 39 FIN. MGMT. 323, 351 (2010).

Finally, Panel D of Table 1 shows a time-series evolution of insider trading activity. We report on the number of 10b5-1 and non-10b5-1 disclosing firms, the number of transactions, and the average transaction size for each year from 2003 to 2013.

Table 1. Descriptive Statistics

Three size groups are defined. Small firms are those that have market value less than $1 billion, medium firms are those that have market value between $1 billion and $5 billion, and large firms are those that have market value equal to or greater than $5 billion.

Panel A. Number of Transactions by Firm Size

Transactions		Firm Size			
		Small	Medium	Large	Total
10b5-1	Purchases	6619	1004	153	7776
Non-10b5-1	Purchases	266,128	49,448	13,148	328,724
Total	Purchases	272,747	50,452	13,301	336,500
10b5-1	Sales	122,103	90,145	55,465	267,713
Non-10b5-1	Sales	399,641	307,985	218,953	926,579
Total	Sales	521,744	398,130	274,418	1,194,292
All transactions		*794,491*	*448,582*	*287,719*	*1,530,792*

Panel B. Average Transaction Value ($ million) by Firm Size

		Firm Size		
Transaction value		Small	Medium	Large
10b5-1	Purchases	0.026	0.430	1.405
Non-10b5-1	Purchases	0.166	0.735	1.116
Total	Purchases	0.162	0.729	1.120
10b5-1	Sales	0.072	0.178	0.569
Non-10b5-1	Sales	0.294	0.587	0.834
Total	Sales	0.242	0.495	0.780
Overall average		*0.214*	*0.521*	*0.796*

Panel C. Transactions by Insider Type

		Insider type					
Transactions		Director	Officer	Top Exec.	10% owner	Other	Total
10b5-1	No tr.	48,641	94,277	77,814	48,007	6,750	275,489
Non-10b5-1	No tr.	310,473	368,554	212,427	290,247	73,602	1,255,303
Total	No tr.	359,114	462,831	290,241	338,254	80,352	1,530,792
10b5-1	Av. tr. size	0.182	0.178	0.257	0.206	0.249	
Non-10b5-1	Av. tr. size	0.248	0.223	0.338	0.985	0.802	
Total	Av. tr. size	0.239	0.214	0.317	0.874	0.756	

Panel D. Transactions Across Time

Year	Total Firms	Total Insiders	Total No. Tr.	Total Av. tr. size	10b5-1 Firms	10b5-1 Insiders
2003	3490	10,479	78,085	0.352	220	405
2004	4370	15,556	128,609	0.349	447	969
2005	4532	18,349	197,450	0.321	609	1474
2006	3642	11,286	132,971	0.317	556	1091
2007	4415	16,879	260,134	0.247	761	1860
2008	4137	14,152	209,661	0.213	523	1067
2009	3557	11,217	86,416	0.398	520	1053
2010	3552	11,534	84,660	0.529	644	1351
2011	3730	13,474	100,100	0.703	706	1509
2012	3584	15,309	110,704	0.747	781	1834
2013	3611	18,083	142,002	0.803	849	2539
Sum			*1,530,792*			

Year	10b5-1 No. Tr.	10b5-1 Av tr. size	Non-10b5-1 Firms	Non-10b5-1 Insiders	Non-10b5-1 No. Tr.	Non-10b5-1 Av. tr. size
2003	7749	0.131	3462	10,252	70,336	0.377
2004	15,353	0.191	4316	14,999	113,256	0.370
2005	41,213	0.102	4469	17,460	156,237	0.379
2006	24,864	0.157	3545	10,583	108,107	0.354
2007	63,826	0.102	4314	15,689	196,308	0.294
2008	33,089	0.084	4071	13,426	176,572	0.237
2009	10,680	0.249	3476	10,514	75,736	0.419
2010	15,921	0.311	3454	10,690	68,739	0.579
2011	19,294	0.281	3655	12,540	80,806	0.804
2012	16,098	0.539	3511	14,158	94,606	0.782
2013	27,402	0.516	3536	16,497	114,600	0.872
Sum	*275,489*				*1,255,303*	

Panel A of Table 1 shows that the overall sample contains 7776 10b5-1 insider purchases and 328,724 non-planned insider purchases, for a total insider purchase sample size of 336,500. Our database contains 267,713 10b5-1 insider sales and 926,579 non-planned insider sales, for a total insider

sale sample of 1,194,292. Our total sample contains 1,530,792 insider trades.

Looking at percentages for the overall sample, 2.3% of the purchases are tagged with 10b5-1 designations and 22.4% of the sales are tagged with 10b5-1 designations. Hence, the 10b5-1 designation is almost ten times more likely to be used for sales than for purchases. Insiders appear to prefer 10b5-1 plans mostly for their sales activity.

Moreover, Panel A shows that insiders in smaller firms prefer 10b5-1 purchases over non-planned purchases (2.5%) at more than twice the frequency as insiders in large firms (1.2%). Similarly, for sales, the 10b5-1 planned to non-planned ratio is 30.6% in small firms and 25.3% in large firms. Given that insider trading is more profitable in small firms, the fact that 10b5-1 plans are also more popular in small firms should be expected.[34]

Panel B of Table 1 focuses on transaction size sorted by firm size. Both 10b5-1 purchases and sales are typically smaller than their non-planned counterparts. For small firms, 10b5-1 purchases average about $26,000, while non-10b5-1 purchases average about $166,000. In medium size firms, again, 10b5-1 purchase size is smaller than non-planned purchases. In large firms, however, the order is reversed, but there are only 153 such purchases. Similar trends are observed in sales. Planned sales tend to be

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[34] Insiders in small firms tend to have more purchases than sales. In large firms, insiders have fewer purchases than sales. This evidence might be one reason why we observe positive abnormal returns following insider purchases and negative abnormal returns following insider sales. The strength of the small firm effect and the distribution of the sales and purchase transactions across firms have substantial consequences, which may lead to an upward bias in abnormal returns calculations. Consistent with this conjecture, the cumulative daily average prediction errors following the insider-trading day decrease substantially as firm size increases. This means that insiders in small firms tend to earn greater abnormal returns on their transactions than insiders in large firms. For further details on the profitability of insider trading by firm size, see H. Nejat Seyhun, *Insiders' Profits, Costs of Trading, and Market Efficiency*, 16 J. FIN. ECON. 189, 199–206 (1986).

smaller in size than non-planned sales for all three firm size groups.

Looking at the types of insiders, we observe that the popularity of 10b5-1 plans increases proportionally with the amount of inside information. For top executives who are best informed, the frequency of 10b5-1 plans to non-10b5-1 transactions is about 1:3. As the seniority of the insiders falls, so does the popularity of 10b5-1 plans. This ratio is 1:4 for officers, 1:6 for directors, 1:6 for large shareholders, and 1:11 for other insiders.

While the average transaction value of 10b5-1 trades is smaller than that of non-planned trades across all insider classes, the ratio is smaller for more informed insiders.[35] For instance, the ratio is 76.0% for top executives and 79.8% for officers. As one proceeds down the hierarchy, the ratio falls to 73.4% for directors, 20.9% for large shareholders, and 31.0% for others.

Finally, Panel D shows the time-series evolution of 10b5-1 planned trades. Our analyses show that insider trading is becoming more prevalent over time. The evidence also points to increasing popularity of 10b5-1 plans over time. This is consistent with the findings that insider trading litigation costs have increased over time, and consequently the value of safe harbor benefits of the 10b5-1 tag have also increased over time. Interestingly, insider trading also appears to have been most prevalent during the recent financial crisis. From 2006 to 2007, the total number of insider trades just about doubled, and it remained elevated throughout 2008. Immediately following the financial crisis, the number of insider transactions fell by more than 50%.

Another observation is that the frequency of insiders who report 10b5-1 trades increased significantly over time. The data show an increase of 527% between 2003 and 2013. The data also show that the number of insiders who disclosed their transactions varies from 405 to 2539 for each year. The

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[35] *See id.* at 202, 204–05 (discussing profitability of insider trading across insider types).

number of disclosing firms varies from 220 to 849. Each year, 10,252 to 16,497 insiders and 3462 to 3536 firms did not disclose.

The average transaction size increased by 128% over the years. The increase is larger for 10b5-1 transactions (294%) than for non-10b5-1 transactions (131%). The average size of the transactions is the lowest in both the 10b5-1 and the non-10b5-1 samples in 2008 ($84,000 and $237,000 respectively). Thus, unlike previous studies that utilize more limited samples,[36] our comprehensive dataset is likely to provide more precise analyses and comparisons of 10b5-1 and non-10b5-1 transactions.
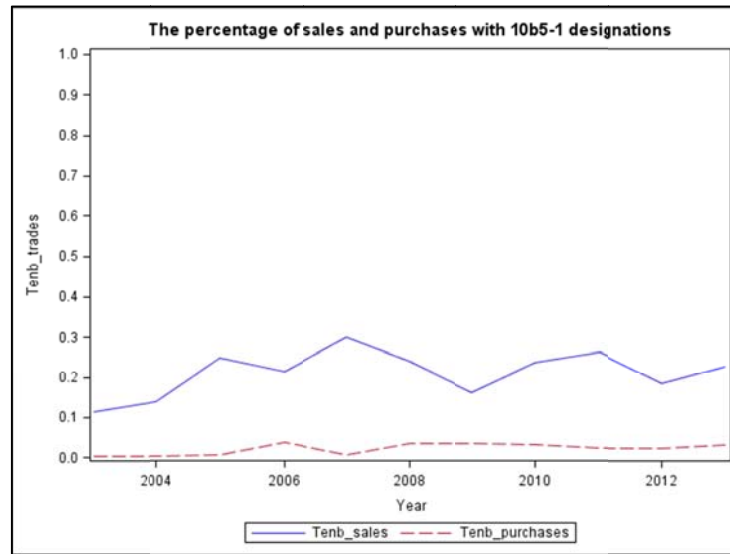

Figure 5. The Percentage of Sales and Purchases with 10b5-1 Designations Over Time

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[36] *See, e.g.,* Jagolinzer, *supra* note 4; Henderson et al., *supra* note 4; Sen, *supra* note 27.
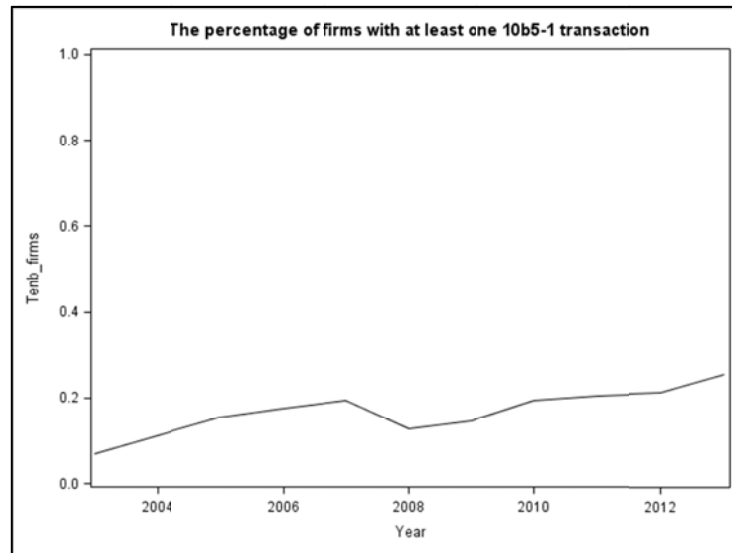
Figure 6. The Percentage of Firms with at Least One 10b5-1 Transaction Over Time

The evolution of insider trading is best seen in Figures 5 and 6. Figure 5 shows the percentage of sales and purchases with 10b5-1 designations over time. In general, the proportion of both sales and purchases with 10b5-1 designations increased over the sample period. The proportion of sales transactions increased from about 12% to 23% while purchases increased from about 1% to 3%. While 10b5-1 purchases tend to be more or less constant, particularly after 2008, 10b5-1 sales seem to follow cycles during the sample period, declining between 2007 and 2009. In all sub-periods, insiders tend to sell more than they buy. The proportion of sales transactions under Rule 10b5-1 is about eight times larger.

The financial crisis in 2008 appears to have decreased insiders' 10b5-1 sales but increased their 10b5-1 purchases. Despite this temporary decrease during the financial crisis, Figure 6 suggests that the proportion of firms with at least one 10b5-1 transaction increased about four-fold over time, from about 6% to 24% during our sample period. This result

also indicates that, unlike earlier studies, recent data allow more accurate analysis of the effects of Rule 10b5-1 on insider-trading and profitability.[37]

B. Methodology

To analyze and compare whether insiders' 10b5-1 and non-10b5-1 purchases and sales predict future stock returns, we evaluate the calendar-time portfolio approach for tests of long-run abnormal stock returns.[38] Previous research utilizing event studies[39] suggests that this approach mitigates the skewness bias that arises because of the documented positive skewed distribution of the long-run abnormal returns.[40]

The distribution of the calendar-time portfolio approach estimator is better approximated by the normal distribution that allows for standard statistical inference. Because the

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[37] *See, e.g.*, Jagolinzer, *supra* note 4; Henderson et al., *supra* note 4; Sen, *supra* note 27.

[38] For a thorough discussion of this approach, see Eugene F. Fama, *Market Efficiency, Long-Term Returns, and Behavioral Finance*, 49 J. FIN. ECON. 283 (1998). For implementation, see, e.g., Tim Loughran & Jay R. Ritter, *The New Issue Puzzle,* 50 J. FIN. 23 (1995); Brad M. Barber & Terrance Odean, *Boys Will Be Boys: Gender, Overconfidence, and Common Stock Investment,* 116 Q.J. ECON. 261 (2001); Brad M. Barber, Reuven Lehavy & Brett Trueman, *Comparing the Stock Recommendation Performance of Investment Banks and Independent Research Firms*, 85 J. FIN. ECON. 490 (2007). For implementation in recent work, see Jagolinzer, *supra* note 4.

[39] *See, e.g.*, Brad M. Barber & John D. Lyon, *Detecting Long-Run Abnormal Stock Returns: The Empirical Power and Specification of Test Statistics*, 43 J. FIN. ECON. 341 (1997); John D. Lyon, Brad M. Barber & Chih-Ling Tsai, *Improved Methods for Tests of Long-Run Abnormal Stock Returns*, 54 J. FIN. 165 (1999); S.P. Kothari & Jerold B. Warner, *Measuring Long-Horizon Security Price Performance*, 43 J. FIN. ECON. 301 (1997); Mark J. Mitchell & Erik Stafford, *Managerial Decisions and Long-Term Stock Price Performance*, 73 J. BUS. 287 (2000).

[40] The positive skewness leads to negatively biased *t*-statistics causing smaller *p* values for lower-tailed tests (thus an inflated significance level), and larger *p* values for upper-tailed tests (thus a loss of power). *See* Seyhun, *supra* note 34.

firm returns are clustered into a single portfolio, using a calendar-time portfolio approach also eliminates the problem of cross-sectional dependence among the event-firm abnormal returns in the portfolio variance.

For each holding period, we obtain daily calendar-time portfolio returns for 2769 insider trade days between the years of 2003 and 2013. We compute calendar-time portfolios based on insider-trading and holding periods of one, three, six, and twelve months following the insider trade. In Tables 2 and 3, we form four portfolios, one each for 10b5-1 and non-10b5-1 purchases and one each for 10b5-1 and non-10b5-1 sales. In the remaining tables, we form separate portfolios for each insider trade pattern, insider position within the firm, and firm characteristics within Rule10b5-1 and non-10b5-1. We do this for purchases and sales separately. During each holding period, if more than one insider traded a particular stock, or if the same insider traded a stock multiple times, then that stock will appear multiple times in the portfolio. The calendar-time portfolio return on event date t is given by Equation 1:

$$(1) \qquad R_{pt} = \frac{1}{n_t}\sum_{i=1}^{n_t} R_{it}$$

where R_{it} is the gross return (with dividends) on event date t for trade i, which is either a purchase or a sale, and n_t is the number of purchases or sales in the portfolio corresponding to holding periods of one, three, six, and twelve months, respectively. This calculation yields a time series of daily returns for each portfolio, R_{pt}.

We compute excess returns by subtracting the risk-free rate from each portfolio's gross return. We then estimate abnormal returns by regressing these daily portfolio excess returns on the daily excess return to the equally-weighted index of New York Stock Exchange, AMEX, and NASDAQ stocks and other risk factors.[41] We follow the standard

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[41] Although not reported here, using the total return as the benchmark for the value-weighted market portfolio instead of the total return to the equally-weighted market portfolio gives similar results.

literature[42] and use Fama-French and Carhart factors to control for expected returns in the regressions.[43] In these regressions, abnormal return is calculated as the intercept α_p, from the four-factor model, in the following time series regression for each portfolio p. All daily returns are expressed in basis points.

$$(2) \qquad R_{pt} - R_{ft} = \alpha_p + b_p\left(R_{mt} - R_{ft}\right) + s_p(SMB_t) + \\ h_p(HML_t) + u_p(UMD_t) + e_{pt}$$

R_{pt} is the simple daily return on the calendar-time portfolio formed for each trade group, R_{ft} is the daily return on three-month U.S. Treasury bills, R_{mt} is the return on an equally-weighted market index, SMB_t is the difference in the returns of value-weighted portfolios of small stocks and large stocks, HML_t is the difference in the returns of value-weighted portfolios of high book-to-market stocks and low

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[42] It has been noted however, that common estimation procedures such as cumulative abnormal return and buy-and-hold returns produce biased test statistics. In addition, these methodologies ignore cross-sectional dependence of event-firm abnormal returns that are overlapping in calendar time (which is a very common feature of our data, as multiple executives across different firms trade during similar time windows) and are likely to produce biased test statistics. Therefore, Lyon, Barber and Tsai, Fama, and Mitchell and Stafford advocate a calendar-time portfolio approach for measuring long-term abnormal performance. By forming daily calendar-time portfolios, all cross-correlations of event-firm abnormal returns are automatically accounted for in the portfolio variance. The distribution of this estimator is better approximated by the normal distribution, allowing for classical statistical inference. *See* Barber & Lyon, *supra* note 39; Fama, *supra* note 38; Kothari & Warner, *supra* note 39; Lyon, Barber & Tsai, *supra* note 39; Mitchell & Stafford, *supra* note 39.

[43] These factors include market factor, book-to-market factor, size and momentum. Kenneth R. French, *Current Research Returns*, KENNETH R. FRENCH, http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html [http://perma.cc/4LFM-64J5]. For implementation, see, e.g., Barber & Lyon, *supra* note 39; Fama, *supra* note 38; Mark Carhart, *On Persistence in Mutual Fund Performance*, 52 J. FIN. 57 (1997).

book-to-market stocks, and UMD_t is the difference in returns of a value-weighted portfolio of stocks with high and low recent (six months) returns. e_{pt} is an independent and identically distributed error term. The estimate of the intercept α_p provides a test of the null hypothesis that the mean daily abnormal return on the calendar-time portfolio is zero.

We also estimate stacked regressions to provide coefficient difference test statistics across the 10b5-1 and the non-10b5-1 samples. One advantage that our comparison provides is that analyzing non-Rule 10b5-1 participant trade returns during the same holding period works as a control group and allows us to control for firm-, industry-, and macro-level factors that may otherwise affect insiders' 10b5-1 trade returns.

IV. EMPIRICAL RESULTS

A. Abnormal Returns and Rule 10b5-1

Table 2 presents the average daily abnormal returns to the portfolios of 10b5-1 and non-10b5-1 trades separately for the holding periods of one, three, six, and twelve months. To obtain expected returns, we use the simple CAPM. Table 2 also shows the differences between 10b5-1 planned and non-planned trades, and their test statistics from stacked regressions.

Table 2. Results from CAPM Returns on 10b5-1 and Non-10b5-1 Trades

$R_{p,t} - R_{f,t} = \alpha + \beta_1(R_{m,t} - R_{f,t}) + \varepsilon_t$, where $R_{p,t}$ is calendar-time portfolios based on insider trading and holding period, $R_{m,t}$ is the return on the CRSP equally-weighted index for day t. $R_{f,t}$ is the daily risk-free interest rate (one-day treasury bill rate). The coefficients are obtained from an OLS regression on the estimation period returns. Stacked regressions are run to provide coefficient difference test statistics across 10b5-1 participant and nonparticipant samples. Results are shown for the horizon of the following one, three, six months, and one year.

		10b5-1 (1)		Non-10b5-1 (2)		Diff. (1)-(2)	
Purchases[a]	Horizon	Mean	*t*-stat	Mean	*t*-stat	Mean	*t*-stat
CAPM	1 month	0.0012	2.72	0.0013	10.11	-0.0001	-0.28
CAPM	3 months	0.0005	1.33	0.0004	4.73	0.0001	0.24
CAPM	6 months	0.0004	1.16	0.0002	2.58	0.0002	0.60
CAPM	1 year	0.0004	1.30	0.0001	0.98	0.00035	1.02
Sales[b]	Horizon	Mean	*t*-stat	Mean	*t*-stat	Mean	*t*-stat
CAPM	1 month	-0.0006	-3.12	-0.0004	-3.65	-0.0001	-0.67
CAPM	3 months	-0.0005	-2.81	-0.0003	-3.81	-0.0002	-0.90
CAPM	6 months	-0.0004	-2.37	-0.0003	-4.38	-0.0001	-0.42
CAPM	1 year	-0.0003	-2.03	-0.0003	-4.35	0.0000	-0.19

[a] and [b] The number of observations used in both purchases and sales regressions is 2769.

Our evidence in Table 2 shows that on average, insider purchases in non-10b5-1 plans outperform the market significantly for holding periods of one, three, and six months. The average daily abnormal returns are 0.13% (*t*-statistics: 10.11), 0.04% (*t*-statistics: 4.73), and 0.02% (*t*-statistics: 2.58) for corresponding holding periods. These abnormal returns are also economically significant. Cumulative abnormal return ("CAR") after one year following insider trades adds up to 10% (obtained as the sum of the abnormal returns from one day after insider trading day to corresponding 20, 60, 125, and 250 days after the

insider trading day). These findings are consistent with the prior literature's assessment that insiders' purchases convey material non-public information.[44]

Table 2 further shows that insiders' 10b5-1 planned purchases also out-perform the market for a one-month holding period, with an average daily abnormal return of 0.12% (*t*-statistics: 2.72). For other holding periods, abnormal returns following 10b5-1 purchases are insignificant. However, a statistical difference between the abnormal returns of 10b5-1 and non-10b5-1 purchases does not seem to exist. Hence, insiders' purchases within 10b5-1 plans appear to be just as profitable as non-planned purchases. This evidence is inconsistent with the presumption of safe harbor for insider purchases. Caution is required here because the sample size for 10b5-1 planned purchases is relatively small. Consequently, any definitive statements regarding the statistical significance of insiders' 10b5-1 planned purchases must be tempered in light of the small sample size.

The results are similar for insiders' sales. Our evidence shows that both insiders' 10b5-1 and non-10b5-1 sales under-perform the market significantly, indicating that insiders' sales are motivated by negative material non-public information. Consistent with prior literature, profitability of insiders' sales appears to be lower than insiders' purchases. After one year, CARs are equal to -7.5% for participant and nonparticipant sales. Interestingly, once again, there is no difference in profitability between the participant and the nonparticipant samples. Insiders' sales under 10b5-1 planned trades are again just as profitable as the non-planned sales. Again, this evidence is inconsistent with the safe harbor for insiders' sales, since there is no evidence that insiders are using 10b5-1 plans to only report diversification-related sales transactions.

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[44] *See, e.g.*, Jagolinzer, *supra* note 4; Henderson et al., *supra* note 4.
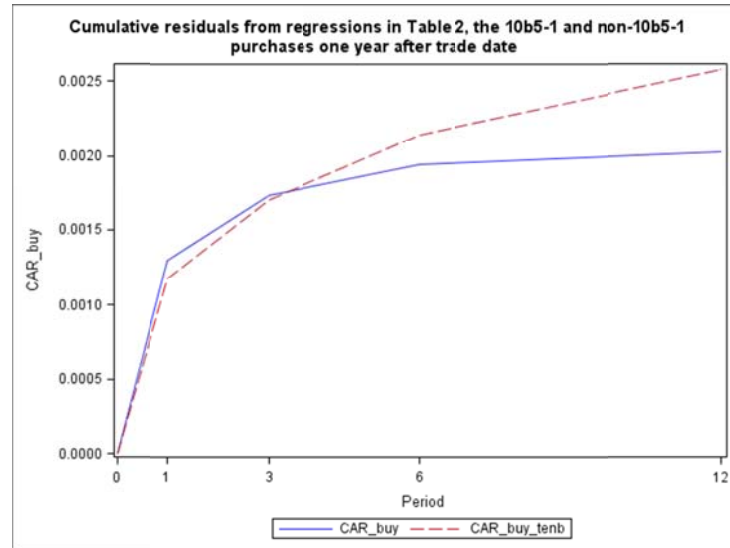
Figure 7. Cumulative Residuals from Regressions in Table 2 Showing Cumulative Abnormal Returns on Both 10b5-1 and Non-10b5-1 Purchases One Year After Trade Date

Period shows the months relative to the insider-trading month, which is denoted as month 0. Month 6 refers to the six-month period following the insider-trading month. To make it easier to measure abnormal returns relative to the insider-trading month, both 10b5-1 and non-10b5-1 purchases are constructed to meet at zero returns for the insider-trading month (month 0). The solid line shows non-10b5-1 transactions and the dashed line shows 10b5-1 transactions.
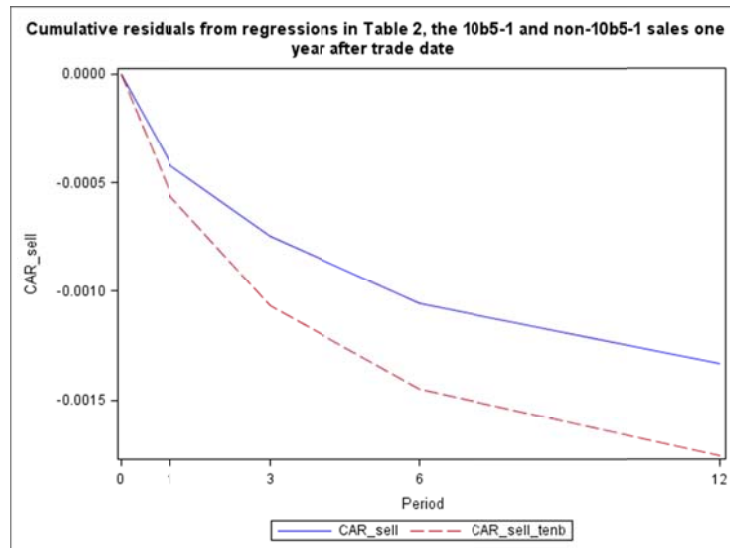
Figure 8. Cumulative Residuals from Regressions in Table 2 Showing Cumulative Abnormal Returns on Both 10b5-1 and Non-10b5-1 Sales One Year After Trade Date

Period shows the months relative to the insider-trading month, which is denoted as month 0. Month 6 refers to the six-month period following the insider-trading month. To make it easier to measure abnormal returns relative to the insider-trading month, both 10b5-1 and non-10b5-1 sales are constructed to meet at zero returns for the insider-trading month (month 0). The solid line shows the non-10b5-1 transactions and the dashed line shows 10b5-1 transactions.

The cumulative daily average prediction errors from regressions in Table 2 are displayed in Figures 7 (purchases) and 8 (sales) for holding periods of one, three, six, and twelve months after insiders' 10b5-1 and non-10b5-1 trades. While the solid line indicates non-10b5-1 transactions, the dashed line indicates the 10b5-1 transactions. Figure 7 shows that stock prices rose after both 10b5-1 and non-10b5-1 purchases. By three months after the transaction date, the abnormal returns for planned purchases exceed the abnormal returns for non-planned purchases.

For sales, the declines in prices for the first month after the trading day for 10b5-1 planned sales and non-planned sales appear to be very similar. After one month, the two patterns diverge and 10b5-1 planned sales show somewhat greater abnormal profitability. Over a full year, stock prices fall sharply following both 10b5-1 and non-10b5-1 sales, with 10b5-1 planned sales showing greater declines. Nevertheless, the differences in cumulative abnormal returns between 10b5-1 planned and non-planned sales do not attain statistical significance.

The shapes of abnormal returns for both planned and non-planned purchases and sales indicate that insiders exploit short-lived information. Cumulative abnormal returns for purchases tend to increase at a relatively sharper rate for the first six months and then tend to level off. Similarly, in the case of cumulative abnormal returns for sales, stock prices fall at a relatively sharper rate for about six months and then tend to level off.

Table 3. Results from Fama-French Carhart Four-Factor Model Returns

$R_{p,t} - R_{f,t} = \alpha + \beta_1(R_{m,t} - R_{f,t}) + \beta_2 SMB_t + \beta_3 HML_t + \beta_4 UMD_t + \varepsilon_t$, where $R_{p,t}$ is calendar-time portfolios based on insider trading and holding period, $R_{m,t}$ is the return on the CRSP equally-weighted index for day t.

$R_{f,t}$ is the daily risk-free interest rate (one-day treasury bill rate). SMB_t (small minus big) is a mimicking portfolio to capture risk related to size, HML_t (high minus low) is a mimicking portfolio to capture risk associated with book-to-market characteristics, and UMD_t (up minus down) is a mimicking portfolio designed to address risk associated with prior returns by subtracting a portfolio of low prior return firms from a portfolio of high prior return firms. α is the abnormal return. The coefficients are obtained from an OLS regression on the estimation period returns. Stacked regressions are run to provide coefficient difference test statistics across 10b5-1 participant and nonparticipant samples. Results are shown for the horizon of the following one month, three months, six months, and one year.

		10b5-1 (1)		Non-10b5-1 (2)		Diff. (1)-(2)	
Purchases[a]	Horizon	Mean	t-stat	Mean	t-stat	Mean	t-stat
4-factor AR	1 month	0.0012	2.36	0.0013	10.25	-0.0002	-0.36
4-factor AR	3 months	0.0005	0.90	0.0005	5.31	0.0001	0.15
4-factor AR	6 months	0.0004	0.71	0.0002	2.83	0.0002	0.47
4-factor AR	1 year	0.0004	1.04	0.0001	0.96	0.0003	0.94
Sales[b]	Horizon	Mean	t-stat	Mean	t-stat	Mean	t-stat
4-factor AR	1 month	-0.0006	-2.81	-0.0005	-3.48	-0.0001	-0.70
4-factor AR	3 months	-0.0005	-3.25	-0.0004	-3.49	-0.0002	-0.95
4-factor AR	6 months	-0.0004	-2.79	-0.0003	-4.03	-0.0001	-0.49
4-factor AR	1 year	-0.0003	-2.34	-0.0003	-3.62	0.0000	-0.25

[a] and [b] The number of observations used in both purchases and sales regressions is 2769.

In Table 3, we repeat our analyses by including firm size, book-to-market characteristics, and momentum factor returns.[45] For our expected return model, we use the four-factor Fama-French model, with a calendar-time portfolio approach. We obtain very similar results to those shown in Table 2. The magnitude of abnormal returns differs only slightly from the simple CAPM model. These findings indicate that our results are not sensitive to variations in measuring expected returns.

So far our evidence suggests that insiders exploit their material non-public information using both 10b5-1 planned and non-planned transactions since positive abnormal returns follow their purchases and negative abnormal returns follow their sales. Overall, there is no evidence that 10b5-1 plan transactions deserve any safe harbor treatment.

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[45] *See* Eugene F. Fama & Kenneth R. French, *Common Risk Factors in the Returns on Stocks and Bonds*, 33 J. FIN. ECON. 3 (1993); Carhart, *supra* note 43.

B. Abnormal Returns, Rule 10b5-1, and Insider Trading Patterns

In our next analyses we seek to understand the reasons behind the profitability of 10b5-1 planned trades. As we discussed earlier, there are two non-competing explanations for the profitability of 10b5-1 planned trades. First, insiders may set up these plans while in possession of material non-public information. We test this hypothesis by comparing the profitability of the first trade from the plan with subsequent trades. If the first trade is profitable, this finding would corroborate the hypothesis that insiders set up these plans in possession of material non-public information, thus in violation of the requirements of the 10b5-1 plans.

Second, 10b5-1 plans typically call for regular trading schedules at regular intervals.[46] In many examples, insiders sell exactly the same number of shares at about the same time every month.[47] We hypothesize that if insiders receive subsequent information that is at odds with their planned trades, they may respond by cancelling or modifying the terms of the existing plans. These actions will then tend to introduce breaks in insider trading patterns and result in irregular trading patterns. We test this hypothesis by examining the relationship between the profitability and regularity of the planned trades. If there is no difference in profitability of regular and irregular trades, then this finding would suggest that profitability comes from the information possessed at the time the plan is set up. However, if irregular trades are more profitable than regular trades, this finding would suggest that insiders intervene in the scheduled trades to take advantage of any subsequent non-public information they come to possess by changing the magnitude or timing of their planned trades, by cancelling their plans altogether, or by otherwise modifying their plans.

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[46] *See* Eaglesham & Barry, *supra* note 5; Sasseen, *supra* note 7.

[47] *See* Eaglesham & Barry, *supra* note 5.

Table 4. Results from Fama-French Carhart Four-Factor Model Returns by Trade Patterns

$R_{p,t} - R_{f,t} = \alpha + \beta_1(R_{m,t} - R_{f,t}) + \beta_2 SMB_t + \beta_3 HML_t + \beta_4 UMD_t + \varepsilon_t$, where $R_{p,t}$ is calendar-time portfolios based on insider trading and holding period, $R_{m,t}$ is the return on the CRSP equally-weighted index for day t.

$R_{f,t}$ is the daily risk-free interest rate (one-day treasury bill rate). SMB_t (small minus big) is a mimicking portfolio to capture risk related to size, HML_t (high minus low) is a mimicking portfolio to capture risk associated with book-to-market characteristics, and UMD_t (up minus down) is a mimicking portfolio designed to address risk associated with prior returns by subtracting a portfolio of low prior return firms from a portfolio of high prior return firms. α is the abnormal return. The coefficients are obtained from an OLS regression on the estimation period returns. Stacked regressions are run to provide coefficient difference test statistics across 10b5-1 participant and nonparticipant samples. Results are shown for the horizon of the following: one month, three months, six months, and one year. In Panel A, initial insider trade is determined as if the insider is making a transaction for the first time in the sample. Subsequent insider trades are the trades following the initial trade. Calendar-time portfolios are formed for the initial insider trade and subsequent insider trades separately.

Panel A. Initial and Subsequent Insider Trade

		10b5-1		Non-10b5-1		Diff.	
		(1)		(2)		(1)-(2)	
Purchases[a]	Horizon	Mean	*t*-stat	Mean	*t*-stat	Mean	*t*-stat
Initial insider trade	1 month	0.0011	1.89	0.0015	14.78	-0.0004	-0.64
Initial insider trade	3 months	0.0004	0.95	0.0006	8.85	-0.0001	-0.32
Initial insider trade	6 months	0.0003	0.85	0.0003	5.93	0.0000	-0.05
Initial insider trade	1 year	0.0004	1.26	0.0002	3.79	0.0002	0.66
Subsequent insider trades	1 month	0.0010	2.53	0.0013	9.30	-0.0003	-0.79
Subsequent insider trades	3 months	0.0003	0.96	0.0005	4.53	-0.0001	-0.32
Subsequent insider trades	6 months	0.0002	0.62	0.0002	2.61	0.0000	-0.08
Subsequent insider trades	1 year	0.0002	0.81	0.0001	1.22	0.0001	0.37
Sales[b]	Horizon	Mean	*t*-stat	Mean	*t*-stat	Mean	*t*-stat
Initial insider trade	1 month	-0.0005	-2.99	-0.0005	-6.41	0.0001	0.42
Initial insider trade	3 months	-0.0005	-3.32	-0.0004	-5.98	-0.0001	-0.74
Initial insider trade	6 months	-0.0004	-3.28	-0.0004	-6.87	-0.0001	-0.53
Initial insider trade	1 year	-0.0004	-2.97	-0.0003	-5.86	-0.0001	-0.75
Subsequent insider trades	1 month	-0.0005	-3.05	-0.0005	-3.72	-0.0001	-0.26
Subsequent insider trades	3 months	-0.0005	-3.45	-0.0004	-4.01	-0.0001	-0.73
Subsequent insider trades	6 months	-0.0004	-3.03	-0.0003	-4.40	0.0000	-0.17
Subsequent insider trades	1 year	-0.0003	-2.57	-0.0003	-4.13	0.0000	0.15

[a] and [b] The number of observations used in both purchases and sales regressions is 2769.

The results are shown in Table 4, Panels A and B. In Panel A, for initial 10b5-1 insider purchases, the abnormal return is eleven basis points per day (about 2.2% per month). This abnormal return does not attain statistical significance given the small sample size. For non-planned purchases, the abnormal returns are fifteen basis points per day (about 3% per month). This value is highly significant. The differences between planned and non-planned purchases are insignificant. For subsequent purchases, both planned and non-planned purchases (after one month) exhibit statistically significant profitability, and once again, the differences do not attain statistical significance.

Similar patterns can be seen in the case of insiders' sales. Both initial sales and subsequent sales show abnormal profitability for both planned and non-planned sales, while the differences again do not attain statistical significance. Initial insider sales under 10b5-1 plans show an abnormal profit of about five basis points per day during the first month (about -1% per month). This value is highly significant. For the initial non-planned insider sales, abnormal profitability also attains five basis points per day during the first month (-1% per month). This value is also highly significant. Again, the differences between these values are not statistically significant. The subsequent sale trades are profitable for both planned and non-planned sales. Once again, the differences are not statistically significant.

Our key finding so far is that the very first trade from a 10b5-1 plan shows abnormal profitability. This finding corroborates our conclusion that 10b5-1 plans are actually set up when insiders possess material non-public information. Such behavior would violate the safe harbor requirements of Rule 10b5-1.

In Panel B of Table 4 we examine whether regularity of trades under Rule 10b5-1 is related to the trade's profitability. We classify insider trades into four categories: (i) a "regular trade" is defined as another 10b5-1 transaction coming from the same insider made in the past twenty to twenty-five trading days with the same number of shares; (ii) a "regular interval-irregular amount" trade is defined as

another 10b5-1 transaction coming from the same insider made in the past twenty to twenty-five trading days, but the number of shares traded is different; (iii) an "irregular interval-regular amount trade" is defined as another 10b5-1 transaction coming from the same insider with the same number of shares made anytime in the past three months; and finally, (iv) an "irregular trade" is defined as a 10b5-1 transaction in none of the above mentioned three groups. We present our result only for trades within Rule 10b5-1. As a caveat, it is important to repeat that our sample size for purchases is small.

Panel B. Trade Interval within Rule 10b5-1

An irregular trade is a 10b5-1 transaction not in one of the following three groups. A regular interval-irregular amount trade is defined as another 10b5-1 transaction coming from the same insider made in the past 20–25 trading days, but with a different number of shares traded. An irregular interval-regular amount trade is another 10b5-1 transaction coming from the same insider with the same number of shares made anytime in the past three months. A regular trade is another 10b5-1 transaction coming from the same insider made in the past 20–25 trading days with the same number of shares. Results are shown for the horizon of the following one month, three months, six months, and one year.

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10b5-1	.	Purchases[a]		Sales[b]	
Transaction interval	Horizon	Mean	t-stat	Mean	t-stat
Irregular trade	1 month	0.0015	3.46	-0.0006	-3.46
Irregular trade	3 months	0.0008	2.21	-0.0005	-3.21
Irregular trade	6 months	0.0006	1.62	-0.0004	-2.60
Irregular trade	1 year	0.0004	1.42	-0.0003	-2.31
Regular interval, irregular amount	1 month	0.0002	0.39	-0.0010	-3.01
Regular interval, irregular amount	3 months	-0.0004	-0.76	-0.0006	-2.41
Regular interval, irregular amount	6 months	-0.0003	-0.59	-0.0005	-2.43
Regular interval, irregular amount	1 year	-0.0002	-0.56	-0.0004	-2.06
Irregular interval, regular amount	1 month	0.0005	0.97	-0.0005	-2.16
Irregular interval, regular amount	3 months	0.0006	1.22	-0.0003	-1.63
Irregular interval, regular amount	6 months	0.0002	0.51	-0.0002	-1.44
Irregular interval, regular amount	1 year	0.0005	1.39	-0.0002	-1.35
Regular trade	1 month	0.0002	0.51	-0.0006	-2.03
Regular trade	3 months	-0.0001	-0.26	-0.0001	-0.13
Regular trade	6 months	-0.0002	-0.35	-0.0004	-1.44
Regular trade	1 year	-0.00001	-0.03	-0.0003	-1.43

[a] and [b] The number of observations used in both purchases and sales regressions is 2769.

Our overall conclusion from Panel B is that irregular trades tend to be more profitable. When insider trades are regular, the only group with abnormal profitability is sales after one month. However, irregular sales groups show profitability after all the analyzed periods. Furthermore, additional irregularities increase profitability. When both trade amount and trade interval are irregular, both purchases and sales show statistically significant abnormal profitability. These results indicate that Rule 10b5-1 purchases are followed by significantly positive abnormal

returns for holding periods of one and three months only in the irregular trade sample. Average daily abnormal returns are 0.15% (t-statistics: 3.46) and 0.08% (t-statistics: 2.21), respectively. Thus insiders' irregular 10b5-1 purchases show enhanced profitability.

Irregular sales within Rule 10b5-1 convey the most meaningful signal to outsiders. Abnormal returns in this sample are significantly negative for all holding periods, accumulating CAR of about -7.5% one year after insider sales.

Additional evidence shown in Table 4 Panel B indicates that adding regularity to either trading volume or trading interval reduces the profitability of insider trades under 10b5-1 plans. Overall, our finding is consistent with the hypothesis that insiders intervene in their planned transactions to increase profitability. Furthermore, the greater the intervention (in terms of both trading volumes and trading intervals), the greater the increase in profitability.

C. Abnormal Returns, Rule 10b5-1, and Insiders' Trade Volume

In our next set of analyses, we seek to further understand the reasons behind the profitability of 10b5-1 planned trades. We examine whether the same factors that lead to profitable insiders' transactions in general are at work for 10b5-1 planned trades. For this purpose, we test to see if the abnormal returns earned by insiders are systematically related to the size of their transactions, the size of their firms, and the insiders' positions within the firm. We measure expected stock returns using the same four-factor model as shown in Table 3.[48]

In Panel A of Table 5, we analyze whether higher trading volumes show increased profitability for 10b5-1 planned trades. For this purpose, we group insider trading into three

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[48] *See* Fama & French, *supra* note 45.

trade volume groups. Group 1 is defined as trades of fewer than 1000 shares. Group 2 is defined as trades of between 1000 and 10,000 shares. Finally, Group 3 includes trades of greater than 10,000 shares.

Table 5. Results from Fama-French & Carhart Four-Factor Model Returns by Trade Volume, Type of Insider, and Firm Size

Panel A. Abnormal Returns, Rule 10b5-1, and Insiders' Trade Volume

Trade volume Group 1 is defined as transactions of fewer than 1000 shares. Group 2 is defined as transactions of between 1000 and 10,000 shares and group 3 includes transactions of more than 10,000 shares. Results are shown for the horizon of the following: one month, three months, six months, and one year.

		10b5-1 (1)		Non-10b5-1 (2)		Diff. (1)-(2)	
Purchases[a]							
Trade volume	Horizon	Mean	*t*-stat	Mean	*t*-stat	Mean	*t*-stat
Less than 1000	1 month	0.0009	2.00	0.0009	5.74	0.0000	-0.06
Less than 1000	3 months	0.0004	0.92	0.0003	3.10	0.0000	0.10
Less than 1000	6 months	0.0003	0.71	0.0002	1.80	0.0001	0.28
Less than 1000	1 year	0.0002	0.57	0.0001	0.79	0.0001	0.30
Between 1000 and 10,000	1 month	0.0010	2.35	0.0014	9.84	-0.0004	-0.94
Between 1000 and 10,000	3 months	0.0000	-0.12	0.0005	5.62	-0.0006	-1.36
Between 1000 and 10,000	6 months	-0.0003	-0.87	0.0002	3.07	-0.0006	-1.47
Between 1000 and 10,000	1 year	-0.0001	-0.24	0.0001	1.20	-0.0002	-0.56
Greater than 10,000	1 month	0.0007	1.38	0.0022	9.95	-0.0015	-2.52
Greater than 10,000	3 months	0.0009	1.44	0.0006	3.24	0.0003	0.43
Greater than 10,000	6 months	0.0006	0.88	0.0003	1.63	0.0003	0.44
Greater than 10,000	1 year	0.0011	1.84	0.0001	0.53	0.0010	1.66

Sales[b]		10b5-1 (1)		Non-10b5-1 (2)		Diff. (1)-(2)	
Trade volume	Horizon	Mean	*t*-stat	Mean	*t*-stat	Mean	*t*-stat
Less than 1000	1 month	-0.0006	-2.72	-0.0006	-4.53	-0.00006	-0.22
Less than 1000	3 months	-0.0006	-2.80	-0.0004	-4.64	-0.0001	-0.62
Less than 1000	6 months	-0.0004	-2.31	-0.0004	-4.35	0.0000	-0.19
Less than 1000	1 year	-0.0002	-1.73	-0.0003	-4.01	0.0000	0.30
Between 1000 and 10,000	1 month	-0.0004	-3.05	-0.0004	-3.42	0.0000	0.03
Between 1000 and 10,000	3 months	-0.0005	-4.04	-0.0003	-4.17	-0.0001	-0.89
Between 1000 and 10,000	6 months	-0.0004	-3.75	-0.0003	-4.31	-0.0001	-0.81
Between 1000 and 10,000	1 year	-0.0003	-3.38	-0.0003	-4.20	-0.0001	-0.59
Greater than 10,000	1 month	-0.0005	-2.78	-0.0003	-1.00	-0.0002	-0.64
Greater than 10,000	3 months	-0.0004	-2.19	-0.0003	-1.54	-0.0001	-0.34
Greater than 10,000	6 months	-0.0003	-1.95	-0.0004	-2.95	0.0001	0.40
Greater than 10,000	1 year	-0.0003	-2.20	-0.0003	-3.02	0.00002	0.12

[a] and [b] The number of observations used in both purchases and sales regressions is 2769.

While insiders' purchases under non-10b5-1 plans show a strong relation between profitability and trading volume, the same relation does not hold for 10b5-1 planned purchases. The most profitable group here is Group 2 (trading volume between 1000 and 10,000 shares), while the least profitable one is Group 3 (10,000 or greater volume of purchases). This finding suggests that the information-based motivation for purchases tends to be somewhat weaker for planned 10b5-1 purchases.

For insider sales, long-term profitability of more than one year is much stronger for both planned and non-planned sales in Group 2 (between 1000 and 10,000 sales volume) and in Group 3 (10,000 or greater sales volume) than in

Group 1 (volume of fewer than 1000 shares). This finding is consistent with the conclusion that both 10b5-1 and non-10b5-1 sales are motivated by the quality of information. When insiders have more valuable information, they increase the volume of trading for both 10b5-1 and non-10b5-1 sales.[49]

D. Abnormal Returns, Rule 10b5-1, and Firm Size

Panel B of Table 5 shows analyses examining whether Rule 10b5-1 influences the identification of unusual insider-trading activity by partitioning the sample into the firm size classes defined earlier. Typically, insiders in small firms, as opposed to insiders in large firms, tend to have a better picture of their firm's entire organization and tend to forecast the stock returns of their firms to a better extent. Previous evidence suggests that in large firms, any given piece of information is less likely to have a substantial impact on the stock prices, and hence, insiders in large firms do not tend to experience profitable insider trading.[50]

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[49] While not shown here, extremely high sales volumes (over 100,000 shares) are associated with lower abnormal returns for both planned and non-planned sales. This finding indicates that insiders do worry about trading extremely large volumes before important information events for fear of attracting litigation.

[50] *See* SEYHUN, *supra* note 31, at 89–92.

Panel B. Abnormal Returns, Rule 10b5-1, and Firm Size

Three size groups are defined. Small firms are those that have market values less than $1 billion, medium firms are those that have market values between $1 billion and $5 billion, and large firms are those that have market values equal to or greater than $5 billion.

Purchases[a]		10b5-1 (1)		Non-10b5-1 (2)		Diff. (1)-(2)	
Firm size	Horizon	Mean	*t*-stat	Mean	*t*-stat	Mean	*t*-stat
Less than $1B	1 month	0.0015	2.91	0.0015	10.66	0.0000	-0.06
Less than $1B	3 months	0.0008	1.74	0.0006	6.01	0.0002	0.41
Less than $1B	6 months	0.0006	1.45	0.0004	4.71	0.0002	0.51
Less than $1B	1 year	0.0005	1.47	0.0002	2.79	0.0003	0.85
Between $1B and $5B	1 month	0.0000	0.07	0.0001	0.61	-0.0001	-0.22
Between $1B and $5B	3 months	0.0002	0.66	-0.0003	-2.14	0.0005	1.45
Between $1B and $5B	6 months	-0.0003	-0.81	-0.0004	-3.43	0.0001	0.25
Between $1B and $5B	1 year	-0.0002	-0.57	-0.0004	-1.97	0.0002	0.42
Greater than $5B	1 month	-0.0004	-1.42	0.0001	0.42	-0.0005	-1.42
Greater than $5B	3 months	-0.0003	-0.97	-0.0001	-0.40	-0.0002	-0.71
Greater than $5B	6 months	-0.0003	-1.05	-0.0003	-2.04	0.0000	-0.13
Greater than $5B	1 year	-0.0003	-1.04	-0.0004	-3.50	0.0001	0.28

| | | 10b5-1 | | Non-10b5-1 | | Diff. | |
Sales[b]		(1)		(2)		(1)-(2)	
Firm size	Horizon	Mean	*t*-stat	Mean	*t*-stat	Mean	*t*-stat
Less than $1B	1 month	-0.0006	-2.58	-0.0005	-2.40	-0.0001	-0.48
Less than $1B	3 months	-0.0006	-2.76	-0.0003	-2.70	-0.0003	-1.04
Less than $1B	6 months	-0.0004	-2.15	-0.0004	-4.04	-0.0001	-0.29
Less than $1B	1 year	-0.0003	-1.58	-0.0003	-3.61	0.0000	-0.13
Between $1B and $5B	1 month	-0.0007	-4.19	-0.0005	-4.81	-0.0002	-0.91
Between $1B and $5B	3 months	-0.0006	-4.50	-0.0004	-4.66	-0.0002	-1.15
Between $1B and $5B	6 months	-0.0005	-3.99	-0.0004	-4.19	-0.0002	-1.07
Between $1B and $5B	1 year	-0.0004	-3.41	-0.0003	-3.89	-0.0001	-0.75
Greater than $5B	1 month	-0.0003	-1.73	-0.0005	-4.16	0.0002	0.89
Greater than $5B	3 months	-0.0003	-2.03	-0.0004	-3.87	0.0001	0.45
Greater than $5B	6 months	-0.0003	-1.92	-0.0003	-3.79	0.0001	0.47
Greater than $5B	1 year	-0.0003	-2.31	-0.0003	-4.00	0.0001	0.36

[a] and [b] The number of observations used in both purchases and sales regressions is 2769.

Our results in Panel B indicate that insider purchases are most profitable in smaller firms. This finding holds for both 10b5-1 planned and non-planned trades. Moreover, the magnitudes of profitability for planned and non-planned trades are similar. The differences in abnormal profits do not attain statistical significance.

Firm size appears to be less of a factor in the profitability of insider sales. This finding is true for both planned and non-planned sales. The biggest profitability occurs in medium sized firms. This finding is consistent with the

finance literature that suggests insider sales exhibit lesser profitability than insider purchases.[51]

E. Abnormal Returns, Rule 10b5-1, and Insiders' Positions within the Firm

In Panel C of Table 5 we examine how profitability of insider trading correlates with types of insiders. The typical relations documented in the finance literature also hold here.[52] Typically, the profitability of insider trading is greatest for high ranking officers, followed by directors, officers, and large shareholders.[53]

Panel C. Abnormal Returns, Rule 10b5-1, and Insiders' Positions Within the Firm

Purchases[a]		10b5-1 (1)		Non-10b5-1 (2)		Diff. (1)-(2)	
Insider type	Horizon	Mean	*t*-stat	Mean	*t*-stat	Mean	*t*-stat
Director	1 month	0.0007	1.62	0.0012	11.03	-0.0005	-1.00
Director	3 months	0.0007	1.75	0.0005	6.58	0.0002	0.47
Director	6 months	0.0006	1.59	0.0002	3.56	0.0004	0.98
Director	1 year	0.0004	1.12	0.0001	1.98	0.0003	0.82
Officer	1 month	0.0011	1.84	0.0012	8.43	-0.0001	-0.21
Officer	3 months	0.0011	2.08	0.0005	5.42	0.0006	1.11
Officer	6 months	0.0008	1.65	0.0003	3.63	0.0006	1.07
Officer	1 year	0.0005	1.13	0.0002	2.32	0.0003	0.76
Top Executive	1 month	0.0008	1.55	0.0019	5.94	-0.0010	-1.62
Top Executive	3 months	0.0003	0.64	0.0009	3.79	-0.0005	-0.89
Top Executive	6 months	0.0001	0.22	0.0005	3.36	-0.0003	-0.68
Top Executive	1 year	0.0001	0.12	0.0002	2.16	-0.0002	-0.33

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[51] *See id.* at 43–46, 86–88; Lakonishok & Lee, *supra* note 33, at 79–111.

[52] *See* SEYHUN, *supra* note 31, at 68–74.

[53] *Id.* at 72–74.

Purchases[a]		10b5-1 (1)		Non-10b5-1 (2)		Diff. (1)-(2)	
10% owner	1 month	0.0006	1.27	0.0015	5.66	-0.0009	-1.55
10% owner	3 months	-0.0001	-0.17	0.0004	2.26	-0.0005	-0.95
10% owner	6 months	0.0002	0.35	0.0002	1.29	0.0000	-0.07
10% owner	1 year	0.0010	2.16	0.0001	0.47	0.0009	1.82
Other	1 month	-0.0001	-0.20	0.0006	2.12	-0.0007	-1.69
Other	3 months	0.0002	0.60	0.0000	0.12	0.0002	0.39
Other	6 months	-0.0002	-0.46	0.0003	0.96	-0.0005	-0.88
Other	1 year	-0.0003	-0.75	0.0002	0.80	-0.0006	-1.05
Sales[b]							
Insider type	Horizon	Mean	*t*-stat	Mean	*t*-stat	Mean	*t*-stat
Director	1 month	-0.0008	-3.29	-0.0006	-3.31	-0.0002	-0.62
Director	3 months	-0.0009	-3.68	-0.0005	-3.57	-0.0003	-1.23
Director	6 months	-0.0007	-2.49	-0.0005	-3.54	-0.0002	-0.60
Director	1 year	-0.0005	-1.96	-0.0004	-3.25	-0.0001	-0.19
Officer	1 month	-0.0004	-2.32	-0.0004	-3.80	-0.0001	-0.24
Officer	3 months	-0.0004	-2.41	-0.0004	-5.27	0.0000	0.03
Officer	6 months	-0.0002	-1.63	-0.0004	-5.10	0.0001	0.84
Officer	1 year	-0.0001	-1.17	-0.0003	-4.16	0.0001	1.03
Top Executive	1 month	-0.0006	-2.94	-0.0005	-2.93	-0.0001	-0.23
Top Executive	3 months	-0.0005	-2.90	-0.0004	-3.15	-0.0001	-0.63
Top Executive	6 months	-0.0004	-3.03	-0.0004	-3.57	-0.0001	-0.39
Top Executive	1 year	-0.0004	-3.04	-0.0003	-3.22	-0.0001	-0.38
10% owner	1 month	-0.0001	-0.20	-0.0004	-1.32	0.0003	0.67
10% owner	3 months	-0.0001	-0.31	-0.0001	-0.60	0.0000	0.14
10% owner	6 months	-0.0002	-0.68	-0.0002	-1.46	0.0000	0.14
10% owner	1 year	-0.0002	-0.81	-0.0003	-2.24	0.0001	0.33
Other	1 month	-0.0003	-0.65	-0.0003	-0.77	0.0000	0.07
Other	3 months	-0.0004	-1.20	-0.0003	-1.09	-0.0001	-0.24
Other	6 months	-0.0004	-1.19	-0.0002	-1.10	-0.0001	-0.34
Other	1 year	-0.0004	-1.34	0.0000	-0.09	-0.0004	-1.11

[a] and [b] The number of observations used in both purchases and sales regressions is 2769.

Panel C of Table 5 shows that the most profitable purchases come from top executives and officers. This is particularly true for both planned and non-planned purchases. The category of "other" insiders shows the least profitable purchases, especially over longer holding periods.

For insider sales, directors appear to be engaging in most profitable 10b5-1 trades. Directors are closely followed by top executives and officers. Large shareholders and other insiders do not exhibit profitability at all. We also observe similar relations for non-planned sales across all types of insiders.

V. DISCUSSION OF POLICY IMPLICATIONS

Our results indicate that insiders' 10b5-1 plan trades under Rule 10b5-1 are highly profitable and typically similar in profitability to non-plan trades. Our evidence also shows that 10b5-1 plans are becoming more popular over time; the percentage of firms with at least one 10b5-1 transaction increased from 6% to 24% between 2003 and 2013. These findings are consistent with the conclusion that insiders are taking advantage of informational advantages while simultaneously hiding behind 10b5-1 plans to escape potential detection of their informed trades. This evidence supports the conclusion that it is necessary to rewrite the safeguards of the SEC's safe harbor rule in order to prevent such abuse.

We first propose that the SEC require a minimum, built-in six-month delay on planned transactions after a plan is filed. Given that the profitability of an insider's transactions extends into the six months following the date of the first trade, this additional delay of six months will increase the likelihood that any planned transactions will not benefit from this initial informational asymmetry. Most of the asymmetric information will be reflected in stock prices within six months. Some may argue that this requirement is too onerous because it does not allow insiders to trade at all, even for diversification reasons. However, this requirement does not affect the ability of insiders to trade outside of the 10b5-1 Rule. If they desire, insiders can still buy or sell

immediately after setting up a plan; however, those transactions cannot receive the benefit of the safe harbor rule.

Second, insiders can benefit from their informational advantages by subsequently modifying their plans. To prevent abuse, we propose that any modification to an existing plan must prompt a new built-in six-month trading delay. This requirement will again reduce the incentives for insiders to modify 10b5-1 plans as a result of gaining subsequent material non-public information.

Third, we propose that the SEC rescind its grant of permission for the use of formulas, algorithms, or computer programs with safe harbor plans. Making safe harbor trading dependent on the market price of a company's stock and allowing insiders to provide a formula or a computer program to determine trading activity actually increases insiders' degree of freedom with respect to exploiting material non-public information. Instead, the SEC should require that plans contain only two elements: the number of shares to be purchased or sold, and the dates of these proposed transactions. The less discretion insiders have over the future course of their proposed transactions, the less they will be able to use their material non-public information.

Fourth, we propose that all the details of a 10b5-1 plan must be disclosed at the time of the initial filing of the plan. Any subsequent modifications to a plan or subsequent cancellation of a plan must also be publicly disclosed. Public disclosure is necessary to ensure that (1) plans are not set up to exploit material, non-public information and (2) that investors can verify for themselves that insiders are following their own rules. In addition, such a public disclosure rule would also direct additional attention to any subsequent modification or cancellation of the plan, thereby reducing insiders' incentives to use their informational advantages to effect such changes.

Some opponents may argue that such public disclosures are inconsistent with insiders' right to privacy.[54] Two arguments weigh against this line of reasoning. First, insiders and firms do not give up any business secrets by disclosing their supposedly non-information-related planned transactions. By definition, these trades should not contain any material information. Alternatively, if simple knowledge of the plan dates, quantities, and limit prices is sufficient to infer insiders' material, non-public information, then these plans should not qualify for the safe harbor privilege. Second, existing SEC rules already require prior public disclosure of insiders' planned sales of restricted or control shares.[55] In this case, insiders must file a notice of proposed sale with the SEC on Form 144 if the sale involves more than 5000 shares or greater than $50,000 in any three-month period.[56] To address privacy concerns, similar small-trade volume conditions could be added to our proposed disclosure requirements for Rule 10b5-1 trades as well.

VI. CONCLUSIONS

This Article examines the profitability of insider transactions under Rule 10b5-1. One of the innovations of this study is its inclusion of all reported 10b5-1 trades. We find that, on average, insiders' trades within Rule 10b5-1 appear to be based on material non-public information. Moreover, the profitability of 10b5-1 plan trades is similar to the profitability of non-plan insider trades.

To analyze how insiders might trade strategically within the rule, we examine a number of trade characteristics. We also identify insiders' initial and subsequent trades, as well as their regular and irregular trades. Our results show that even initial trades under Rule 10b5-1 appear to be based on material non-public information, suggesting that insiders set

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[54] Potential privacy concerns were relayed to us during our presentations of the paper by seminar participants.

[55] 17 C.F.R. § 230.144(h) (2014).

[56] *Id.*

up their 10b5-1 plans to take into account material non-public information. We also find that any irregularity with respect to trading intervals or trading volumes increases the profitability of insiders' trades under Rule 10b5-1. This finding supports the conclusion that insiders modify or cancel their plans in response to acquiring subsequent material non-public information.

Moreover, we examine the effects of Rule 10b5-1 on insider trading by trade volume, firm size, and insiders' positions within the firm. We find that these variables provide additional clues to the profitability of insider trading for both planned and non-planned transactions. For instance, insiders' non-10b5-1 planned purchases tend to be positively related to the trading volume. The 10b5-1 planned purchases show similar, but somewhat weaker, relations between abnormal returns and trading volume. Profitability of insiders' sales (both planned and non-planned), particularly as measured by long-term abnormal returns (one year), is positively related to trading volume. These findings suggest that insiders increase trading volume when they possess material non-public information.

Furthermore, while both 10b5-1 planned and non-planned purchases by insiders seem to be most profitable in small firms, the relationship between insiders' sales and firm size is weaker for both 10b5-1 planned and non-planned sales. High-ranking officers seem to earn the greatest abnormal returns on their non-planned purchases among the insider types. Directors earn the next most abnormal returns, followed by officers and large shareholders. For officers, both 10b5-1 planned and non-planned purchases seem to be most profitable. The insider type "other" shows the least profitable planned purchases. Directors' 10b5-1 planned sales seem to be the most profitable, followed by those of top executives and officers. Planned sales of "other" insiders do not show abnormal profits at all. Our analyses show similar patterns for non-planned sales across all types of insiders.

Our evidence suggests that insiders take advantage of their material non-public information when they set up

10b5-1 plans and when they modify 10b5-1 plans. To prevent further abuse of 10b5-1 rules, we propose that the SEC institute four additional requirements to qualify under the safe harbor. First, any planned trades must have a minimum six-month required delay after the plan is filed. Second, any subsequent modifications to the plan will trigger a new six-month delay period. Third, the SEC must repeal its permission of trades based on prices, formulas, and computer programs and insist that safe harbor plans should only contain two elements: trading quantities and dates of trade. Fourth, the details of the initial plan must be publicly disclosed to enable investors to verify that insiders are abiding by their own requirements. Similarly, any subsequent modifications or cancellation of the plans must also be publicly disclosed to increase attention to changes in these planned transactions.