

**ARE TARGET MANAGERS
AFRAID OF SECTION 16b?**

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Are Target Managers Afraid of Section 16b?

Abstract

This paper empirically examines whether the short-swing rule (Section 16b of the Securities Exchange Act) deters managers from trading before mergers. This rule bars insiders from profiting on round-trip trades completed within a six month period. Around most corporate events, insiders can escape the short-swing rule by selling six months and a day after purchase. However, a merger forces the sale of all the outstanding common stock of the target firm, preventing insider purchases within six months before the merger from escaping this rule. We analyze the trading behavior of top managers of takeover targets before mergers. In order to disentangle the effect of this rule from the deterrent effect of Rule 10b-5, ITSA, ITSFEA and recent case law, we examine the time period from 1941 to 1961, an era when none of these regulations was enforced. We find that managers of target firms reduce their purchases before the merger announcement below their normal level of purchases and relative to a control sample of non-target firms. This evidence is consistent with a deterrent effect of Section 16b. We find that managers reduce their purchases before the merger completion only in the first half of our sample period. Surprisingly, managers do not reduce their sales before the announcement, even though 16b cannot punish deferral of planned sales. Despite a variety of tests, we are unable to resolve this puzzle.

Are target managers afraid of Section 16b?

1. Introduction

Since 1934, officers, directors, and owners of more than 10% of the common stock of a firm have been required to report their trades to the Securities and Exchange Commission (SEC) under Section 16a of the Securities Exchange Act of 1934. Each month, the SEC publishes these trades in the *Official Summary of Security Transactions and Holdings*. Using this publication, many researchers have analyzed insider trading. This research has unanimously concluded that, on average, insiders earn positive excess returns from their trades (see, e.g., Jaffe (1974a,b), Seyhun (1986), and Rozeff and Zaman (1988)).

The focus of efforts to deter insider trading in recent decades has been the SEC's Rule 10b-5. This rule makes trading on a non-public "material fact" (i.e., information important to a reasonable investor) illegal and applies to individuals with a duty not to disclose the information. While adopted by the SEC in 1942, Rule 10b-5 was not enforced on transactions over stock exchanges until the Cady, Roberts decision in 1961 (see, e.g., *Columbia Law Review* (1962), Hines (1963), and Manne (1966)). After 1961, Rule 10b-5 became the main focus of efforts to deter trading based on special information. A number of court cases in the ensuing decades have strengthened insider trading regulation.¹ Furthermore, the Insider Trading Sanctions Act of 1984 (ITSA) and the Insider Trading and Securities Fraud Enforcement Act of 1988 (ITSFEA) have increased penalties for insider trading.

The effectiveness of these regulations has been tested by examining changes in insider trading following regulation changes. For example, Jaffe (1974b) finds that profits to insiders did not fall following the Cady, Roberts decision, the Texas Gulf Sulphur indictment, and the Texas Gulf Sulphur decision. Seyhun (1992) concludes that abnormal returns to insiders actually increased after the passage of ITSA. However, he finds that

¹For example, see *SEC v. Texas Gulf Sulphur Co.*, 401 F.2d 833 (1968), cert. denied, 394 U.S. 976 (1969) and *Chiarella v. United States*, 588 F.2d (2d Cir. 1978), revised 100 S. Ct. 1108 (1980).

insider trading prior to earnings and takeover announcements diminished after ITSA.

In contrast, we are unaware of any empirical study that examines the consequences of the short-swing rule (Section 16b of the Securities Exchange Act). A short-swing trade is a purchase and a subsequent sale (or a sale followed by a purchase) within a six-month period. Section 16b of the Act requires insiders to return all profits from such trades in equity or convertible securities to the corporation. In effect since 1934, this is a simple rule that is intended to avoid the most obvious types of insider trading abuses. It is relatively easy to enforce, because there is no requirement of proof that a trade was based on inside information. The enforcement of this law does not tie up resources of the SEC, since action can be brought by any shareholder. However, a shareholder lacks incentives to bring a lawsuit because of a free-rider problem: he incurs 100% of the costs of the lawsuit but, if he wins, the insider returns the illegal trading profits to the company. Therefore, Section 16b is typically enforced by lawyers, who continuously monitor the *Official Summary*. If an insider does not comply with the law upon notification, a lawyer need only purchase one share of the company to become a shareholder and file a suit. The lawyer receives legal fees out of the trading profits that the insider returns to the company. This rule is attractive, because it makes use of free market forces rather than large amounts of public expenditures for enforcement.

Nevertheless, for two reasons, Section 16b is unlikely to reduce informed trading by insiders. First, trades will be challenged by a lawyer only when her anticipated compensation exceeds the value of her time and effort. Trades with profits below a certain threshold should escape challenge by lawyers. Second, and more importantly, the rule is unlikely to prevent insider trading before announcements of most corporate events. Insiders can simply sell the stock six months and a day after buying and avoid violating the rule. This "loophole" may be the reason academics have not attempted empirical studies of Section 16b.²

²For instance, Jennings and Marsh (1987) say, "any moderately bright manipulator should be able...to string out his activities and thus escape any penalty." Indeed, Section 16b is viewed by some as redundant, given the more potent Rule 10b-5 (see, e.g., Lowenfels(1968, p. 64) and O'Connor (1989)).

However, it is little known that this loophole does not exist for one important corporate event, viz. mergers. A merger forces a sale of all the outstanding common stock of the target firm. Thus, an insider of the target firm who purchased stock within six months before the merger date finds himself caught by the short-swing rule. Case law has established that the rule applies to stock-for-stock, as well as cash-for-stock, mergers.³ Furthermore, arguments that the insider was forced to sell involuntarily or even that the insider voted *against* the merger appear to have legal standing in only the most exceptional of circumstances.⁴

That Section 16b might reduce insider trading prior to mergers is particularly interesting for a number of reasons. First, mergers are known to have large impacts on the stock prices of target firms (see Jensen and Ruback (1983) and Jarrell, Brickley and Netter (1988) for recent reviews). Second, a large proportion of the recent cases of insider trading fraud involved knowledge of an impending takeover.⁵ Third, one common criticism of government is that regulation has unexpected effects. Section 16b may be an example of this "law of unintended consequences", since the effect of the Section on trading before mergers does not appear to have been anticipated.⁶ Accordingly, this paper empirically examines the trades of target managers before mergers.

In addition to Section 16b, insider trading is currently affected by three regulations: Rule 10b-5, ITSA and ITSFEA. And case law in the 1980s may also have had a strong effect. Seyhun (1992, p. 151) states, "Case law in effect defined illegal trading as trading

³For example, see *Kern County Land Co. v. Occidental Petroleum Corp.*, Supreme Court of the United States, 1973, 411 U.S. 582, 93 S. Ct. 1736, 36 L.Ed. 2d 503. Even this landmark case does not question the application of the short swing rule to stock-for-stock mergers.

⁴See *Kern County Land Co. v. Occidental Petroleum Corp.*, *op. cit.*

⁵For example, 79% of Meulbroek's (1992) sample of illegal insider trading involves corporate control transactions.

⁶For example, Haddock and Macey (1987) say, "Because the reach of 16(b) can be avoided by holding securities for longer than six months, even the drafters (of the law) anticipated little effect in curbing insider trading."

immediately prior to takeovers and earnings announcements and other important corporate announcements." Overall, these regulations and case law seem to have been quite effective in deterring insider trading before mergers. For example, Seyhun (1992, p. 175) writes, "Top executives almost completely stopped trading before takeovers" over the period from April 1980 to December 1989.

In order to disentangle the effect of Section 16b from these other regulatory efforts, it is important to examine a time period when only 16b was operative. Since the first of these regulations, Rule 10b-5, was not enforced prior to the Cady, Roberts decision in November 1961, we examine mergers completed over the period from 1941 to October 1961.^{7,8} While we study an early time period, the findings of this study have important implications for the current policy on insider trading because Section 16b continues to be enforced and still applies to mergers. And mergers and acquisitions continue to be a major focus of the regulatory effort against insider trading. Unlike other regulations, 16b is attractive because it is relatively inexpensive to enforce. Therefore, knowledge of its effects gives us a base case for understanding the incremental effects of later, more costly regulations.

The paper is organized as follows. Section 2 discusses the different implications of Section 16b for managers' purchases and sales. Previous studies are reviewed in section 3. The data are described in section 4. Results are presented in the next section. Conclusions are provided in section 6.

2. Section 16b and purchases vs. sales

Many studies on insider trading before corporate events only measure net insider purchases, i.e. the difference between purchases and sales. This approach loses information, since regulation is likely to affect managers' purchases differently from their sales. In this section, we discuss the differential effects of Section 16b on purchases and sales.

⁷While Rule 10b-5 was not enforced during this period, there is plenty of evidence that Section 16b *was* enforced. See, e.g., Lowenfels (1968).

⁸The choice of the beginning year of the sample period is explained in Section 4.1.

2.1. Purchases

2.1.1. Purchases before the announcement

In a world with no regulation of insider trading, managers should increase their purchases and decrease their sales upon receipt of private good news about their firm. For most types of information, this was the case for 1934 to 1961, when Rule 10b-5 was not operative and a manager could avoid Section 16b by holding the stock for more than six months.

However, managers with knowledge of their firm's possible takeover might not have had an incentive to buy even during the 1934-1961 period. Consider an example where the firm's stock is selling at \$45, reflecting the market's assessment that there is a 25% probability of being acquired at \$60 and 75% probability of the stock falling to \$40 if not acquired. Suppose a manager knows of an imminent merger announcement that would increase the probability of acquisition to 75%. This announcement should raise the stock price to \$55. However, if the acquisition is likely to occur within six months, the manager who purchases before the announcement is in effect giving away a call option to the firm. If the merger goes through, Section 16b causes the manager to forfeit all profits from the acquisition. Conversely, if the acquisition falls through and the price drops to \$40, the manager is, of course, not reimbursed for his losses. Thus, Section 16b essentially eliminates the manager's incentive to exploit his private information by purchasing the stock before the merger announcement.

It goes without saying that the above situation is stylized. For example, the argument does not hold if managers know of an acquisition more than six months in advance.⁹ Similarly, the price should not drop after an acquisition falls through, if the market had no advance knowledge of the merger possibility.

The important point is that insider purchases may either rise or fall prior to merger announcements. On the one hand, if Section 16b does not have a deterrent effect, managers

⁹It also does not hold if target managers can negotiate side payments from the acquiring firm to compensate them for any losses suffered due to Section 16b or delay the merger completion to avoid violating the rule.

should increase their purchases relative to their normal level. On the other hand, in the above stylized example with effective regulation, managers' buying should completely dry up before a merger announcement.¹⁰ Under less extreme conditions, managerial purchases before mergers may still fall below their normal levels. Thus, the effect of Section 16b on insider buying prior to mergers is an empirical issue.

2.1.2. Purchases between announcement and completion

The situation is somewhat different here. First, consider a world without effective regulation. In the extreme case where the announcement *guarantees* completion, no abnormal returns would be expected to follow the announcement. Thus, managers would have no incentive to buy here. In other cases where, after the announcement, a manager believes consummation of the merger is more (less) likely than does the market, he has an incentive to increase (decrease) purchases. For a sample of merger *attempts*, the effects of these two possibilities on purchases would be offsetting. But since our sample consists of completed mergers, managers may be more optimistic about completion than the market. However, this asymmetry is likely to be smaller than the asymmetry before the announcement. Therefore, absent regulation, while purchases may increase during this period as well, the increase should not be as large as before the announcement.

Second, while effective regulation should reduce managers' purchases after the announcement, it is unclear whether this reduction is greater than that before the announcement. On the one hand, 16b violations are more likely to occur on purchases during this period than before the announcement because this period is closer to merger completion, which forces sale of the stock. On the other hand, these purchases are less profitable because the stock has already risen at the announcement. Therefore, potential 16b violations stemming from these purchases are less likely to be challenged by lawyers, since their fees have to be paid out of the insider trading profits.

¹⁰In this example, the manager choosing not to purchase possesses special information. However, a manager without special information, i.e. one who assesses the probability of acquisition at 25%, would also choose not to purchase.

2.2. Sales

2.2.1. Sales before the announcement

The story is quite different with sales. Consider a risk-neutral manager who bought the stock over six months ago and is considering a sale in the near future. In our stylized example, he could sell his stock at the current price of \$45 or for \$55 after the announcement. Clearly, the manager should defer the sale until after the announcement because Section 16b can not punish such deferrals. This implies that sales should decrease before the announcement.

2.2.2. Sales between announcement and completion

However, deferral of planned sales need not continue *after* the announcement. For example, in the extreme case where the announcement guarantees completion, the abnormal returns after the announcement would have a zero expectation. Here, the manager would not benefit by continuing to defer the sale once the announcement is made. In fact, if planned sales were indeed postponed from the pre-announcement period, they may take place now, causing sales to go up. And analogous to the information asymmetry argument on purchases in section 2.1.2, it follows that the incentive to keep deferring sales once the announcement date has passed is small, even when completion is not guaranteed.

3. Prior studies

While no prior study has examined the effect of Section 16b on insider trading before mergers, a number of studies have investigated insider trading before corporate events. We interpret the majority of these as suggesting that insiders do not profitably time their trades before events.¹¹ In addition, there are two studies with conflicting results for dividend

¹¹See, e.g., Elliott, Morse and Richardson (1984) and Givoly and Palmon (1985) for various corporate news, Loderer and Sheehan (1989) for bankruptcy, and Seyhun (1990) for acquisitions. However, Seyhun looks at acquiring firms while this paper examines target firms.

initiations.¹² Finally, we found two papers presenting strong evidence that insiders trade profitably before corporate events.¹³

Taken together, the above studies do not indicate that insiders profitably time their trades prior to corporate events. Because all of the studies use data after the Cady, Roberts decision in 1961, the results are consistent with the hypothesis that Rule 10b-5 or later regulations (ITSA, ITSFEA and case laws - see Seyhun (1992)) deter profitable trading. However, since the authors did not view their works as examinations of these regulations, precise tests of the regulations were not included. For example, we argue in the previous section that regulation should affect purchases and sales differently. For the most part, the above studies did not separate purchases from sales.

4. Sample and Data

4.1. The merger sample

This paper examines the pre-merger trading by top managers of acquired firms prior to the 1961 Cady, Roberts decision. The pre-1961 period is chosen because it was a relatively pure regulatory era when Section 16b was the only rule enforced against insider trading, at least for securities traded on stock exchanges. The sample of mergers was obtained by a two-step process. First, we compiled a list of all New York Stock Exchange (NYSE) firms that were delisted from the monthly files of the Center for Research in Security Prices (CRSP) due to a merger or reorganization over the period from 1941 to 1961.¹⁴ The merger completion month was defined as the month in which a firm

¹²See John and Lang (1991) and Ku and Westerfield (1992).

¹³See Karpoff and Lee (1991) for security offerings, and Penman (1982) for managers' earnings forecasts.

¹⁴The beginning year of the sample period was chosen for two reasons. First, the SEC was created in 1934 and therefore the *Official Summary*, which reports insiders' trades, was not published before then. Second, as discussed later in this section, we need five years of insider trading data before the merger announcement. Thus, 1939 is the earliest possible beginning year for our sample. There were very few mergers in 1939 and 1940, and none of them met our data requirements, so our sample begins with mergers occurring in 1941. The acquisition of the last firm in the sample was completed before the Cady, Roberts

disappears from the CRSP tapes. Second, we determined the announcement date of the merger using the Wall Street Journal Index (WSJI) for mergers that occurred in 1956 or later, and the New York Times Index (NYTI) for mergers that occurred prior to 1956.¹⁵ The announcement date is defined as the date of the first public announcement about the merger of a target firm by either the target or a bidder.¹⁶ Table 1 shows a time profile of our sample of merger targets. About 14% of the mergers in our sample took place in the decade of the 1940s, 72% in the 1950s, and 14% in the early 1960s.

4.2. Institutional setting of mergers in the sample period

Our sample period includes the mini merger wave of 1943-56 (Nelson (1959)). Some of the mergers in the early part of this wave were vertical, to avoid price controls and allocations during World War II (Stigler (1951)). Other mergers were motivated by the low capital gains tax at the time (Butters, Lintner and Cary (1951)). Unlike the merger wave of 1975-89 that resulted in core consolidations, this mini-wave was not specific to a set of industries, except for electrical equipment (Post (1994)). Following the Celler-Kefauver Act of 1950, mergers became increasingly conglomerate, being driven in part by product or market extension.

The last two decades have been characterized by enormous variety in the market for corporate control (see Jensen and Ruback (1983) and Jarrell, Brickley and Netter (1988)). Acquisitions now vary in form (mergers, tender-offers, proxy contests), method of payment (cash, equity, preferred stock, notes), competition among bidders, and target management's reaction to the bid (hostile, friendly or white-knight takeovers). There has also been substantial growth in takeover defenses such as antitakeover amendments, poison pills, creation of dual classes of common stock, and defensive restructuring. In contrast, in our sample period, the corporate control market seems to have been fairly homogeneous. For

decision in November 1961.

¹⁵The WSJI was not published prior to 1956.

¹⁶The sample of firms acquired in mergers during 1955 to 1961 was kindly provided by Prof. Robert Harris. We collected the sample for 1941 to 1954, using the same procedure.

example, only 2 of the 132 mergers in our sample were preceded by a tender-offer. The great majority of mergers were financed by equity swap, supplemented in some cases by preferred stock. Similarly, in the vast majority of the cases, there was only a single bidder. The transactions tended to be friendly, negotiated deals, making it more likely that target managers had special information before the merger announcement, as opposed to hostile tender-offers where they can be caught by surprise. Despite the greater variety in today's market for corporate control, the vast majority of acquisitions even today are friendly, negotiated transactions (see Jensen (1988, p. 22)). Therefore, the analysis here is equally relevant for today's situation.

4.3. Insider trading data

For each acquired firm, data on open market trades of top managers were obtained from the *Official Summary of Security Transactions and Holdings* from 60 months prior to the announcement month to the month of merger completion.¹⁷ We focus on top managers, defined as officer-directors, because a merger of the firm involves major decisions that are usually restricted to top executives. This approach follows Seyhun (1990, p. 443) who says, "... lower level executives or the large shareholders (many of whom are firms) may not be aware of top management's attitude toward the potential acquisition. Restricting the sample to top management also focuses on a relatively homogeneous group. For instance, the large shareholders usually trade larger volumes of stock (by an order of magnitude) than the executives, much of which is for noninformation-related reasons (Seyhun 1986). Hence, if all transactions are pooled together, large shareholders' transactions would dominate the top executives' transactions, and the pooled transactions would contain less information."

For each month, we determined the number of managers who bought, the number of shares that they bought, the number of managers who sold, and the number of shares that

¹⁷In addition, we checked for late reports for six months after the merger completion.

they sold.¹⁸ We classified relatives of an insider as well as trusts for the insider's benefit as one person. Exercises of stock options were ignored. Trades that the *Official Summary* indicated were executed at non-market prices (private sales) were ignored as well.

We first compare the trading activity of target managers prior to merger announcements with two sets of controls: a time-series control and a cross-sectional control. We view the year before the merger announcement (i.e., months (-12,-1), where 0 is the announcement month) as a period of possibly informed trading by managers. For the time-series control, we use the trading activity of target managers in months (-60,-13). For the cross-sectional control, we match each acquired firm in our sample with a non-acquired firm on the basis of industry and size. This control firm is the one whose market value of equity is the closest to that of the acquired firm one year before the merger announcement amongst all NYSE firms with the same two-digit SIC industry code as the acquired firm. Data on insider trading for each control firm are collected over the same time interval as its matched acquired firm. Next, we use the same approach to compare the trading activity of target managers prior to the merger completion month with the two sets of controls.

Table 2 presents the frequency distribution of the number of managers trading in a month for both the target firms and the control firms. Trading is relatively infrequent; out of the sample of 9451 company-months for targets, managers bought in only 414 company-months, giving an average frequency of once in about 22.8 months. Sales are even less frequent. In months *with* trades, the trading is usually done by a single individual. Trading frequency is similarly low in the control sample of non-targets.

5. Results

5.1. Stock price reaction

Prior studies find that the announcement of a merger substantially increases the stock price of the acquired firm (see Jensen and Ruback (1983) and Jarrell, Brickley, and Netter

¹⁸In the rare case where a single manager both buys and sells in the same month, we classify him as a buyer (seller) if the number of shares purchased is greater (less) than the number of shares sold.

(1988) for reviews of this literature). However, these studies generally do not cover our sample period. To examine whether mergers had similar effects on acquired firms during our time period, we calculate the abnormal performance of firms in our sample around the time of the merger announcement. Furthermore, since our time series control for insider trading begins five years before the merger announcement, we also examine the stock price performance over the five years before the announcement.

We measure abnormal performance after adjusting for both firm size and beta risk as in Agrawal, Jaffe, and Mandelker (1992), since their results indicate that an adjustment for the size effect is important when measuring long run performance around merger events. The results are presented in Table 3. Abnormal returns are essentially zero over months (-60, -13) relative to the merger announcement. Target firms experience a large and statistically significant abnormal return of 11.75% over months (-3, 0). While the magnitude of this return is lower than that experienced by targets in recent decades (see Jensen and Ruback (1983, p. 11-13)), it is closer to the findings of Mandelker (1974, Table 2), who examines a sample period similar to ours.¹⁹ Higher abnormal performance in more recent decades may follow from higher premiums or from a greater probability of successful outcome, among other reasons. Performance rises from the announcement month to the month of completion, as the probability of success of the bid increases to one.

As a check on the above results, Table 3 also presents the abnormal performance for our control group of industry-size matched non-target firms around the time of the merger event. These results show essentially random performance over all the time periods examined. This is not surprising, since our control group is matched using the 2-digit SIC industry classification, which is broad enough that the announcement of the merger is likely to have little or no effect on the control firms.

We draw three conclusions from Table 3. First, the announcement of a merger has

¹⁹Mandelker finds an abnormal return of 15.0% over the eight month period leading up to the month of merger completion, based on the market model. We find a significant abnormal return of 15.1% (not shown in Table 3) over months (-3, C), where months 0 and C are the months of announcement and completion, respectively, using size and beta-adjustment.

a large and statistically significant effect on the stock price of the acquired firm. This suggests that, in the absence of effective regulation of insider trading, managers have an incentive to increase their purchases and decrease their sales prior to the announcement. Second, abnormal performance is essentially flat in months (-60, -13) relative to the merger. This suggests that the level of insider trading activity in the months before the merger can be meaningfully compared to its level in the control period of months (-60, -13), as we do in our time-series control. Third, the control firms display no abnormal performance during any time period. This suggests that insider trading activity for the acquired firms can be meaningfully compared to the activity in the control firms, as we do in our cross-sectional control.

5.2. Purchases in the overall sample period

Based on the discussion in section 2, we examine purchases and sales separately. Table 4 reports the average measures of purchases by top managers. For each firm in each month, we measure purchases in four ways:

- i) The number of managers purchasing
- ii) The number of shares purchased
- iii) The dollar value of purchases
- iv) The percentage of the outstanding equity purchased

We first examine the purchases of top managers relative to the month of merger announcement. Next, we look at purchases relative to the month of completion.

5.2.1. Purchases before the announcement

An examination of purchases relative to the announcement is interesting, since our discussion in section 2 indicates two possibilities. If Section 16b has no deterrent effect, top managers should increase their purchases prior to the merger announcement. If Section 16b has a deterrent effect, purchases should not increase prior to the announcement. In fact, as we argued, purchases could actually be reduced here.

Panel A of Table 4 divides the 60 month period prior to the announcement month into five separate periods. For each measure of purchase and for each time interval, the

first line presents the average value per month for managers of target firms. The second line shows the average per month for the control group of non-target firms. The third line presents t_c , the (cross-sectional) t-statistic for the difference between the two samples. The last line in every period except (-60, -13) presents t_t , the test statistic for the time-series control. This statistic compares the purchases of target managers in a given interval with their purchases during months (-60,-13). Both t-statistics are calculated from matched pairs and the normal distribution is assumed. Non-parametric binomial tests have been performed as well. These results are not reported since they are similar.

For example, consider the observations that lie in the first three rows of Panel A of Table 4. These represent the statistics during months (-60,-13) relative to the announcement month. Three of the four t-values are insignificantly negative and one (-1.96) is borderline significant. We believe that, taken together, the results indicate that the purchases of target managers are not significantly different from those of the control firms over months (-60, -13).

If managers of target firms profit from inside information on mergers, their purchases in year -1 should increase above those of the non-target firms. However, the results show a significant *reduction* in purchases for year-1, as evidenced by each of our eight t-values for months (-12,-1). This result is consistent with Section 16b actually lowering managers' purchases below their normal levels.

The rest of Panel A in Table 4 presents evidence on managers' purchases during three subperiods over year -1 relative to the announcement. Managers show a significant reduction in purchases during each subperiod. As with months (-12,-1), we view the subperiod results as suggesting a deterrent effect for Section 16b. However, a reduction in managerial buying also occurs in months (-12,-7), a period before the six-month rule should be taking effect. Since managers may not know the precise date of either the announcement or the completion of the merger ahead of time²⁰, these results may indicate that the

²⁰While the median time between merger announcement and completion date is under three months, there is a fair amount of variability across firms. One-sixth of the sample firms completed the merger within one month of the announcement, while approximately one-seventh of the firms took more than 6 months. The longest time between

deterrent effect in a world of uncertainty begins months earlier than it would in a world of perfect certainty.

Alternatively, some target firms may delay the merger completion so that their managers escape the six-month window of Section 16b. Under this hypothesis, one might expect managers' purchases to fall in months (-6,-1), but *rise* in months (-12,-7). However, since we observe a fall in both months (-12,-7) and (-6,-1) and since the period (-6,-1) relative to announcement is further before the date of merger completion, the evidence does not support this hypothesis.

5.2.2. Purchases before completion

This subsection examines the purchases by top managers relative to the completion month. As discussed in section 2, if Section 16b has a deterrent effect, purchases should decrease prior to completion. However, it is not clear what the magnitude of this reduction should be relative to that before the announcement. If Section 16b has no deterrent effect, insiders may still have an incentive to increase purchases between the announcement and completion. However, given the strong reduction in managers' information advantage at the announcement, this incentive would be lower.

The results relative to the completion month are presented in Panel B of Table 4. For the intervals (-12, 0), (-6, 0) and (-3, 0), only the t-values for the number of insiders

announcement and completion was 21 months.

It is generally difficult to know, even ex-post, when target managers first learnt about a merger attempt on their firm or when the merger talks were initiated. Sanders and Zdanowicz (1992) find that the initiation date was disclosed ex-post in only 30 of the corporate control transactions (including mergers, tender-offers, LBOs and MBOs) that took place among NYSE and AMEX firms during the period 1978 to 1986. For this sample, they find (see their Appendix 2, p. 126) that talks began between managers of the two firms an average of about three months before the announcement, with a wide variation across firms in this interval. In our sample, a reading of the relevant articles in the Wall Street Journal and the New York Times revealed the initiation date of the merger for only a handful of the targets.

buying are significantly negative.²¹ The t-values for the other three measures are insignificantly different from zero. Thus, while the evidence relative to completion might be viewed as suggestive of a deterrent effect of Section 16b, the evidence is clearly much weaker here than it is for purchases prior to the announcement.

5.3. Purchases over subperiods

We next examine managers' purchases over different subperiods. Panel A of Table 5 compares the purchases of officer-directors relative to the announcement for mergers that took place in the sub-period 1941-1955 with those in the sub-period 1956-1961.²² Over months (-12,-1), t-values are somewhat larger in magnitude for the 1956-1961 period than for the 1941-1955 period. However, difference of the means tests (not shown in the Table) do not reveal a significant difference over months (-12,-1) between the purchases of managers in target firms (adjusted for either control) during the two sub-periods. We also divide the 1941-1961 period into other sub-periods. We find (but do not report) no significant differences between the different sub-periods in the pre-announcement purchases of target managers (relative to either control).

Panel B of Table 5 compares purchases relative to the completion date for the two subperiods. For the first subperiod, purchases decline significantly in the intervals (-6, 0) and (-3, 0) relative to the completion date, findings consistent with Section 16b's deterrent effect in the six months prior to completion. However, purchases do not decline significantly prior to completion for the second subperiod.

This difference between the two subperiods is not easily explained. One possibility

²¹Panel A of Table 4 presents purchases for the interval (-x, -1) relative to the announcement month. This interval was chosen to avoid including trades after the announcement date. Conversely, Panel B of the table uses the interval (-x, 0) relative to the completion month. Since trading stops for the acquired firm on the completion date, our results can not be contaminated by purchases after completion even when month 0 is included.

²²While these two time periods are of unequal lengths, they contain the same number of mergers.

is that Rule 10b-5 was feared in the early years after the formation of the SEC. However, we found no mention of this viewpoint in our literature search. In fact, Manne (1966) says, "Strangely enough, during the early development of 10b-5 as an insider trading provision, neither the SEC nor the influential commentators saw it as very important." Alternatively, one can hypothesize that Section 16b was ineffective during the period 1956-1961. However, we found no support in the literature for this viewpoint either.

5.4. Purchases in small vs. large firms

Managers in small capitalization firms may behave differently from those in large firms. Perhaps managers of small firms are better informed of their firms' activities than managers of larger, more bureaucratic companies. In addition, managers in larger firms may be better informed about all the technicalities of Section 16b. However, our results relative to both announcement and completion (unreported) indicate no significant differences between the purchases of managers in small vs. large target firms (adjusted for either control).

5.5. Purchases in firms with small vs. large abnormal returns

Finally, we examine whether managers' purchases prior to the merger announcement are related to the stock price reaction to the announcement. Managers may avoid purchases before merger announcements with bigger stock price increases because such cases are more likely to be pursued by lawyers searching for violations of Section 16b. We subdivide our target sample into two groups: firms whose month 0 abnormal return is above vs. below the sample median. Our results (unreported) do not reveal significant differences between managers' purchases for the two types of firms.²³

²³We did not examine whether purchases before completion are related to the announcement return since most of the purchases here occur *after* the announcement.

5.6. Sales

5.6.1. Sales before the announcement

Just as a manager can profit by purchasing before an announcement of good news, he can profit by deferring a planned sale until after the announcement. Table 2 showed that individual managers trade quite infrequently. Thus, an individual who sells in a particular month is unlikely to have purchased the security within the previous six months. Because of this, for the great majority of cases, Section 16b could not have prevented managers from deferring sales until after the merger announcement. Therefore, we expect managers' sales to be lower in targets than in control firms before the announcement.

The results on insider sales are presented in Table 6. No t-statistic in the table has an absolute value greater than 2. Thus, the table shows no evidence that managers defer sales prior to merger announcements. This is particularly surprising for the months closest to the announcement. If a person has special information about a merger, it is difficult to imagine why he would not merely defer the sale a few days, weeks or months until the announcement is made and the stock rises. While some managers may be forced to sell for financial emergencies, it is hard to believe that this unlikely possibility adds enough noise to obscure a systematic relationship. The alternative hypothesis that managers simply have no special information prior to the official announcement of the merger is unlikely as well, since merger negotiations are often protracted affairs (see Sanders and Zdanowicz (1992) for some evidence of this).

We performed a number of additional tests in an attempt to resolve this issue. Results (not reported) after separation of the sample by firm size, calendar time period, price reaction in the announcement month, and time between announcement and completion reveal no significant patterns. In fact, we find no decrease in sales even in the month immediately before the announcement.

One possible explanation of this puzzle is as follows. Before the announcement, if a manager's assessment of the probability of a merger is greater than the market's assessment, the manager has an incentive not to sell until after the announcement. This is probably the typical situation in our sample of completed mergers. However, the number of deferring sellers prior to any individual announcement is likely low, since few insiders generally plan

to sell over any short time interval in the first place (see Table 2). Conversely, in the atypical case where the manager's probability of completion is lower than the market's, the manager has an incentive to sell immediately. This situation would occur when merger talks break down, even if they later resume unexpectedly. Sales may be much higher in such cases because a manager's entire holdings could be sold or many managers in the firm may sell.²⁴ Thus, while there may be more companies with sales deferrals than with sales initiations in our sample, the size of deferrals may be smaller than the size of initiations.

One implication of this conjecture is a skewed distribution. For most companies, managers' sales may be lower in targets than in the control group. However, the largest sales may occur more frequently in the targets than in the control group. Indeed, we find that in our sample, the largest sales occur in the target firms. However, even when we exclude these large sales, we do not find that sales in the target firms are significantly lower than sales in the control firms. Thus, the evidence does not support this conjecture.

5.6.2. Sales between announcement and completion

Table 6 also presents the sales of top managers over the period from the month of the merger announcement to the month of completion (0,C). Here also, we find no evidence of a reduction in sales. However, this is not surprising. As discussed in section 2.2.2, there is less reason to expect a reduction over this period, because the announcement greatly reduces the information asymmetry between managers and other market participants.

6. Summary and conclusions

This paper empirically examines whether the short-swing rule (Section 16b) deters managers from trading before mergers. This rule bars insiders from profiting on trades with holding periods of six months or less. Managers can generally escape the short-swing rule

²⁴This story does not imply that managers systematically make mistakes about the probability of merger completion because our sample consists of targets in *completed* mergers. For a hypothetical sample of targets of merger *attempts*, one would presumably find that knowledgeable managers sell more often before merger talks that break down and never resume than before talks that break down but resume later.

by selling six months and a day after purchase. However, a merger forces a sale of all the outstanding common stock of the target firm, preventing insider purchases within six months prior to a merger from escaping this rule. We analyze the volume of insider trading in takeover targets before mergers. In order to disentangle the effect of this rule from the deterrent effect of Rule 10b-5, ITSA, ITSFEA, and recent case law, we examine mergers announced during 1941 to 1961, an era when none of these regulations was enforced. While this study examines an early time period, our findings have important implications for the current policy on insider trading because Section 16b continues to be enforced and still applies to mergers. Mergers and acquisitions continue to be a major focus of the regulatory effort against insider trading. Therefore, knowledge of the effect of this inexpensive (to enforce) rule helps us in understanding the incremental effects of later, more costly regulations.

We argue that if Section 16b does not have a deterrent effect against mergers, managers' purchases should rise both before the merger announcement and between the announcement and completion. However, because of the substantial reduction in managers' information advantage at the announcement, their incentive to purchase is lower over the latter period. If Section 16b has a deterrent effect, managers' purchases should fall both before the announcement and between the announcement and completion.²⁵ However, as discussed in section 2.2.2, the relative magnitude of the reduction during the two periods is not clear. We find that managers reduce their purchases in the months before merger announcements, evidence consistent with a deterrent effect of Section 16b. Purchases are significantly reduced before the completion date only for the first half of the sample.

In addition, managers with advance knowledge of an upcoming merger announcement clearly have an incentive to defer sales, something that Section 16b can not deter. However, we find that managers' sales do not fall in the year before the merger announcement. In fact, there is no evidence of a decrease in sales even in the month immediately before the

²⁵As previously mentioned in footnote 10, Section 16b can deter managers both with and without inside information. Thus, our tests have examined whether the short-swing rule deters purchases before mergers, regardless of managers' information.

month of the merger announcement. Neither is there evidence of a decrease in sales in firms where the merger announcement generates large, positive abnormal returns. We also find that insiders do not reduce sales between the announcement and completion. However, this last result is not surprising because the announcement greatly reduces the information asymmetry between managers and outside investors.

A few caveats are in order. First, friends and relatives of managers (other than members of their immediate families), who neither report their trades under Section 16a nor are subject to Section 16b, may have increased their purchases before mergers. This increase may offset the reduction in the purchases of managers themselves. Of course, this possibility exists in almost every study of insider trading since, even to this day, friends and relatives of insiders are not required to disclose their trades.

Second, our tests assume that managers report their trades to the SEC, as required by the law, an assumption on which we have no evidence. Third, companies sometime restrict their employees from trading before certain corporate events. Our results may be the result of company-specific rules, not Section 16b. However, such company-specific rules may be a more recent phenomenon. Fourth, as discussed in footnote 9 above, merger agreements may indemnify managers from shareholder lawsuits, although such agreements are likely to increase, rather than decrease, managers' purchases before merger announcements. Finally, the evidence that insiders do not defer sales until after the merger announcement may suggest that the observed trading behavior could be unrelated to merger information. However, since we find that managers significantly reduce their purchases before the announcement and in the first half of our sample period before the completion, this explanation does not seem persuasive.

In future research, it would be interesting to examine whether managers trade profitably around major corporate events that do *not* result in a forced sale of stock (such as corporate stock buybacks) during this pure regulatory era, since 16b would not apply in such cases.

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Table 1

Time profile of the sample of merger targets

Year of announcement	Number of firms
1941	1
1942	1
1943	4
1944	2
1945	3
1946	4
1947	1
1948	1
1949	1
1950	4
1951	5
1952	3
1953	10
1954	7
1955	18
1956	12
1957	14
1958	9
1959	13
1960	9
1961	<u>10</u>
	<u>132</u>

Table 2

Frequency distribution of the number of top managers trading in a month

The table shows the trades of officer-directors of target firms in 132 mergers that took place during 1941 to 1961 and a control sample of non-acquired firms matched by size and industry. For each target firm and its control, trades are included for months (-60,C), where months 0 and C are, respectively, the months of announcement and completion of the merger.

Number of managers trading in a month	Number of Company-months			
	Targets		Non-targets	
	Purchases	Sales	Purchases	Sales
0	9037	9105	8837	8977
1	359	319	520	419
2	43	22	83	48
3	5	5	6	6
4	6	0	3	0
5	0	0	1	1
6	<u>1</u>	<u>0</u>	<u>1</u>	<u>0</u>
Total	<u>9451</u>	<u>9451</u>	<u>9451</u>	<u>9451</u>

Table 3

Size and beta-adjusted abnormal stock returns for the samples of target and non-target firms

The abnormal return for firm i in month t is computed as in (A1):

$$\epsilon_{it} = R_{it} - R_{st} - (\beta_i - \beta_s) (R_{mt} - R_{ft}),$$

where R_{it} and R_{st} are the stock returns on firm i and its size control portfolio s , respectively, in month t ; R_{ft} and R_{mt} are the returns in month t on one-month Treasury bills and the NYSE value-weighted market index, respectively; and β_i and β_s are the betas of firm i and its size control portfolio s , respectively. At the beginning of each year before the merger announcement month, we estimate β_i and β_s using monthly data over the previous 60 months. The samples consist of targets in 132 mergers between NYSE acquirers and NYSE targets over 1941-1961 and a control group of non-target firms matched by size and industry. The t -statistic for the average abnormal return (AAR) and the cumulative average abnormal return (CAAR) is computed according to the crude dependence adjustment method of Brown and Warner (1980, pp. 250-252).

Months around announcement	Targets		Non-targets	
	CAAR (%)	t-stat.	CAAR (%)	t-stat.
(-60, -49)	-3.48	-1.85	-0.00	0.80
(-48, -37)	1.47	0.77	-1.63	-0.58
(-36, -25)	0.85	-0.03	1.25	0.37
(-24, -13)	0.06	-0.23	0.13	0.26
(-12, -1)	5.26	2.68	-0.45	-0.24
(-60, -37)	-2.01	-0.76	-1.64	0.16
(-60, -25)	-1.16	-0.64	-0.39	0.34
(-60, -13)	-1.10	-0.67	-0.26	0.42
(-60, -1)	4.17	0.60	-0.70	0.27
(-1, 0)	9.21	11.65	0.20	0.46
(-2, 0)	10.14	10.08	-0.43	-0.17
(-3, 0)	11.75	9.92	0.37	0.57

Table 4

Top managers' purchases around merger announcements and completions in targets vs. non-targets

The table shows the average values per month of each of the four measures of purchases by officer-directors for each time interval. The row labeled t_c shows the matched pairs t-statistic for the cross-sectional difference between the means of the target and control firms. For months (-12,-1) and its sub-intervals, a similar t-statistic for the time-series control (t_t), for the difference between a given interval and months (-60,-13), is also shown. The sample of targets consists of 132 NYSE firms that were acquired during 1941-61. Each target firm was matched with a control firm on the NYSE in its 2-digit SIC industry that had the closest market value of equity as of the end of the year before the merger announcement. The control firm was not acquired for at least 12 months after the completion of the merger of its matched target firm. All dollar values are expressed in thousands of inflation-adjusted 1965 dollars. Month 0 is the month of merger announcement (ANN) in Panel A and the month of completion in Panel B.

		Panel A				Panel B				
Target Control t_c	Months around ANN	Number of		Shares bought (\$ '000)	% of equity bought	Months relative to completion	Number of		Shares bought (\$ '000)	% of equity bought
		Managers buying	Shares bought				Managers buying	Shares bought		
Target		0.063	67.71	1.98	0.0094					
Control	(-60, -13)	0.084	116.55	2.54	0.0159	(-60, -13)	0.059	66.23	1.96	0.0093
t_c		-1.96	-1.12	-0.59	-0.98		-2.54	-1.10	-0.57	-0.91
Target		0.037	13.27	0.40	0.0015		0.042	44.69	1.32	0.0044
Control	(-12, -1)	0.088	46.26	1.39	0.0038	(-12, 0)	0.077	51.62	1.40	0.0052
t_c		-3.00	-2.54	-1.91	-2.36		-2.71	-0.28	-0.11	-0.32
t_t		-2.93	-2.75	-2.32	-2.28		-1.89	-0.76	-0.74	-1.26
Target		0.038	10.37	0.38	0.0015		0.048	19.49	0.66	0.0020
Control	(-12, -7)	0.095	41.70	1.16	0.0049	(-12, -7)	0.082	54.83	1.69	0.0048
t_c		-2.77	-2.85	-2.38	-2.26		-1.54	-1.52	-1.03	-1.68
t_t		-2.58	-2.90	-2.35	-2.28		-0.90	-2.28	-1.82	-2.08
Target		0.037	16.16	0.42	0.0016		0.037	66.28	1.89	0.0066
Control	(-6, -1)	0.081	50.81	1.62	0.0026	(-6, 0)	0.073	48.87	1.16	0.0055
t_c		-2.33	-1.53	-1.23	-1.12		-2.83	0.42	0.72	0.29
t_t		-2.43	-2.54	-2.26	-2.25		-2.27	0.00	-0.06	-0.58
Target		0.023	14.30	0.19	0.0008		0.032	39.22	1.70	0.0063
Control	(-3, -1)	0.078	33.98	0.89	0.0028	(-3, 0)	0.074	59.42	1.29	0.0073
t_c		-2.73	-1.36	-2.58	-1.91		-2.73	-0.64	0.35	-0.20
t_t		-4.00	-2.49	-2.63	-2.47		-2.34	-0.95	-0.20	-0.58

Table 5

Purchases of top managers around merger announcements and completions in targets vs. control during 1941-1955 and 1956-1961

The table shows the average values per month of each of the four measures of purchases by officer-directors for each time interval. The row labeled t_c shows the matched pairs t-statistic for the cross-sectional difference between the means of the target and control firms. For months (-12,-1) and its sub-intervals, a similar t-statistic for the time-series control (t_c), for the difference between a given interval and months (-60,-13), is also shown. The sample of targets consists of 132 NYSE firms that were acquired during 1941-61. Each target firm was matched with a control firm on the NYSE in its 2-digit SIC industry that had the closest market value of equity as of the end of the year before the merger announcement. The control firm was not acquired for at least 12 months after the completion of the merger of its matched target firm. All dollar values are expressed in thousands of inflation-adjusted 1965 dollars. Month 0 is the month of merger announcement (ANN) in Panel A and the month of completion (OMP) in Panel B.

Months around ANN or OMP	Panel A: Months around announcement						Panel B: Months around completion										
	1941-1955			1956-1961			1941-1955			1956-1961							
	Number of Managers buying	Shares bought (\$ '000)	% of equity bought	Number of Managers buying	Shares bought (\$ '000)	% of equity bought	Number of Managers buying	Shares bought (\$ '000)	% of equity bought	Number of Managers buying	Shares bought (\$ '000)	% of equity bought					
(-60, -13)	Target	0.076	84.06	2.24	0.014	0.050	52.33	1.74	0.0048	0.069	82.45	2.20	0.0140	0.049	50.97	1.73	0.0048
	Control	0.078	52.79	1.38	0.006	0.089	176.57	3.63	0.0255	0.082	53.39	1.36	0.0058	0.089	170.35	3.56	0.0241
	t_c	-0.07	0.84	0.86	1.27	-3.27	-1.63	-1.20	-1.87	-0.72	0.79	0.84	1.25	-3.43	-1.58	-1.17	-1.78
(-12, -1) ^d	Target	0.049	15.04	0.53	0.0022	0.026	11.59	0.28	0.0008	0.049	15.98	0.57	0.0022	0.035	71.70	2.03	0.006
	Control	0.094	53.45	1.74	0.0037	0.082	39.48	1.06	0.0038	0.077	57.00	1.73	0.0039	0.077	46.55	1.10	0.006
	t_c	-1.50	-1.63	-1.18	-1.01	-3.24	-2.28	-2.57	-2.41	-1.24	-1.78	-1.22	-1.20	-3.03	0.59	0.89	0.08
t_c	-1.91	-1.91	-1.73	-1.74	-2.30	-2.24	-1.54	-2.46	-1.59	-1.94	-1.70	-1.75	-1.09	0.47	0.22	0.50	
(-12, -7)	Target	0.055	14.87	0.56	0.0023	0.022	6.13	0.20	0.0006	0.063	18.68	0.91	0.0027	0.034	20.25	0.43	0.0013
	Control	0.094	31.74	0.89	0.0044	0.096	51.07	1.42	0.0054	0.083	74.73	2.59	0.0044	0.081	36.10	0.85	0.0051
	t_c	-1.22	-1.49	-0.80	-1.01	-2.80	-2.44	-2.39	-2.09	-0.54	-1.24	-0.82	-0.69	-2.04	-1.09	-1.37	-1.71
t_c	-1.33	-1.91	-1.69	-1.71	-2.59	-2.61	-1.62	-2.56	-0.36	-1.75	-1.22	-1.62	-0.96	-1.52	-1.34	-2.05	
(-6, -1) ^d	Target	0.044	15.21	0.50	0.0022	0.029	17.06	0.35	0.0010	0.038	13.66	0.29	0.0017	0.036	115.81	3.39	0.011
	Control	0.094	75.16	2.60	0.0031	0.069	27.89	0.70	0.0022	0.071	41.81	0.99	0.0035	0.074	55.51	1.31	0.007
	t_c	-1.47	-1.33	-1.05	-0.47	-2.08	-0.89	-1.34	-1.67	-1.74	-1.73	-2.12	-1.03	-2.28	0.76	1.08	0.53
t_c	-2.07	-1.89	-1.75	-1.73	-1.36	-1.78	-1.45	-2.29	-2.24	-2.09	-2.09	-1.85	-0.98	0.84	0.80	1.03	
(-3, -1) ^d	Target	0.036	13.30	0.22	0.0013	0.010	15.25	0.17	0.0004	0.027	5.38	0.18	0.0009	0.037	71.07	3.13	0.011
	Control	0.088	31.95	0.82	0.0026	0.069	35.89	0.96	0.0031	0.090	47.39	1.06	0.0031	0.059	70.75	1.51	0.011
	t_c	-1.46	-1.02	-1.81	-0.75	-2.82	-0.93	-1.86	-2.19	-2.58	-2.13	-2.27	-1.55	-1.18	0.01	0.73	0.01
t_c	-2.31	-1.91	-2.09	-1.88	-3.73	-1.63	-1.64	-2.67	-2.69	-2.18	-2.12	-1.92	-0.75	0.46	0.63	0.88	

^dIn Panel B, this interval ends at 0.

Table 6

Top managers' sales around merger announcements in targets vs. non-targets

The table shows the average values per month of each of the four measures of sales by officer-directors for each time interval. The row labeled t_c shows the matched pairs t-statistic for the cross-sectional difference between the means of the target and control firms. For months (-12,-1) and its sub-intervals, a similar t-statistic for the time-series control (t_t), for the difference between a given interval and months (-60,-13), is also shown. The sample of targets consists of 132 NYSE firms that were acquired during 1941-61. Each target firm was matched with a control firm on the NYSE in its 2-digit SIC industry that had the closest market value of equity as of the end of the year before the merger announcement. The control firm was not acquired for at least 12 months after the completion of the merger of its matched target firm. All dollar values are expressed in thousands of inflation-adjusted 1965 dollars. Month 0 is the month of merger announcement (ANN) and C is the month of merger completion.

Months around ANN		Number of		Shares sold (\$ '000)	% of equity sold
		Managers selling	Shares sold		
(-60, -13)	Target	0.041	127.26	4.47	0.0150
	Control	0.059	76.72	2.16	0.0081
	t_c	-1.82	1.33	1.25	1.35
(-12, -1)	Target	0.049	152.49	4.53	0.0278
	Control	0.068	230.84	6.31	0.0193
	t_c	-1.34	-0.43	-0.37	0.35
	t_t	0.82	0.31	0.02	0.65
(-12, -7)	Target	0.045	77.44	1.79	0.0097
	Control	0.076	407.43	11.15	0.0334
	t_c	-1.62	-0.99	-1.12	-0.84
	t_t	0.52	-1.17	-1.27	-0.90
(-6, -1)	Target	0.052	227.53	7.26	0.0459
	Control	0.061	54.25	1.48	0.0051
	t_c	-0.54	1.21	1.23	1.05
	t_t	0.87	0.68	0.54	0.79
(-3, -1)	Target	0.045	77.64	3.15	0.0065
	Control	0.076	61.37	1.86	0.0044
	t_c	-1.42	0.31	0.46	0.57
	t_t	0.33	-0.83	-0.39	-1.59
(0, C)	Target	0.053	964.42	29.01	0.0341
	Control	0.061	93.51	2.70	0.0095
	t_c	-0.42	1.04	1.07	1.05
	t_t	0.93	1.04	1.07	1.04