

Payout Policy Tradeoffs and the Rise of 10b5-1 Preset Repurchase Plans

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ABSTRACT

We are the first to document and study the use of Rule 10b5-1 preset repurchase plans. Though the Rule's original intent was to clarify conditions for enforcing insider trading laws, generally thought to apply to individuals classified as firm insiders, we find strong use of the Rule *at the firm level* to repurchase company stock. We exploit this new and widespread form of payout to examine an issue at the core of payout decisions—the tradeoff between commitment and financial flexibility. Relative to open market repurchases, preset plans provide an expanded repurchase window and increased legal cover, albeit at the cost of reducing repurchase flexibility and the option to time repurchases. These costs and benefits are significantly associated with Rule 10b5-1 adoption: Firms with alternative sources of financial flexibility are more likely to pre-commit to a repurchase plan, as are firms with a history of poor repurchase timing and firms constrained by blackout windows. Consistent with preset plans signaling commitment, Rule 10b5-1 repurchase announcements are associated with greater and faster completion rates, with more positive market reactions, and with more dividend substitution than open market repurchases. Lastly, we find that preset repurchase plans represent a unique payout tool whose introduction encouraged a different set of firms to buy back stock and significantly altered the payout landscape.

Keywords: Share repurchase; share buyback; Rule 10b5-1; preset trading plan; accelerated share repurchase; payout policy; financial crisis; repurchase plan completion rates; announcement returns; financial flexibility; blackout windows; dividend substitution

JEL classification: G35; G24; G30

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1. Introduction

In 2000 the SEC enacted Rule 10b5-1 to allow insiders to trade while in possession of material, non-public information by establishing a preset trading plan with a third party. Though the SEC intended the Rule to clarify enforcement of insider trading laws for individuals, firms and their advisors soon realized that the Rule also created the same safe harbor for firms to repurchase shares while in possession of material, non-public information. Preset repurchases under Rule 10b5-1 are unique in that they allow firms to repurchase in a continuous fashion regardless of the timing of information releases and provide additional legal coverage, but at the cost of forfeiting control over the repurchase program. In doing so, firms partially relinquish the timing and abandonment options associated with open market repurchase (OMR) programs, thus incurring a real, costly commitment to distribute cash to shareholders, a commitment which traditional open market repurchases lack.

We exploit the introduction of preset repurchases to answer the following research questions. First, how do firms respond to an addition to the menu of payout options? Specifically, do they use the new option and more broadly, when the menu of options expands, how do firms change their overall payout decisions? Second, how do firms' responses to the new option inform our views of tradeoffs in payout policy?

We hand-collect 1,933 repurchase announcements between 2001 and 2014 that reference Rule 10b5-1. The use of the Rule to repurchase shares has been increasing rapidly since its enactment: We document only four such announcements in 2001, compared to at least 200 announcements per year from 2011 to 2014. In recent years Rule 10b5-1 plans are more than twice as popular as accelerated share repurchases, and approximately one quarter of all repurchase announcements include a Rule 10b5-1 component. In sum, after the immediate post-enactment period during which firms and investment banks learned to apply Rule 10b5-1, many firms responded to the availability of preset plans by incorporating them fully or partially into their payout policy.

Next, we study how firms' decisions to adopt preset plans inform our views of tradeoffs in payout policy. At the core of payout policy is the tradeoff between commitment, i.e., agreeing to distribute a certain sum of cash to shareholders in a set timeframe, and financial flexibility, i.e., maintaining the ability to

abandon payouts or time the market. The primary benefit to signaling commitment is an immediate increase in stock price when the firm announces payout decisions because payout announcement returns increase with expected payout levels (e.g., Comment and Jarrell (1991), Bonaime (2012)). The relative benefits of flexibility are a function of the firm's ability to access capital and to successfully exploit inside information.

We first establish that preset repurchase plans indeed represent a greater commitment to follow through on announced repurchases than OMRs, the most prevalent form of share repurchase. Relative to matched OMR programs, Rule 10b5-1 plans are associated with faster completion, greater completion rates (the dollar amount repurchased relative to the announced dollar amount), and are more likely to be completed. Thus, Rule 10b5-1 programs are a stronger commitment to repurchase shares, and a commitment to repurchase them more quickly, than are OMRs.

We next study the determinants of the decision to adopt a Rule 10b5-1 preset repurchase program relative to an OMR. A preset plan reduces a firm's ability to modify future repurchases because firms delegate repurchase responsibilities to a third party and Rule 10b5-1 prohibits adjustments to plans during blackout windows. We find that the likelihood of adopting a preset plan is greater for firms with more stable cash flows, no dividend payments, better recent stock performance, or more liquid stocks. These results are consistent with managers viewing payout flexibility and other sources of financial flexibility as substitutes in their management of overall firm financial flexibility. We also draw from a growing literature that characterizes the 2008-2009 financial crisis as an unanticipated shock to credit supply (e.g., Ivashina and Scharfstein (2010), Cornett, McNutt, Strahan, and Tehranian (2010), Bliss, Cheng, and Denis (2015)), which in turn increased the marginal benefits of financial flexibility. We find that 10b5-1 repurchase plan usage significantly stagnated during the crisis relative to estimated expected growth patterns, consistent with preset repurchase plan adoption likelihood decreasing as the marginal benefit of financial flexibility increases.

The institutional structure of Rule 10b5-1 plans is unique: Firms enter into a 10b5-1 trading plan with an investment bank during an "open window" when they are not in possession of material, nonpublic information, then the bank repurchases on the firms' behalf. Restricting plan adoption to open trading

windows limits a firm's ability to trade on information (i.e., "time their trades"). We find that firms with a record of worse repurchase timing are more likely to adopt a 10b5-1 plan, and smaller, younger, less financially sophisticated firms are among the first to adopt Rule 10b5-1 plans. These results are consistent with firms that are unable to or uninterested in making information-based trades being more likely to adopt a preset plan.

In addition, by allowing a firm to continue repurchasing while in possession of material, non-public information, 10b5-1 plans expand a firm's available repurchase window and provide legal cover for these trades. These institutional features represent alternative benefits—unrelated to signaling commitment—of preset plans over OMRs. We find that firms that are more constrained by blackout windows, either due to longer reporting lags or more frequent releases of material information through 8-K reports, are more likely to adopt a 10b5-1 plan than an OMR. However, we find no evidence of firms at higher risk of litigation being more likely to adopt a preset repurchase plan. These results suggest that, in addition to trading off flexibility for commitment, firms must weigh the cost of forfeiting the flexibility of OMR programs against the benefit of trading continuously throughout blackout periods.

We also show that firms without an active repurchase program when Rule 10b5-1 was enacted were more likely to choose 10b5-1 plans over OMRs. These results are consistent with preset repurchases facilitating buy backs within a different set of firms and occupying a unique space within the payout landscape.

Our data reveal that most firms that adopt a 10b5-1 plan continue to use a preset plan for future repurchases. Hence, adopting a 10b5-1 plan *for the first time* represents an important decision. We focus on time to first 10b5-1 plan adoption using a Cox proportional hazard model. The hazard model generally corroborates our prior results and further shows that firms whose CEO's bonus is tied to earnings per share and firms with more dilution or executive options adopt a 10b5-1 plan more quickly.

We next turn our attention to stock returns around Rule 10b5-1 repurchase announcements. On the one hand, 10b5-1 plans, by construction, should not be information-driven, potentially reducing their announcement effect. On the other hand, establishing a preset trading plan lessens the firm's repurchasing

flexibility and, on average, represents a stronger commitment to follow through on the announced repurchase plan. Empirically, we find that 10b5-1 announcements are met with positive and significant cumulative abnormal returns, which are generally increasing in the expected portion of the plan to be effected under the Rule. In fact, after matching on firm characteristics associated with 10b5-1 adoption, returns associated with repurchase announcements fully effected under Rule 10b5-1 are more than double returns to matched OMR announcements. The results are consistent with investors valuing the increased commitment of a preset repurchase plan, perhaps due to expected reductions in agency costs associated with free cash flow as in Jensen (1986).

In a final series of tests, we examine how preset repurchases disrupted the broader equilibrium choices under the existing set of payout policy options. First, we test how 10b5-1 repurchases contribute to the substitution of repurchases for dividends and find that the general substitution effect is concentrated in the subset of firm-year observations associated with Rule 10b5-1 announcements. These results are consistent with preset plans being distinct from traditional OMRs by emerging as the preferred substitute for dividend increases, likely because 10b5-1 plans represent a greater commitment and are thus more similar to dividends. Next, we document that the determinants of payout policy, particularly with respect to repurchase policy, changed significantly around the enactment of Rule 10b5-1. In sum, our results suggest the advent of Rule 10b5-1 significantly changed which types of firms engage in stock repurchases and how repurchases fit into a firm's broader payout policy.

Our findings contribute to the payout policy literature¹ along multiple dimensions. At a basic level, we document the adoption and analyze the costs and benefits of a new form of payout—Rule 10b5-1 preset repurchase plans. Studying preset repurchases is valuable because by comparing preset and traditional

¹ The literature focusing on how firms choose to distribute cash to shareholders has primarily examined the choice between dividends and share repurchases (e.g., Brennan and Thakor (1990), Allen, Bernardo, and Welch (2000), Jagannathan, Stephens, and Weisbach (2000), Guay and Harford (2000), Grullon and Michaely (2002), and Grinstein and Michaely (2005)). Other research examines different aspects of payout choice. For example, Brickley (1983) and DeAngelo, DeAngelo, and Skinner (2000) examine the choice between regular and special dividends, Comment and Jarrell (1991) compare the signaling strength of Dutch auctions, tender offers, and OMRs, and Barger, Kulchania, and Thomas (2011) examine the choice to repurchase through accelerated share repurchases relative to OMRs.

OMRs we can hold constant factors that often confound payout analysis, such as taxes, or compensation-driven incentives (Fenn and Liang (2001), and Cheng, Harford, and Zhang (2015)), thus allowing us to more cleanly identify why some firms favor committing to payout versus maintaining payout flexibility. More broadly, we show how firms react to an expansion of allowable payout methods, and in particular how this new option affects the long-term trend in substitution between repurchases and dividends.

Further, we contribute to the literature examining market reactions to payout announcements, particularly their relation to completion rates (e.g., Stephens and Weisbach (1998) and Bonaime (2012)). We also contribute to the discussion regarding payout “smoothing” (e.g., Lambrecht and Myers (2012), Michaely and Roberts (2012) and Leary and Michaely (2011)), as we have identified a means by which firms can commit to regular repurchase transactions, unencumbered by blackout windows. Our evidence that investors react more strongly to preset repurchase announcements than OMR announcements is consistent with them placing a premium on greater expected completion rates and smoother repurchases.

Additionally, our results have policy implications. First, they show that creative unintended responses to policies can have wide-reaching implications for firm actions. Second, the breadth and speed of adoption of the 10b5-1 preset plans demonstrates that the existing regulated menu of payout options was a binding constraint on firms’ preferred methods for distributing cash to shareholders. Specifically, we show that Rule 10b5-1—though originally intended to clarify insider trading laws *for individuals*—is now used extensively by firms to buy back stock, and find no evidence that litigation risk is associated with the firm’s use of the Rule to repurchase stock, indicating that the motives to adopt a preset plan to repurchase appear distinct from those associated with insider trading at the individual level. At a minimum, our results demonstrate the legal overlap in the definition of informed trading such that, when establishing insider trading regulation, policy makers should consider its potential effects on firm behavior.

2. Hypothesis Development

Financing frictions result in the need to preserve financial flexibility in corporate finance decisions. Firms need to maintain sufficient financial slack to invest in positive net present value projects as they arise.

One way to maintain financial flexibility is to build it into corporate payout policy. Managers state that flexibility is one of the most important reasons they choose share repurchases over dividends (Brav, Graham, Harvey, and Michaely (2005)). Empirical evidence corroborates managers' views and shows that financial flexibility is related to both the level and form of corporate payout (e.g., Guay and Harford (2000), Jagannathan, Stephens, and Weisbach (2000), Lie (2005), DeAngelo and DeAngelo (2007), and Bonaime, Hankins, and Harford (2014)). Clearly, maintaining sufficient flexibility is important to managers when choosing an optimal payout structure.

However, payout vehicles that provide firms with more discretion come at the cost of sending weaker signals of commitment to distribute announced amounts of cash to shareholders. A long line of research (see Farre-Mensa, Michaely, and Schmalz (2014) for a review) documents positive abnormal returns around payout initiations and increases, consistent with investors generally viewing the benefits of cash distributions as outweighing the potential negative signal about profitable investments. For example, abnormal returns to repurchase announcements are increasing in the implied level of commitment, with returns to fixed-price tender offers being greatest, followed by Dutch auctions, then OMRs (Comment and Jarrell (1991)). Moreover, prior literature documents that announcement returns are increasing in a program's size (e.g., Stephens and Weisbach (1998)) and prior completion rates (Bonaime (2012)), consistent with investors' (positive) reaction to repurchase announcements increasing in their expected value of future repurchases. These findings all suggest that committing to distribute cash causes investors to positively reassess firm value, possibly because these distributions reduce agency costs associated with free cash flow as in Jensen (1986).

We reexamine the flexibility-signaling tradeoff within the context of an important recent change in the payout choice set. On October 23, 2000, the Securities and Exchange Commission (SEC) enacted Rule 10b5-1, which for the first time allows insiders or the firm itself to trade company stock while in possession of material, nonpublic information. Prior to Rule 10b5-1 courts disagreed on when insider trading liability arises. The Rule was intended to clarify that liability arises when insiders trade while in "knowing possession" of material, non-public information and to establish conditions under which insiders may

legally trade in company stock. In an attempt to provide “appropriate flexibility” to insiders who wish to trade in company stock, the Rule specifies conditions that constitute an affirmative defense: that the insider establish a trading plan in advance with a third party, over whom they do not exert influence.² Thus, while the Rule specifically targeted insider trading for individuals, it also permitted firms to establish preset trading plans to repurchase shares.

Specifically, under Rule 10b5-1 firms enter into a trading plan during an “open window” when they are not in possession of material, nonpublic information, which provides an affirmative defense to any subsequent trading under the plan. The Rule states that a firm must either: (i) specify a written trading plan with either the amounts, dates, and prices to repurchase or a trading formula in a binding contract with a broker or dealer, or (ii) delegate the repurchase decisions to a broker or dealer (the company can have no further influence). The firm may modify the plan, but only during an open window. In addition, though early termination of a preset plan is legal, it jeopardizes the affirmative defense associated with 10b5-1 repurchases. Lastly, to maintain an affirmative defense at the motion to dismiss phase of litigation, the firm must publicly announce the plan and enter into it under good faith (Henderson, Jagolinzer, and Muller (2012)). In sum, relative to OMRs, preset Rule 10b5-1 repurchases restrict a firm’s ability to *ex post* modify repurchase activity or to exploit inside information, but expand a firm’s available repurchase window and provide additional legal coverage. These costs and benefits of preset repurchases relative to OMRs motivate our four hypotheses below.

2.1 Abandonment Options

Preset repurchase plans provide less flexibility since they reduce a firm’s ability to modify repurchases. Essentially, firms adopting a preset plan partially relinquish the abandonment option associated with OMRs, which leads to our first hypothesis, the *Abandonment Option Hypothesis*: Firms

² According to the SEC: “Taken as a whole, the revised defense is designed to cover situations in which a person can demonstrate that the material nonpublic information was not a factor in the trading decision. We believe this provision will provide appropriate flexibility to those who would like to plan securities transactions in advance at a time when they are not aware of material nonpublic information, and then carry out those pre-planned transactions at a later time, even if they later become aware of material nonpublic information.” (<https://www.sec.gov/rules/final/33-7881.htm>)

with more internal capital or easier access to external capital markets will value the abandonment option inherent in OMRs less and thus be more likely to adopt alternative payout strategies without abandonment options, specifically, preset Rule 10b5-1 repurchase plans. The empirical predictions of the *Abandonment Option Hypothesis* are that firms with greater cash and cash flow and firms with predictable cash flows should be more willing to adopt 10b5-1 plans to execute share repurchases. We also predict that firms that can easily access the debt market, i.e., those with excess debt capacity, or the equity market, i.e., firms with liquid stocks that are not trading below fair value, should be more likely to adopt preset trading plans. We summarize variables used to test each hypothesis in Table 3 and provide detailed definitions in Appendix A.

We also note that, consistent with firms facing a direct trade-off between flexibility and commitment, firms with lower or unstable internal reserves and limited access to external capital markets are likely to value flexibility the most *and* are likely the firms for which the commitment signal is most costly because these firms risk financial distress to fund payouts.³ Further, committing to payouts likely provides little benefit to these firms because agency costs should be low. Alternatively, firms with sufficient internal resources and easy access to external capital likely value flexibility the least and incur minimal costs to signaling commitment while also reducing agency costs surrounding the use of the capital.

2.2 Timing

Next, preset plans differ from OMRs in that the firm must delegate repurchase responsibility to a third party (without further influence) and thus the firm forfeits full control over the program, which reduces its ability to make information-based trades as in Dittmar and Field (2015). A firm may be willing to forfeit the option of exploiting inside information because it prefers to allocate resources to its core business. We also acknowledge the possibility that managers still time repurchases executed under Rule 10b5-1, either

³ While it may seem counterintuitive for a firm to access external capital markets, particularly the equity market, to fund distributions to shareholders, recent empirical evidence by Farre-Mensa, Michaely, and Schmalz (2016) suggests that firms rely on external capital to finance as much as one third of payouts, contradicting the pecking order theory of Myers and Majluf (1984). Further, our argument does not hinge on firms accessing external capital to fund repurchases *per se*; we simply argue that firms that diminish cash holdings by committing to payouts may be obliged to raise capital externally to fund future projects.

by creating complex price matrices that reflect the firm's private information regarding stock prices or by (illegally) exploiting alternative information channels to influence broker trades ex post. In either case, repurchasing under the Rule creates an additional barrier to timing repurchases because in the former situation firms must commit to a price matrix, however complex, in the latter situation they must risk accusations of insider trading.

Other firms may recognize that poor repurchase timing could lead to bad press. Many companies, including Viacom, Pfizer, C.R. Bard, Lowes, Exxon Mobil, Boeing, and EBay, have been accused of poor repurchase timing in the popular press.⁴ Just as managers often cite preset 10b5-1 trading plans when asked about questionable personal transactions,⁵ companies can use Rule 10b5-1 as a buffer against accusations of poor timing. Companies less concerned about timing or with a reputation of poor timing would value this buffer more. We hypothesize that firms that value the timing option associated with OMRs the most will be less likely to adopt preset repurchase plans, which leads to our second hypothesis, *the Timing Option Hypothesis*: Firms that place more value on the timing option associated with OMR plans will be less likely to adopt preset Rule 10b5-1 repurchase plans.

The empirical implications of the *Timing Option Hypothesis* are that firms with a history of poor repurchase timing will be more willing and likely to outsource their repurchase program through a 10b5-1 plan either due to a lack of skill or an indifference to timing repurchases to correspond with low stock prices. We also expect that small firms, young firms, and those with less financially sophisticated treasury functions will be more likely to adopt preset plans.

2.3 Information Releases and Trading Blackouts

Rule 10b5-1 plans expand a firm's available repurchase window, and repurchasing firms often cite avoiding blackout windows as the motivation for repurchasing under Rule 10b5-1. While the Securities and

⁴ See "Hey, Big Spender!" (*Barron's* on January 27, 2014) and "Apple Buybacks Pay Most Ever as CEOs Spend \$211 Billion" (*Bloomberg* on August 5, 2014).

⁵ For example, in March of 2011 when Douglas Bergeron, CEO of VeriFone Systems Inc., was questioned about selling \$14 million of VeriFone stock immediately prior to a stock price decline, Bergeron defended the sale of his stock by pointing to his preset Rule 10b5-1 trading plan. ("Executives' Good Luck in Trading Own Stock," *The Wall Street Journal*, November 28, 2012.)

Exchange Commission (SEC) generally does not mandate blackout periods, most companies impose explicit blackout windows to minimize the costs associated with illegal insider trading (Bettis, Coles, and Lemmon (2000)). Blackout windows generally last from quarter end until the release of earnings, as well as during other major corporate events that may result in insiders possessing material, nonpublic information. Firms with greater than \$75 million in public float must release earnings within 35 days of fiscal quarter end and 60 days of fiscal year end; smaller companies must release earnings within 45 and 90 days. Though firms may choose to some extent when to report earnings, reporting lags are most likely driven by factors other than the desire to repurchase sooner. For example, Sengupta (2004) finds that investor base, litigation risk, and accounting complexity are associated with reporting lags. Hence, blackout windows may substantially constrain firms by preventing them from repurchasing for months at a time throughout the year. In fact, some firms report blackout windows prohibiting repurchasing during two-thirds of all trading days.⁶ Further, a firm with a large repurchase program may not be able to execute the entire program in the desired time frame due to blackout windows and volume conditions, which limit repurchases to a maximum of 25% of the average daily trading volume. To summarize, we hypothesize that blackout windows are a real constraint, but preset repurchases will circumvent this constraint. Thus, the *Blackout Window Hypothesis* states that firms that are more constrained by blackout windows are more likely to adopt a Rule 10b5-1 trading plan to circumvent blackout window restrictions. Empirically, this implies that firms with long reporting lags or frequent releases of material information will be more likely to adopt Rule 10b5-1 plans.

2.4 Litigation Risk

Finally, Rule 10b5-1 repurchases differ from OMRs in terms of legal cover. Firms may value additional legal cover as shareholders endure losses and managers suffer individual consequences when

⁶ In their August 3rd, 2006 Q2 Earnings Conference Call Captaris stated that Rule 10b5-1 plans would allow them to repurchase during “blackout periods, which comprise about two-thirds of the trading days in each quarter.” Further, a July 1st, 2011 article “Corporate Buybacks on the Rise” in *Traders Magazine* stated: “Corporations have about eight months out of the year when insider trading rules create blackout periods. However, under the SEC's 10b5-1 rule, companies can set up a system to perform automatic stock buybacks during those times.”

caught engaging in financial misrepresentation (Karpoff, Lee, and Martin (2008)). In 1982 the SEC enacted Rule 10b-18 to provide safe harbor to firms that repurchase under the manner, timing, price, and volume conditions. However, even if the firm meets all Rule 10b-18 conditions, it cannot legally engage in repurchases while in possession of material, nonpublic information. Though the new Rule 10b5-1 does not provide safe harbor, it does provide the firm with an affirmative defense. An affirmative defense differs from safe harbor in that a firm admits that its actions were a literal violation of the law against trading while in possession of material nonpublic information, but may introduce as evidence the existence of a preset Rule 10b5-1 trading plan establishing the trades when it was not in such possession, which, if found to be credible, will negate any criminal liability for insider trading.⁷ Therefore, 10b5-1 plans provide companies with an additional shield from potential lawsuits related to repurchase activity. For example, during its July 25, 2014, conference call, Centene Corp. stated that "...the only way to do it [repurchase] and be clean and above board is on a 10b5-1." The *Litigation Risk Hypothesis* states that firms that are more subject to litigation risk will be more likely to adopt a Rule 10b5-1 plan. The empirical predictions of the *Litigation Risk Hypothesis* are that firms with a high estimated probability of litigation are more likely to adopt a preset repurchase plan.

3. Sample formation and descriptive statistics

3.1 Sample construction

To construct our sample of preset repurchases, we search Factiva for announcements of Rule 10b5-1 repurchases and accelerated share repurchase (ASR), another type of preset repurchase, over the period 2001 to 2014. We verify all Factiva results to ensure that the use of Rule 10b5-1 corresponds to a repurchase and not an insider transaction. Our search identifies 1,933 announcements with a Rule 10b5-1 plan by 950 distinct firms and 700 announcements with an ASR by 376 firms. As most firms announce preset plans in

⁷ "Rule 10b-18 confers no immunity from possible Rule 10b-5 liability where the issuer engages in repurchases while in possession of favorable, material, nonpublic material, and nonpublic information concerning its securities." 1982 Adopting Release, *supra* note 4, at 47 FR 53333.

conjunction with OMR announcements, we merge our hand-collected Rule 10b5-1 and ASR data with repurchase announcements from Thomson Financial's Securities Data Company (SDC) Mergers & Acquisitions and Repurchases databases.⁸ We generally use non-preset OMRs (OMRs), i.e., OMRs without a Rule 10b5-1 or ASR component, as our control group. We further exclude block transactions, tender offers, and any repurchase program with missing data on the size of the announced program. We reconcile slight discrepancies in dates between the two SDC databases by searching Factiva for the repurchase announcement and recording the first available announcement date. This merge yields 14,066 repurchase announcements documented between 2001 and 2014.

We merge our repurchase announcement sample with several databases to construct other variables of interest and control variables. Specifically, accounting data and data on actual repurchases are from Compustat quarterly or annual filings, stock price data from CRSP, institutional ownership data from Thomson Financial 13F filings, options data from Execucomp, and 8-K filings from Edgar.

Our analyses center around two samples. The first sample conditions on a repurchase announcement and is used to compare preset repurchase plans to non-preset OMRs. We present repurchase plan details, completion rates, and announcement returns at the repurchase announcement level. When we use multivariate regressions to test our main hypotheses, we continue to use this conditional data but collapse it to the firm-year level. If a firm announces multiple types of repurchases within a year, we assign that firm-year observation the repurchase program with the highest commitment level. The second unconditional sample includes both repurchasing *and non-repurchasing* firm-years, over our sample period. We generate this sample from the same intersection of databases as the conditional sample and use it to test how the introduction of preset repurchases fits into the broader payout landscape.

3.2 Rule 10b5-1 repurchase plan frequency

⁸ To present the most complete sample possible, we use the union of flagged repurchases within the SDC M&A database with the SDC Repurchase database as our sample. During our sample period, approximately one-third of repurchase announcements appear in both databases, approximately one-half in the Repurchase database only, and the remaining one-sixth in the M&A database only.

As shown in Figure 1 and Panel A of Table 1, the use of Rule 10b5-1 plans has grown rapidly. In 2001, the first year during which firms could adopt a Rule 10b5-1 plan, only four announcements contained such adoptions. These findings are consistent with a post-enactment learning period in which firms and investment banks confirmed the application of Rule 10b5-1 to repurchases over time.⁹ Yet during the last four years in our sample period (2011-2014), at least 200 announcements contained a Rule 10b5-1 adoption each year. In fact, in recent years over one-quarter of repurchase announcements in our sample included a preset component. Therefore, the growth in Rule 10b5-1 plans cannot be explained by the growth in repurchase announcements during our time period because 10b5-1 plan use is growing *even as a percentage of total repurchase announcements*.¹⁰

We also compare Rule 10b5-1 plans to accelerated share repurchases (ASRs), another type of preset plan. In an ASR, an investment bank immediately delivers borrowed shares to the firm, resulting in an instantaneous reduction in shares outstanding by the amount of the repurchase. The investment bank then conducts the repurchase over time at prevailing market prices. The difference between what the firm paid the investment bank for the shares and what the investment bank actually had to pay to purchase them on the open market is settled at the end of the contract. (See Barger, Kulchania, and Thomas (2011) for an in-depth description of the mechanics of ASRs.) In sum, along the commitment/flexibility spectrum, ASRs provide the greatest level of commitment or the least flexibility. The immediacy of ASRs makes them ideal for managerial motives, such as takeover defense and manipulation of EPS numbers, while the hands-off nature of 10b5-1 plans are the least compatible with managerial motives. Further, the SEC has ruled that ASRs do not qualify for safe harbor or affirmative defense status.¹¹ Thus, ASRs and Rule 10b5-1 plans differ from a structural and legal perspective, as well as in their likely motives.

⁹ We observe a similar phenomenon following the introduction of the safe harbor provisions (Rule 10b-18) in 1982 (see, e.g., Grullon and Ikenberry (2000)). Many managers took several years to see enough precedence and implement a new method of payout (open market repurchases).

¹⁰ Some firms mention preset repurchase plans in other corporate announcements, e.g., earnings reports and conference calls. While there is some overlap with our sample of preset repurchase announcements, we calculate that 377 of these mentions correspond to distinct firm-year observations, implying that our original estimates of the use of preset plans are likely conservative.

¹¹ <https://www.sec.gov/divisions/marketreg/r10b18faq0504.htm>

While ASRs have become more common, Rule 10b5-1 plans are the preferred preset repurchase method, particularly in recent years. We observe 2.8 times as many 10b5-1 plans as ASRs during our sample period (2001-2014). In 2014 only 12% of repurchase announcements included an ASR whereas 29% included a 10b5-1 plan. These results are consistent with more firms preferring to maintain some level of flexibility in their repurchase programs.

Preset repurchase announcements vary significantly by the expected portion of the repurchase to be effected under a preset plan. Table 1 Panel A also presents Rule 10b5-1 announcements by type. We refer to announcements as “boilerplate” if the firm “may” adopt a preset plan or conduct the repurchase through other means such as open market purchases, privately negotiated transactions, or block transactions. The boilerplate group represents approximately half of all Rule 10b5-1 announcements. “Expected” plans indicate that the company “expects to” or “intends to” adopt a preset component. Firms often include a general description of preset plans in these announcements. Expected plans make up the smallest group of announcements at 234 announcements or 12% of all 10b5-1 announcements. “Partial” plans include a preset component—with certainty. Partial plans use definitive language or provide specific institutional details about the preset component of the plan. Approximately one quarter of Rule 10b5-1 announcements are partial. Finally, 269 or about 14% of plans are “pure,” i.e., cover the full repurchase program.¹² We generally include all types of 10b5-1 plans in our analyses, though we often show results by type or without boilerplate plans. Firms announcing any type of 10b5-1 plans are important to study because they choose to include 10b5-1 plans as a potential repurchase mechanism.

3.3 Rule 10b5-1 repurchase plan details

We collect preset repurchase plan details regarding size, duration, motive and broker, if mentioned, and report summary statistics on Rule 10b5-1 plans in Panel B. We should note that these summary statistics apply to a small portion of the sample, exclude boilerplate plans by definition, and are skewed towards pure plans fully executed under the Rule. Therefore, these figures provide a glimpse inside these repurchase

¹² Examples of Rule 10b5-1 announcement types can be found in Section I of the Internet Appendix.

contracts, but do not represent the full sample. For the subset of firms that report the size of the preset repurchase, the average (median) Rule 10b5-1 program represents 5.2% (3.5%) of shares outstanding. While the size of Rule 10b5-1 programs appears smaller than that of other repurchase programs, in untabulated results we examine the difference in the *total* repurchase size for repurchase programs including and not including preset components. We find that the total announced repurchase size is slightly larger for repurchases containing a preset component than for those that do not (8.08% versus 7.73%; $p = 0.0625$).

The dollar value of preset plans varies substantially from \$2 million at the 10th percentile to \$200 million at the 90th percentile for Rule 10b5-1 plans. The mean (median) dollar value is \$82 million (\$16 million). For firms that voluntarily disclose the size of their preset repurchase program, the mean (median) percentage of the total repurchase program under a Rule 10b5-1 plan is 94% (100%), and 87% will be conducted fully through a Rule 10b5-1 plan. We should note again, however, that these figures are biased upward because most firms that combine preset plans with other plans do not separately report the value of the preset component and are therefore not included in calculations for this table.

The mean time to commencement of a Rule 10b5-1 plan is 13 days, and 74 plans, or approximately one-third, begin within one day of the announcement. Rule 10b5-1 plans last 195 days on average, and the most frequently observed duration of one year is reported by approximately one in six (47 out of 299) firms. Other common time windows include one month (14 plans or 5%), two months (38 plans or 13%), three months (20 plans or 7%), and six months (22 plans or 7%). The figures are on par with the duration of OMR plans: 70% of OMR completion announcements occur within one year of the authorization, and the median duration for the subsample of firms that announce a completion is 223 days (Bargeron, Bonaime and Thomas (2016)). In sum, the duration of the majority of preset plans is long enough to represent a real and costly commitment.¹³

¹³ Internet Appendix Table IA1 shows plan details for pure 10b5-1 plans only. Pure plans represent on average 6.51% of shares outstanding or \$56.33 million worth of stock. Internet Appendix Table IA15 shows plan details and the breakdown by type for accelerated share repurchases. Approximately one-third of ASRs announcements are “pure,” 39% are “boilerplate,” and the remaining are partial (22%) and expected (4%). ASR plans represent on average 6.22% of shares outstanding or \$604 million worth of stock.

We collect three additional pieces of information not shown in Table 1. First, of the 634 announcements associated with a clear motive, we find that 592 or 93% relate to circumventing blackout windows or maintaining repurchase “regularity.” The next most frequently populated motive is ESOP or dilution (20 announcements), followed by legal risk (7 announcements). Second, we learn that 154 Rule 10b5-1 announcements mention 42 unique brokers that will conduct the repurchase program. Finally, we record only 28 Rule 10b5-1 termination announcements, which occur 132 days on average after the plan begins; most terminations are due to a contractual trigger (e.g., merger) that automatically suspends the plan.

4. Rule 10b5-1 commitment

Given that accelerated share repurchases are executed immediately and in full, they represent a firm commitment to repurchasing the entire announced amount of stock. Rule 10b5-1 plans, on the other hand, allow firms some flexibility in terms of their execution. Anecdotally, we observe firms establishing a “price matrix,” which implies repurchasing more (fewer) shares as the price decreases (increases).¹⁴ However, firms can only put into place or modify a 10b5-1 plan during an open window, thus creating a greater commitment for the firm than a fully flexible OMR. If 10b5-1 plans represent a greater commitment to follow through with the announced repurchase, we expect greater completion rates and more plans completed relative to OMRs.

To test whether completion rates differ across Rule 10b5-1 and OMRs, we limit the sample to the period from 2004 to 2014 since fewer than 5% of repurchases contained a Rule 10b5-1 component prior to 2004 when firms and investment banks were learning how to apply the Rule. Further, after 2003 firms are required to report detailed quarterly information on actual shares repurchased. We calculate completion rate beginning the quarter the firm announces the repurchase program through the following eight quarters. Completion rate is the dollar value of shares repurchased, i.e., the number of shares repurchased times the

¹⁴ Firms do not report the price matrix itself in public disclosure; rather, several firms mentioned that they set up a pricing matrix. We provide an example of a price matrix in Internet Appendix Figure IA1.

average repurchase price per share as reported in Compustat, divided by the dollar value of the announced repurchase from SDC. Following Stephens and Weisbach (1998), we truncate completion rate at 100%. We report average cumulative completion rates for Rule 10b5-1 plans along varying levels of commitment as well as for OMR announcements without a preset component.

Panel A of Table 2 shows average completion rates and the percent of plans completed by quarter and by level of commitment to the Rule. Rule 10b5-1 plans are associated with higher completion rates and a greater fraction of plans completed earlier in the program. Further, completion rates are generally increasing in the level of commitment to a Rule 10b5-1. For example, by quarter one, pure plans are on average 54% complete, compared to 40% complete for non-Rule programs. Similar patterns hold throughout the first year of the repurchase program and are especially strong when excluding boilerplate plans: When we exclude boilerplate plans, we find that completion rates are greater by 3 to 9 percentage points on average for Rule 10b5-1 repurchases than non-Rule repurchases during the first six quarters after the announcements. In addition, during the first year more preset repurchase plans are completed: By quarter four over half of partial and pure plans are complete, while only 38% of non-Rule 10b5-1 repurchases are complete. These results suggest a trend of completion rates increasing with the level of commitment to the Rule, specifically during the first year to year and a half of the repurchase program. By quarter seven completion rates stabilize across groups, indicating that executing a repurchase program through a Rule 10b5-1 plan may not increase the ultimate completion rate of the program but rather significantly increases the *speed* of completion. By quarter eight we identify average completion rates ranging from 71% to 78% across all groups, similar to OMR completion rates documented in previous studies (e.g., Stephens and Weisbach (1998), Bonaime (2012), and Babenko, Tserlukevich, and Vedrashko (2012)). It is interesting to note that even the adoption of a pure plan does not imply that the firm will repurchase 100% of authorized shares with certainty. These results point to the possibility that a non-trivial portion of firms establish a conservative price matrix or allow brokers some discretion over trades.

It is possible that firm characteristics correlated with adopting a preset repurchase program are driving completion rates. To address this issue, we identify control firms that strongly resemble Rule 10b5-

1 announcers but do not repurchase under the Rule. We then examine differences in completion rates and percentage of plans completed between matched control firms and sample firms. To construct a control group of firms, we propensity score match to the five nearest neighbors using the logit model specifications presented in Panel A of Table IA3 in the Internet Appendix. In untabulated results we verify that none of the variables on which we match are statistically different between our sample and the matched sample, giving us confidence in our matching process.

Panel B of Table 2 reports the difference in completion rates or percentage of plans completed between Rule 10b5-1 repurchase programs and matched non-Rule 10b5-1 programs. To account for the fact that we estimate propensity scores, we use the correction proposed by Abadie and Imbens (2012), who find that ignoring the estimation error can bias results in either direction. Completion rates are significantly greater for Rule 10b5-1 plans than for non-Rule 10b5-1 plans during the first six quarters, and results are generally stronger as the level of commitment to repurchasing under the Rule increases. We find similar, if not stronger, results for the difference in percent of plans completed: By the second quarter after the announcement 24% more pure plans are completed than matched non-Rule plans. Furthermore, if we exclude boilerplate plans, the percent of plans completed is greater for Rule 10b5-1 plans than non-Rule plans in every quarter; by quarter eight significantly more (13% more) Rule 10b5-1 plans are complete than matched non-Rule plans.

Our results suggest preset plans are associated with greater completion rates, especially earlier in the life of the repurchase program. These results point to firms completing preset plans more quickly, which we test directly in Panel C using the subsample of completed repurchase programs. We examine time to completion, defined as the number of quarters to completion (conditional on completion). Consistent with expectations, we find that time to completion is monotonically decreasing with the level of commitment to a Rule 10b5-1 plan. In other words, firms complete preset plans faster, and the greater the commitment to repurchasing under the Rule, the faster the completion. Conditional on completion, firms complete non-Rule 10b5-1 plans in 3.2 quarters on average, whereas firms complete partial and pure Rule 10b5-1 plans

within 2.7 and 1.5 quarters, respectively. After excluding boilerplate plans and using propensity score matching to control for firm characteristics, we show these differences are significant at the 1% level.

Overall, these results are consistent with preset plans being associated with stronger commitments to repurchase previously announced shares. Firms buy back larger portions of the announced repurchase under Rule 10b5-1 earlier in the program. Further, we find that preset plans are strongly associated with an increase in the speed of completion, and this speed of completion is increasing in the level of commitment to Rule 10b5-1. Significantly greater and faster preset plan completion rates are consistent with the Rule accomplishing one of the SEC's original goals: providing firms with the flexibility and legal protection to repurchase shares during times they otherwise could not have.

5. The determinants of Rule 10b5-1 adoption

Understanding which firms choose preset plans and what motivates them to do so provides unique insights into the signaling-flexibility tradeoff. In this section we study the determinants of the decision to adopt a Rule 10b5-1 plan, relative to a non-preset OMR, the most common repurchase vehicle, which leaves the firm with full flexibility.

5.1 Logit regressions of the decision to adopt a Rule 10b5-1 plan

Table 3 conditions on the sample of firms announcing a repurchase and presents logit regressions modeling the decision to adopt a Rule 10b5-1 plan relative to adopting a non-preset OMR.¹⁵ We label firms that announce a Rule 10b5-1 plan during the fiscal year “Rule 10b5-1 firms” that year; firms that announce open market repurchases without a preset component are “OMR firms.” The dependent variable is a binary variable equal to one if the repurchase announcement includes a Rule 10b5-1 component. If a firm announces more than one repurchase in a fiscal year, we categorize the firm as a Rule 10b5-1 firm if at least one of the repurchase announcements includes a Rule 10b5-1 plan. When we condition on the availability of control variables and collapse our sample to the firm-year level, our sample consists of 1,014 Rule 10b5-

¹⁵ Summary statistics and difference in means tests are reported in Internet Appendix Table IA4. Internet Appendix Figure IA2 graphs full-sample annual averages for each variable.

1 firm-year observations, 3,611 non-preset OMR observations, and 25,342 non-repurchasing observations, unless otherwise noted. We match each repurchase announcement to prior fiscal year end accounting data from Compustat and stock price data from CRSP. Variable definitions are in Appendix A; continuous variables are winsorized at the 1st and 99th percentile to mitigate the effect of potential data errors and outliers.¹⁶ We report the coefficients on the independent variables along with their *z*-statistics calculated using robust standard errors clustered by firm. Marginal effects calculated at the mean can be found in Internet Appendix Table IA6. We include year dummies and Fama and French (1997) 12 industry dummies in all specifications.

The results in Table 3 support the *Abandonment Option Hypothesis*' predictions that firms with large internal capital reserves and predictable cash flows will be more likely to commit to a preset Rule 10b5-1 plan. Similar in spirit to Chay and Suy (2009), who find that cash flow uncertainty is negatively related to (inflexible) dividends, we find that the likelihood of adopting a Rule 10b5-1 plan as opposed to more flexible OMR decreases with cash flow volatility. The coefficient on the standard deviation of cash flow in Model (1) indicates that a one standard deviation increase in cash flow volatility decreases the likelihood of adopting a preset repurchase relative to an OMR by 16%. These results are also consistent with agency costs driving firms with more cash on hand and more predictable cash flows to commit to distribute more to shareholders. We find further support of the *Abandonment Option Hypothesis* as firms with better prior stock performance and more liquid stocks are generally more likely to adopt a Rule 10b5-1 plan. These results are consistent with firms that have better access to external capital being more likely to adopt a preset repurchase program. In other words, firms that can raise external capital more easily are more likely to commit to future payouts, which expend internal resources. Finally, we find that firms that have already committed to dividend payouts are less likely to commit to a preset repurchase plan—specifically, dividend payers are 17% less likely to adopt a Rule 10b5-1 plan than non-payers.

¹⁶ Our main results from Table 3 are robust using unwinsorized continuous variables (see Internet Appendix Table IA7).

The *Timing Option Hypothesis* predicts that firms with a history of poor repurchase timing will be more likely to adopt a preset plan. Consistent with this prediction, we observe a significant and positive coefficient on our measure of repurchase timing. A one standard deviation increase in repurchase timing (implying worse timing over the prior fiscal year) is associated with an 11% increase in the likelihood of adopting a preset plan. The coefficients on financial sophistication, firm size, and firm age are all negative, as predicted by the *Timing Hypothesis*; however, the coefficients on financial sophistication and size fail to achieve statistical significance in most models.

Adopting a Rule 10b5-1 repurchase program allows firms to circumvent blackout windows. We find that the duration of prior blackout windows is positively and significantly related to the likelihood of adopting a preset plan across all specifications. The standardized odds ratio in Model (1) is 1.22, indicating a one standard deviation increase in blackout windows over the prior 12 quarters will increase the likelihood of adopting a 10b5-1 plan by 22% relative to a non-Rule 10b5-1 plan. We also find that 8-K filing frequency is positively correlated with adopting a preset plan. Thus, as predicted by the *Blackout Window Hypothesis*, we find that firms facing greater constraints to repurchasing due to long blackout windows or more frequent releases of material information are significantly more likely to use a preset Rule 10b5-1 repurchase plan.

Though Rule 10b5-1 provides additional legal protection unavailable in an OMR, we find no evidence that firms facing greater litigation risk are more likely to adopt a preset plan relative to an OMR. Our failure to achieve empirical support for the *Litigation Risk Hypothesis* is in line with the Rule's initial intent to clarify enforcement of insider trading laws for individuals and with anecdotal evidence: We observe very few cases in the popular press of firms being accused of using inside information while repurchasing.¹⁷ However, this could simply reflect care taken not to run afoul of the law while executing

¹⁷ A notable exception is AOL, Inc., which received a securities class action complaint on behalf of selling shareholders between August 11, 2011 and April 9, 2012. The lead plaintiff alleged that AOL deliberately kept their plan to monetize their legacy patents a secret in order to keep AOL stock at an artificially depressed price, which enabled them to exploit the information imbalance through a stock repurchase program. The court dismissed allegations based on lack of factual support for the secret patent deal.

these plans. Overall, our initial multivariate results are consistent with the *Abandonment Option*, *Timing Option*, and *Blackout Window Hypotheses*, but we fail to find support for the *Litigation Risk Hypothesis*.¹⁸

Lastly, we study if and how firms modify payout policy when the menu of payout options expands by examining how pre-Rule payout behavior relates to Rule 10b5-1 adoption likelihood. To examine which types of firms are most likely to exploit the addition of Rule 10b5-1 plans to the menu of payout options, in Model (6) we add indicators to capture pre-enactment payout policy. Specifically, we include three indicators, which equal one if a firm has: (i) no repurchase announcement, (ii) no dividend payment, or (iii) no payout (i.e., no repurchase announcement or dividend payment) in the three years leading up to enactment (1998-2000). The no payout indicator is econometrically equivalent to an interaction term of the other two indicators.¹⁹ We find that firms without an active repurchase program in place when Rule 10b5-1 was enacted are significantly more likely to adopt a preset repurchase plan instead of an OMR. The no dividend and no payout indicators are statistically insignificant. These results are consistent with preset repurchases occupying a unique space within the payout landscape. Specifically, preset plans allowed a different set of firms who had not been repurchasing to begin buying back their shares.

We include several other control variables that may affect a firm's choice of payout vehicle. Several models suggest that firms adopting 10b5-1 plans have more volatile prior repurchases, which may be correlated with blackout window constraints.²⁰ We find that repurchase frequency, institutional

¹⁸ In Internet Appendix Table IA8 we investigate whether firms with greater agency concerns, more employee stock options (ESOs), or higher turnover are more likely to adopt Rule 10b5-1 plans. The likelihood of adopting a Rule 10b5-1 plan is unrelated to the Bebchuk, Cohen, and Ferrell (2004) Entrenchment Index, to whether the CEO is also Chairman of the Board, or to whether an activist is present. However, firms with staggered boards, generally associated with worse corporate governance, are more likely to adopt preset repurchase plans. We do not identify a significant relation between the likelihood of adopting a Rule 10b5-1 plan and ESOs or turnover.

¹⁹ We recognize the issue of interpreting interaction effects in non-linear models (Ai and Norton (2003) and Green (2010)) and provide additional clarification by showing the marginal effects at the mean of different iterations of the interaction term in Internet Appendix Table IA6 Panel B.

²⁰ We include repurchase frequency and standard deviation as controls to capture how regularly the firm is in the market for its own stock. Firms with more regular repurchases (high frequency, lower standard deviation) may not need preset plans to circumvent blackout windows because they appear to already be able to be in the market consistently. On the other hand, regular repurchasers may prefer preset plans to ensure that they can be in the market frequently without risk of regulatory scrutiny.

ownership, share dilution, and executive compensation are not significant predictors of Rule 10b5-1 adoption.²¹

5.2 Rule 10b5-1 plan adoption: Robustness to excluding boilerplate announcements

We next examine whether our above results regarding the decision to adopt a preset repurchase plan are sensitive to the exclusion of boilerplate announcements. Boilerplate Rule 10b5-1 plan announcements represent the lowest level of commitment to repurchasing under the Rule and are most susceptible to false signaling, i.e., firms including a Rule 10b5-1 component in their announcement but never actually establishing a preset plan. Table 4 reports the results of logit regressions modeling the decision to repurchase shares under Rule 10b5-1 excluding boilerplate announcements. In other words, Rule 10b5-1 firms are firms that announce a pure, partial, or expected Rule 10b5-1 plan. The base case is OMRs not containing any preset component. We report the coefficients along with their *z*-statistics. We include year and industry indicators in all specifications.

We gain several new insights into the decision to adopt a preset plan when we remove boilerplate plans. With a few caveats, our main results generally hold. We continue to find that flexibility is an important determinant of the decision to adopt a Rule 10b5-1 plan, consistent with the *Abandonment Option Hypothesis*. Firms with more stable cash flows, stronger prior stock performance, and more liquid stocks are generally more likely to adopt Rule 10b5-1 plans. Many of the cash and dividend payer coefficients lose statistical significance, although they maintain their expected sign in all cases. Given that our coefficients do not change drastically when we remove boilerplate plans, our loss of significance is likely due to reducing the power of our tests by cutting the sample size of Rule 10b5-1 plans by half. Poor repurchase timing is strongly related to adopting a non-boilerplate Rule 10b5-1 preset repurchase plan.

²¹ We also model the decision to adopt a Rule 10b5-1 plan versus an ASR in Table IA16. Relative to firms adopting ASRs, Rule 10b5-1 firms have greater, less volatile cash flows, consistent with firms with higher and more predictable cash flows being more willing to adopt Rule 10b5-1 plans, which are executed over time. Yet, Rule 10b5-1 firms have more volatile, less liquid stocks than ASR firms. These findings are consistent with firms with less predictable stock returns being less willing to accept ASR contracts, whose ultimate cost is a function of the volume-weighted stock price during the contract period, and with the immediate execution of ASRs being more problematic for firms with illiquid stocks.

Interestingly, when we exclude boilerplate plans, we discover that firm size is negatively related to Rule 10b5-1 adoption. Small firms and firms with a record of poor repurchase timing most likely lack the sophistication or desire to exercise the timing option associated with OMRs and thus are more likely to adopt a pure Rule 10b5-1 plan, supporting our *Timing Option Hypothesis*. We continue to find some support for the *Blackout Window Hypothesis* but no support of the *Litigation Risk Hypothesis*.²² Further, we continue to show that firms without an active repurchase program when Rule 10b5-1 was enacted are significantly more likely to adopt preset repurchase plans. Taken together, we conclude that our main findings generally hold within Rule 10b5-1 plans that represent a stronger commitment to the Rule.²³

5.3 What determines the speed to first preset repurchase plan adoption?

We observe that many firms adopting a preset repurchase plan continue to use a preset plan for future repurchases. In fact, only 199 firms that announce a preset repurchase plan subsequently announce an OMR without a Rule 10b5-1 component. Of these cases, 75% announced no further repurchase in the sample period, and the remaining 25% adopt another preset plan in their next repurchase announcement after the OMR. These findings suggest that a firm's decision to adopt its *first* Rule 10b5-1 plan is quite important. Thus, we examine the time to first Rule 10b5-1 plan or "adoption speed" in Table 5 employing a Cox proportional hazard model using the sample of firms that announce a Rule 10b5-1 plan during our sample period. We measure the duration to adoption as the number of calendar days from the end of 2003 to the first time a firm adopts a preset plan.

The hazard models generally corroborate the results from our logit models and are consistent with the *Abandonment Option*, *Timing Option*, and *Blackout Window Hypotheses*: Firms that have yet to adopt a preset plan are more likely to adopt a preset plan at time t if they have more cash on hand, have more stable cash flows, carry less debt, do not pay a dividend, have more liquid stocks, are smaller, are younger, are less financially sophisticated, have a record of poor repurchase timing, and disclose material information

²² Interestingly, we lose significance on Blackout window when we include Litigation risk in the model, likely because these variables are correlated ($\rho = -0.2563$; $p\text{-value} = 0.000$).

²³ Internet Appendix Table IA9 examines varying plan types in a multinomial logit setting, with a base case of OMRs not containing a preset component. Overall, we observe that our results are not driven by one specific plan type.

more frequently. In addition, we find that firms adopt Rule 10b5-1 plans more quickly if they did not have an active repurchase program but paid a dividend at Rule enactment, they repurchased inconsistently in the past, their CEO's bonus is tied to earnings per share, and they have more dilution or executive options.

5.4 Shock to cost of adopting a preset repurchase plan

Our results thus far suggest that firms for which financial flexibility is less valuable are more likely to adopt a Rule 10b5-1 plan over a traditional OMR plan. To claim a causal relation between financial flexibility and Rule 10b5-1 likelihood, we need to rule out endogeneity resulting from reverse causality or omitted variables. For reverse causality to be an issue, it must be the case that next year's decision to repurchase under Rule 10b5-1 affects this year's firm characteristics. We find this explanation improbable. A more reasonable concern is that we have failed to control for a variable that drives both financial flexibility and Rule 10b5-1 likelihood. While we take great care to control for an exhaustive list of observable variables, including firm-specific characteristics and industry and year fixed effects, our setting prevents us from completely ruling out omitted variables.

One potential solution is to identify an exogenous shock to the value of financial flexibility and examine changes in Rule 10b5-1 likelihood around this shock. Prior literature identifies the financial crisis of 2008 and 2009 as an unanticipated shock to the supply of credit available to firms (Ivashina and Scharfstein (2010), Cornett, McNutt, Strahan, and Tehranian (2010), and Bliss, Cheng, and Denis (2015)), and a credit supply shock should increase the marginal benefit of financial flexibility. Therefore, adopting a preset repurchase plan became more costly around the financial crisis, and so we expect to see fewer firms adopting these types of plans during the crisis. In this section we examine whether a shock to the marginal benefit of financial flexibility affects the likelihood of adopting a preset plan.

Table 6 presents results on the effect of the shock to the benefits of financial flexibility on the likelihood of adopting a Rule 10b5-1 plan. Mirroring our logit analysis in Table 4, we condense our sample to the firm-year level and estimate the probability of adopting a preset plan, conditional on announcing a repurchase. We include the same list of control variables (though we only show our variables of interest to conserve space), but we replace our year dummies with two variables: (1) a trend variable capturing the

increasing tendency for firms to adopt preset plans over time and (2) an indicator variable to demarcate the financial crisis. The financial crisis indicator variable captures any shift in the probability of announcing a preset plan during the crisis.

As expected, we observe a significant upward trend in the likelihood of adopting a Rule 10b5-1 plan relative to adopting an OMR. Holding other variables constant at the mean, the coefficient on our trend variable implies that the likelihood of adopting a Rule 10b5-1 plan, conditional on announcing a repurchase, increases by approximately 2.6% each year. However, the growth in preset repurchase plans significantly stagnates during the financial crisis. Repurchasing firms are 5.3% less likely to adopt a Rule 10b5-1 plan during the crisis.

We conduct two robustness tests. First, we verify that financial firms do not drive our results. In Internet Appendix Table IA10, we exclude financials (SIC codes 6000-6999) from our above analyses and confirm our prior findings. Second, we run an “out-of-sample” logit model following Model (1) of Table 6 using the non-crisis period (2004-2007 and 2010-2013) and excluding the financial crisis indicator variable. We then predict the likelihood of announcing a preset plan during the financial crisis. The average predicted value during the financial crisis is 22.1%, significantly different at the 1% level from the actual value of 16.4%. This 5.7% difference is in line with our prior results. Overall, this evidence from an unanticipated positive shock to the marginal benefits of financial flexibility provides suggestive evidence that the effect of flexibility concerns on the choice to adopt a 10b5-1 plan is causal.

6. Repurchase announcement returns

We next examine abnormal returns surrounding announcements of Rule 10b5-1 repurchases and OMRs. Preset repurchases are unique in that, relative to an OMR, private information should play a smaller role, if any. This would cause announcement returns to be lower for preset trading plans. On the other hand, preset plans represent a greater commitment to repurchase shares, causing announcement returns to be greater in response to this signal. The net effect is an empirical question.

Panel A of Table 7 reports five-day cumulative abnormal returns (CARs) from trading days -2 to +2 around the announcement by type of repurchase (Rule 10b5-1 and non-preset OMR) and by level of commitment to repurchasing under the preset plan. We remove observations with earnings announcements during this five-day window. We estimate the parameters of the market model over 255 trading days, ending 46 days prior to the announcement. We use the Center for Research in Security and Prices (CRSP) value weighted index as the market portfolio and require a minimum of 100 trading days over the estimation window. We winsorize our returns measures at the 1st and 99th percentiles to mitigate the effect of outliers. Panel B presents difference in means tests, calculated using propensity score matching, which controls for observable firm characteristics likely to affect announcement returns. Control firms are the five nearest neighbors identified through our propensity score matching process based on logit regressions in Panel B of Table IA3 of the Internet Appendix.

We find positive and significant five-day cumulative abnormal returns (CARs) to preset repurchase announcements. In the aggregate, Rule 10b5-1 plans are met with CARs of 1.5%, or 0.4% greater than non-preset OMR plans.²⁴ This difference represents an increase of over 36% from the average non-preset CAR of 1.1%. Announcements with little commitment to a preset plan are associated with lower returns while announcements with a greater commitment are associated with higher returns. Boilerplate Rule 10b5-1 plans are associated with the lowest CARs of 1.1% while pure plans are associated with CARs of 2.4%; the returns to partial and expected plans fall in between. Thus, pure plans, which we know with certainty are executed fully under the Rule, are associated with CARs that are more than double the returns to non-preset OMR announcements. Further, when we control for firm characteristics likely to affect repurchase announcement returns, we find that announcement returns to pure Rule 10b5-1 announcements are 1.4% greater than and statistically different from abnormal returns to non-preset OMR announcements. These results are consistent with the benefit of the increased commitment and reduction in agency costs implied

²⁴ Rule 10b5-1 announcement returns are on par with CARs around ASR announcements, which equal 1.8% for all ASR plans and 1.7% for pure ASR plans. We present these figures in Internet Appendix Table IA17.

by preset plans outweighing the cost of being unable to exploit private information fully.^{25, 26} The current literature documents announcement returns of 1.3% and 3.4% for dividend increases and initiations, respectively (Farre-Mensa, Michaely, and Schmalz (2015); Grullon, Michaely, and Swaminathan (2002); Michaely, Thaler, and Womack (1995)). Therefore, the commitment value (as proxied by announcement returns) of preset repurchases is comparable to that of dividend increases.

7. Rule 10b5-1 repurchase plans and overall payout policy

In a final series of tests, we further examine how Rule 10b5-1 plans fit into the broader set of payout choices. We first test whether preset repurchases substitute for dividend increases, and whether preset plans substitute more so than other repurchases. We then examine whether the determinants of payout policy changed around the introduction of the Rule.

7.1 Do preset repurchases substitute for dividend increases?

In Section 5 we documented that firms that have already committed to dividend payouts are less likely to commit to a preset repurchase plan. In this section, we conduct a more formal analysis of the dividend substitution effect of Rule 10b5-1 plans. The consensus in the literature is that repurchases are gradually replacing dividends, even among firms that continue to make distributions to shareholders through dividends (Skinner (2008)). However, because investors generally view dividend cuts unfavorably, most dividend-paying firms refuse to cut dividends outright, but rather choose not to increase them, using funds instead to repurchase. Indeed, Grullon and Michaely (2002) show that firms finance repurchases in part from cash that otherwise would have been used to increase dividends. In this section we examine

²⁵ In Internet Appendix Table IA11, we also regress announcement returns on a Rule 10b5-1 repurchase plan indicator, the size of the repurchase program and our standard controls included in our base logit model (from Table 4, Panel A, Model (1)). These regressions corroborate our prior results.

²⁶ Given that previous studies document anomalous returns following repurchase announcements (e.g., Lakonishok and Vermaelen (1990), Ikenberry, Lakonishok, and Vermaelen (1995), Gong, Louis, and Sun (2008), Peyer and Vermaelen (2009)), we estimate long-run (12-month) abnormal stock performance in Internet Appendix Table IA12. We document positive and significant long-run abnormal returns of 55 bps per month, but they are driven by the subsample of 10b5-1 plans that are concurrent with OMRs. Overall, our evidence on abnormal returns suggests that investors recognize and immediately respond to the increased commitment in preset repurchase plans.

whether Rule 10b5-1 repurchases offset dividend increases and whether preset repurchases have more of a substitution effect than other types of repurchases. Because dividend increases are expected to be maintained, we expect firms using Rule 10b5-1 plans, which have a higher level of commitment, to increase dividends less often and by less when they do.

Table 8 presents models of dividend increases using the conditional sample of repurchases at the firm-year level merged with non-repurchasing firm-years. Closely following Brown, Liang, and Weisbenner (2008), we define dividend changes as the change in total dividends on common stock, scaled by assets, from fiscal year $t-1$ to year t . Repurchases are total repurchases, scaled by assets, in year t . Rule 10b5-1 is an indicator variable that takes a value of one if a firm announces a Rule 10b5-1 as part of its repurchase program during fiscal year t . Our control variables mimic those in Brown, Liang, and Weisbenner (2008); that is, we control for cash, cash flow, leverage, book-to-market, lagged returns, the standard deviation of returns and firm size. All control variables are measured at the end of fiscal year $t-1$ and are defined in Appendix B. All continuous variables are winsorized at the 1st and 99th percentiles. We include year and industry fixed effects and cluster our standard errors by firm.

Models (1) and (2) are Tobit regressions of dividend increases on repurchase activity. The dependent variable in Model (1) is the maximum of zero and the change in dividends scaled by assets. In Model (2) we impose an additional restriction requiring actual (i.e., unscaled) dividends to increase. We find that the substitution effect of repurchases with dividends is concentrated in the subset of repurchases associated with Rule 10b5-1 plans. The coefficient on the interaction between repurchases and the Rule 10b5-1 indicator is negative and highly significant, consistent with preset repurchases serving as more of a substitution mechanism than other repurchases. In fact, F-tests of the significance of the sum of the coefficients associated with repurchases and the interaction term reveals that increases in Rule 10b5-1 repurchases result in firms increasing dividends to a lesser extent, if at all. Using the more conservative figures from Model (1), if a firm announced a Rule 10b5-1 plan, then a one standard deviation increase in repurchases is associated with a 0.162% decline in dividend increases, or 17.85% of the mean change in dividend, conditional on an increase.

Models (3) and (4) are logit regressions modeling the likelihood of a dividend increase. In Model (3) dividend increases are defined as any increase in dividends; in Model (4) we additionally require unscaled dividends to increase. Our results corroborate those from our Tobit models. Specifically, we observe that dividend increases are more likely for firms with greater repurchase activity, except if the repurchases are conducted under a Rule 10b5-1 plan. The coefficient on the interaction of repurchases and the Rule 10b5-1 indicator is negative and significant, consistent with Rule 10b5-1 repurchases having more of a substitution effect than other types of repurchases. Further, F-tests reveal that the net effect of repurchases on the likelihood of dividend increases is negative if the firm announced a Rule 10b5-1 plan during the fiscal year. Holding other variables constant at the mean, a one standard deviation increase in repurchases if a firm announced a Rule 10b5-1 plan during the fiscal year corresponds to a 1.8 percentage point decrease in the likelihood of increasing its dividend. The effect is economically meaningful given that the unconditional probability of increasing a dividend is 26.35%. Whereas earlier, we found that dividend payers were not more likely to adopt a 10b-5 plan, here we find that conditional on repurchasing through a 10b-5 plan, repurchasing firms are using the plan to substitute for dividends increases.

7.2 Determinants of payout decision before and after Rule 10b5-1 enactment

To further explore how payout policy decisions changed around the advent of preset repurchase plans, in Table 9 we compare the drivers of payout before and after the Rule enactment using the full, unconditional sample of firms with available payout and control variables. We estimate payout choice separately for the pre-Rule 10b5-1 period (1990-2000) and the post-Rule 10b5-1 period (2004-2014) using multinomial logits and then compare coefficients across the two periods. We exclude the 2001-2003 early adoption and learning period because our data suggest that very few firms use preset repurchase plans—perhaps because firms and investment banks were unaware of these plans or uncertain about applying the Rule to repurchases. While we are unable to completely rule out the effect of general time trends, we expand our list of control variables to include two macroeconomic controls that may influence payout decisions.²⁷

²⁷ A common macroeconomic variable in payout policy models is the difference in the tax rates for dividends versus long-term capital gains. We are unable to use tax differential because there is no variation in the post-Rule period.

First, we define dividend premium, following Baker and Wurgler (2004), as the difference in the logs of average market-to-book ratios of dividend-paying and non-dividend-paying stocks. Second, we add market returns, defined as the 12-month buy-and-hold returns on the value-weighted CRSP index. Our base group is firms with no payout, and the three groups of interest are dividend increasers, repurchasers, and firms that are both repurchasers and dividend increasers. Repurchasers are firms that actually repurchased shares in a given year. Because firms do not report prior to 2004 the actual number of shares repurchased, we define repurchasers as firms with positive values of repurchases calculated from cash flow statement values following Banyl, Dyl, and Kahle (2008).

Most changes in coefficients are concentrated in the decision to repurchase and the decision to both increase a dividend and repurchase. This finding is consistent with there being a shock to the repurchase landscape but with the factors determining dividends remaining largely constant. With 10b-5 plans changing the composition of repurchasing firms, cash and cash flow have become less important to the repurchase decision, as has leverage, prior abnormal returns, and repurchase regularity. On the other hand, return volatility, blackout window length, prior repurchase behavior, and the dividend premium have become more important to the repurchase decision, and option compensation is positively related to the repurchase decision in recent years. While we are unable to fully eliminate general time trends in payout policy driving changes in payout policy decision, coupling these findings with our logits in Table 3 modeling the OMR/Rule 10b5-1 decision, the multinomial logit results are consistent with the enactment of Rule 10b5-1 enticing a new group of firms—those without poor prior abnormal returns, with longer blackout windows, and with more option compensation—to repurchase stock.²⁸ Overall, our findings suggest that the determinants of payout policy, specifically with respect to share repurchases, significantly changed around the enactment of Rule 10b5-1.

²⁸ Internet Appendix Table IA13 show results are similar if dividend increasers are replaced with dividend payers.

8. Conclusions

We are the first to our knowledge to document and study the use of Rule 10b5-1 to repurchase company stock. Though the Rule's intent was to clarify the necessary conditions for enforcing insider trading laws, generally thought to apply to *individuals* classified as firm insiders, we find strong use of the Rule *at the firm level*. In fact, the broad and rapid firm-level adoption of preset plans substantially altered the payout landscape, changing the types of firms that repurchase and leading to increased substitution of repurchases for dividends.

We further find that investors value preset plans over OMRs, consistent with the increased commitment of preset repurchase plans enhancing shareholder value, perhaps due to expected reductions in agency costs. Overall, our findings suggest that preset repurchases facilitate buybacks within a new set of firms and that there is strong demand for a payout vehicle that circumvents blackout windows and falls between OMRs and dividends on the flexibility/commitment spectrum. The broad adoption of preset plans and investor reaction to them highlights the policy implication that the existing menu of payout options acted as a binding constraint on firms and their investors. Further, our findings highlight that going forward, regulations aimed at insiders have implications for firm's transactions in their own stock and vice-versa.

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Figure 1. Preset repurchase announcements

This figure shows the number of repurchase announcements containing a preset repurchase plan (left axis) and the percentage of repurchase announcements that include a preset repurchase component (right axis) from 2001 to 2014.

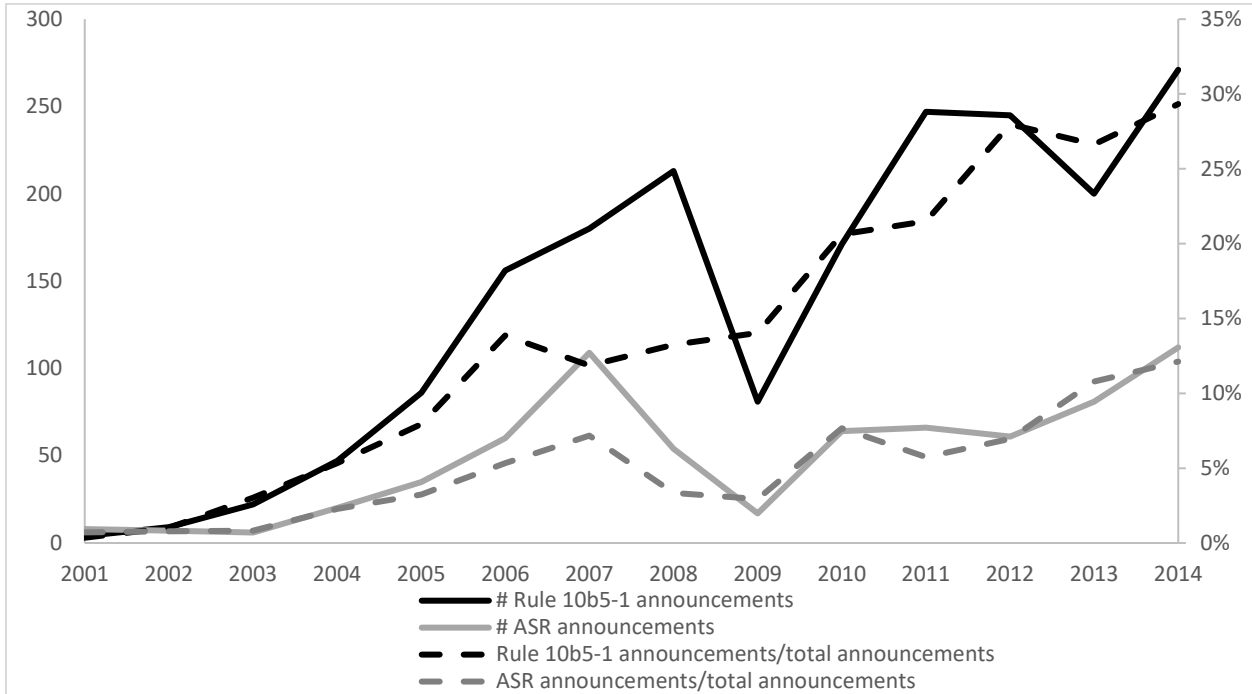


Figure 2. Preset repurchase plans in payout initiations

This figure presents initiations that include a preset repurchase component as a percentage of repurchase initiations and all payout initiations. We define repurchase (payout) initiations as the first repurchase (payout) since 1990.

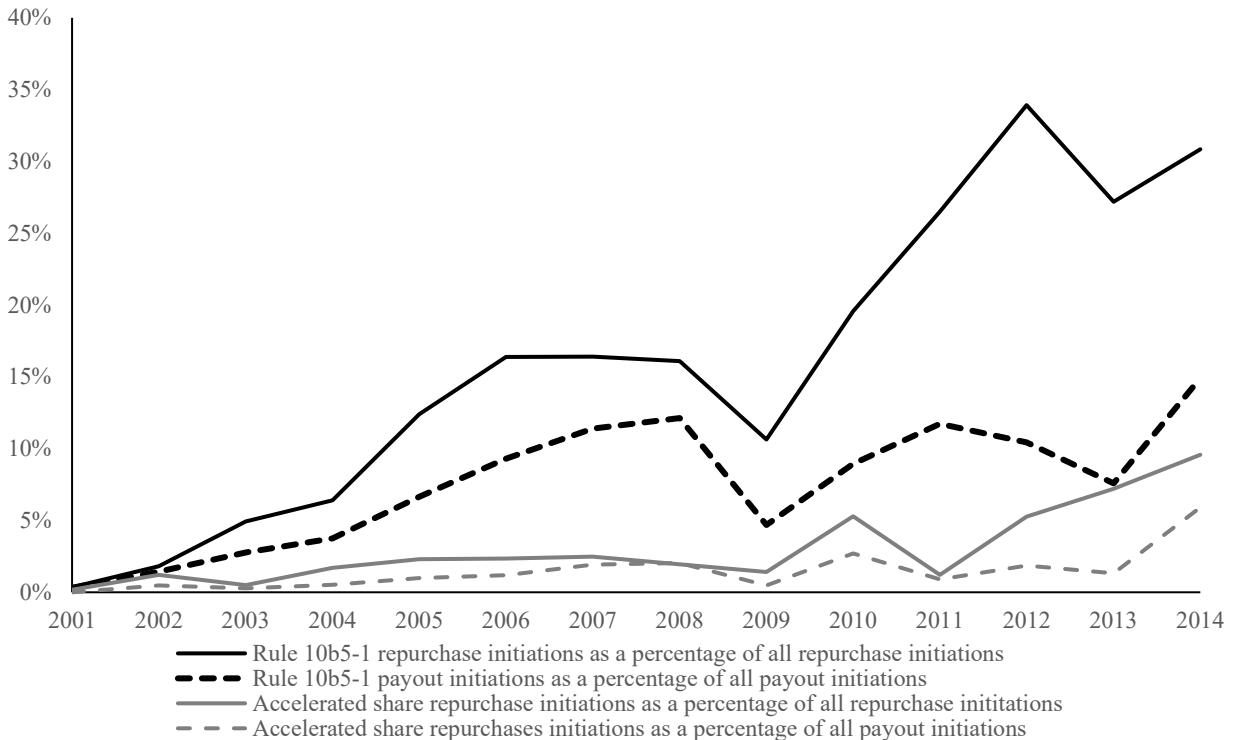


Table 1: Preset repurchase frequency and plan details

Panel A presents the annual frequency of preset repurchase plan announcements. “Pure” (“Partial”) preset plans represent repurchase programs executed fully (in part) under Rule 10b5-1. “Expected” preset plans denote that the firm intends to adopt a Rule 10b5-1 plan. “Boilerplate” refers to announcements that shares may be repurchased through a Rule 10b5-1 or through other means. “ASR” refers to accelerated share repurchases, and “Total Repurchases” includes all Rule 10b5-1 plans, ASRs, and all other open market repurchase (OMR) plans. Appendix A provides further details and examples of each type of plan. Panel B presents summary statistics on Rule 10b5-1 plan details, which are only available for the subset of non-boilerplate announcements that include such details. We report the size of the preset repurchase as a percentage of shares outstanding, in millions of dollars, or as a percentage of the total repurchase plan. Time to commencement is the number of days between the repurchase announcement and the start of the preset plan. Plan duration is the number of days during which the Rule 10b5-1 plan is effective.

Panel A: Annual preset repurchase announcement frequencies

Year	Rule 10b5-1	ASR	Total Repurchases	Rule 10b5-1/		Rule 10b5-1 plans by commitment level			
				Total	ASR/Total	Boilerplate	Expected	Partial	Pure
2001	4	8	1,129	0.35%	0.71%	0	2	2	0
2002	9	7	885	1.02%	0.79%	3	0	5	1
2003	22	6	725	3.03%	0.83%	4	1	8	9
2004	47	20	882	5.33%	2.27%	17	9	13	8
2005	86	35	1,082	7.95%	3.23%	22	16	25	23
2006	156	60	1,125	13.87%	5.33%	58	20	47	31
2007	180	109	1,518	11.86%	7.18%	52	28	54	46
2008	213	54	1,609	13.24%	3.36%	97	35	49	32
2009	81	17	577	14.04%	2.95%	31	11	21	18
2010	172	64	834	20.62%	7.67%	76	24	51	21
2011	247	66	1,149	21.50%	5.74%	138	30	54	25
2012	245	61	876	27.97%	6.96%	135	24	61	25
2013	200	81	751	26.63%	10.79%	126	19	41	14
2014	271	112	924	29.33%	12.12%	192	15	48	16
Total	1,933	700	14,066	13.74%	4.98%	951	234	479	269

Panel B: Preset repurchase plan details (excluding boilerplate)

	N	Mean	10th percentile	Median	90th percentile	Std. Dev.
% shares outstanding	307	5.20	0.84	3.46	10.63	8.01
\$ millions	393	81.51	1.96	16.00	200.00	283.11
% total repurchase	383	93.81	85.58	100.00	100.00	19.58
Time to commencement (in days)	213	13.08	0	4	35	18.97
Plan duration (in days)	299	195.39	37	146	366	164.84

Table 2: Do Rule 10b5-1 plans represent a greater commitment?

This table examines completion rates around Rule 10b5-1 repurchase announcements (by level of commitment) and around open market repurchase (OMR) announcements without a Rule 10b5-1 component. Panel A presents average cumulative quarterly completion rates the cumulative quarterly percentage of repurchase plans completed, where Quarter 0 corresponds to the quarter of the announcement. We truncate completion rates at 100%. Panel B presents difference in means tests controlling for firm characteristics using the five nearest neighbors from a propensity score matching process based on logit regressions presented in Table IA3 of the Internet Appendix. Panel C presents the average time to completion, i.e., the number of quarters until the plan is complete, and difference in means tests also using propensity score matching. ***, **, * represent significance at the 0.01, 0.05, and 0.10 levels, respectively.

Panel A: Average completion rates and percent of plans completed

Quarter	Average completion rate					Percent of plans completed				
	Non-Rule 10b5-1	Boilerplate	Expected	Partial	Pure	Non-Rule 10b5-1	Boilerplate	Expected	Partial	Pure
0	0.245	0.240	0.250	0.304	0.317	0.060	0.054	0.062	0.092	0.136
1	0.399	0.412	0.450	0.495	0.541	0.140	0.146	0.169	0.208	0.333
2	0.503	0.521	0.564	0.624	0.607	0.221	0.240	0.302	0.317	0.443
3	0.576	0.595	0.634	0.690	0.660	0.302	0.315	0.375	0.435	0.493
4	0.629	0.639	0.682	0.728	0.674	0.376	0.385	0.451	0.513	0.523
5	0.668	0.676	0.707	0.761	0.681	0.433	0.444	0.487	0.564	0.532
6	0.696	0.702	0.731	0.784	0.682	0.478	0.495	0.513	0.623	0.529
7	0.718	0.724	0.746	0.779	0.697	0.516	0.541	0.556	0.616	0.552
8	0.737	0.738	0.764	0.783	0.705	0.545	0.567	0.562	0.663	0.554

Panel B: Differences in means controlling for firm characteristics using propensity score matching

Quarter	Difference in completion rate				Difference in percent of plans completed			
	All Rule 10b5-1 - OMR	Expected, Partial, & Pure - OMR	Partial & Pure - OMR	Pure - OMR	All Rule 10b5-1 - OMR	Expected, Partial, & Pure - OMR	Partial & Pure - OMR	Pure - OMR
0	0.005	0.039 **	0.052 **	0.079 ***	0.003	0.033 **	0.023	0.067 ***
1	0.067 ***	0.101 ***	0.150 ***	0.151 ***	0.036 **	0.098 ***	0.116 ***	0.191 ***
2	0.048 ***	0.109 ***	0.145 ***	0.121 ***	0.054 ***	0.147 ***	0.145 ***	0.240 ***
3	0.033 **	0.078 ***	0.125 ***	0.101 ***	0.042 **	0.130 ***	0.161 ***	0.180 ***
4	0.030 **	0.081 ***	0.109 ***	0.081 ***	0.032	0.127 ***	0.172 ***	0.124 ***
5	0.028 **	0.039 *	0.106 ***	0.097 ***	0.054 **	0.089 ***	0.146 ***	0.168 ***
6	0.025 *	0.042 **	0.087 ***	0.042	0.043 **	0.095 ***	0.129 ***	0.043
7	0.021	0.038 *	0.078 ***	0.049 **	0.039 *	0.075 **	0.117 ***	0.082 ***
8	0.022	0.042 **	0.081 ***	0.041 ***	0.040 *	0.083 ***	0.129 ***	0.055 **

Table 2: Do Rule 10b5-1 plans represent a greater commitment?, *continued*

Panel C: Time to completion

Mean time to completion					
Non-Rule 10b5-1	Boilerplate	Expected	Partial	Pure	
3.218	3.103	2.747	2.720	1.453	

Differences in means controlling for firm characteristics using propensity score matching					
All Rule 10b5-1 - OMR	Expected, Partial, & Pure - OMR		Partial & Pure - OMR		Pure - OMR
-0.163	-0.640	***	-1.016	***	-1.470 ***

Table 3: What firm characteristics are related to preset repurchase adoption?

Using our sample of firms that announce a repurchase, this table reports logit regressions modeling the decision to adopt a Rule 10b5-1 plan relative to an open market repurchase without a Rule 10b5-1 component. The dependent variable equals one if the firm announced at least one Rule 10b5-1 repurchase program during the year and zero otherwise. All variables are defined in Appendix A; continuous variables are winsorized at the 1st and 99th percentiles. All specifications include fixed effects for year and Fama and French (1997) 12 industry classifications. Z-statistics (in parentheses) and based on robust standard errors clustered by firm. ***, **, * represent significance at the 0.01, 0.05, and 0.10 levels, respectively.

	Dependent variable: Rule 10b5-1 indicator							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
<i>Abandonment option hypothesis</i>								
Cash	0.933** (2.377)	0.806 (1.622)	0.579 (1.182)	0.789** (1.987)	0.559 (1.348)	0.517 (1.151)	0.966* (1.826)	0.541 (0.982)
Cash flow	2.205 (1.088)	4.242* (1.654)	3.284 (1.306)	2.109 (1.049)	1.978 (0.929)	0.710 (0.313)	1.934 (0.739)	1.182 (0.402)
Standard deviation of cash flow	-13.384*** (-2.589)	-16.886*** (-2.721)	-17.241** (-2.285)	-13.443*** (-2.632)	-13.839** (-2.461)	-12.516** (-2.028)	-6.103 (-0.955)	-15.955* (-1.835)
Leverage	-0.549 (-1.543)	-0.693 (-1.551)	-0.822* (-1.834)	-0.668* (-1.839)	-0.625 (-1.580)	-0.789* (-1.939)	-0.716 (-1.486)	-0.931* (-1.774)
Dividend payer	-0.359*** (-2.897)	-0.200 (-1.238)	-0.455*** (-3.005)	-0.351*** (-2.782)	-0.352*** (-2.673)	-0.311* (-1.914)	-0.364* (-1.958)	-0.449*** (-2.776)
Book-to-market	0.399** (2.208)	0.310 (1.270)	0.344 (1.494)	0.287 (1.569)	0.164 (0.841)	0.269 (1.353)	0.647*** (2.771)	0.229 (0.823)
Prior stock performance	0.599** (1.966)	0.099 (0.256)	0.553 (1.456)	0.589* (1.906)	0.653** (2.056)	0.840** (2.506)	0.401 (0.973)	1.312*** (2.963)
Standard deviation of returns	0.366 (0.056)	0.750 (0.090)	7.950 (1.007)	0.308 (0.046)	-5.523 (-0.776)	4.451 (0.619)	-3.172 (-0.310)	-5.953 (-0.612)
Ln(illiquidity)	-0.162** (-2.379)	-0.157** (-1.978)	-0.170* (-1.789)	-0.177*** (-2.702)	-0.149* (-1.897)	-0.157** (-2.057)	-0.075 (-0.747)	-0.168 (-1.294)
<i>Timing option hypothesis</i>								
Financial sophistication	-0.094 (-0.766)	-0.291* (-1.735)	0.030 (0.206)	-0.087 (-0.691)	-0.156 (-1.163)	-0.069 (-0.509)	-0.262 (-1.281)	-0.075 (-0.463)
Ln(Market Cap)	-0.153 (-1.389)	-0.113 (-0.901)	-0.178 (-1.210)	-0.230** (-2.293)	-0.240* (-1.941)	-0.138 (-1.134)	0.033 (0.227)	-0.279 (-1.641)
Ln(Age)		-0.294** (-2.100)						
Repurchase timing			1.111** (2.152)					
<i>Blackout window hypothesis</i>								
Blackout window (days)	0.002*** (3.438)	0.002*** (3.753)	0.002*** (2.852)	0.002*** (2.931)	0.001* (1.802)	0.002*** (2.825)	0.001** (2.174)	0.001* (1.820)
8-K reporting frequency				0.046*** (2.822)				
<i>Litigation risk hypothesis</i>								
Litigation risk					2.832 (0.759)			
<i>Payout at 10b5-1 enactment</i>								
No active repurchase program						0.483** (2.247)		
No dividend						0.301 (1.208)		
No payout						-0.331 (-1.203)		
<i>Controls</i>								
Standard deviation of repurchases	0.081 (1.498)	0.068 (1.042)	0.116* (1.898)	0.075 (1.380)	0.059 (1.035)	0.087 (1.462)	0.113 (1.523)	0.137** (1.980)
Repurchase frequency	-0.004 (-0.020)	0.169 (0.803)	-0.109 (-0.487)	0.052 (0.303)	0.027 (0.139)	0.089 (0.465)	-0.106 (-0.427)	0.082 (0.381)
Institutional ownership	0.047 (0.175)	-0.042 (-0.118)	-0.125 (-0.355)	0.144 (0.515)	0.055 (0.185)	0.061 (0.200)	0.276 (0.733)	0.076 (0.164)
Dilution	0.232 (0.188)	-1.098 (-0.599)	0.896 (0.568)	0.106 (0.084)	0.405 (0.298)	0.661 (0.478)	1.463 (0.871)	
EPS bonus dummy							0.241 (1.191)	
Options								-2.301 (-0.656)
Observations	4,625	2,435	2,949	4,502	3,678	4,129	2,497	2,692
Pseudo R-squared	0.0791	0.0834	0.0738	0.0788	0.0724	0.0752	0.0540	0.0658

Table 4: Robustness to excluding boilerplate Rule 10b5-1 plans

Using our sample of firms that announce a repurchase, this table reports logit regressions modeling the decision to adopt a Rule 10b5-1 plan relative to an open market repurchase without a Rule 10b5-1 component, using the subsample of Rule 10b5-1 plans excluding boilerplate plans. The dependent variable takes a value of one if a firm announced at least one non-boilerplate (i.e., pure, partial, or expected) Rule 10b5-1 repurchase program during the year and zero otherwise. All variables are defined in Appendix A; continuous variables are winsorized at the 1st and 99th percentiles. All specifications include fixed effects for year and Fama and French (1997) 12 industry classifications. Z-statistics (in parentheses) and are based on robust standard errors clustered by firm. ***, **, * represent significance at the 0.01, 0.05, and 0.10 levels, respectively.

	Dependent variable: Rule 10b5-1 indicator (excluding boilerplate)							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
<i>Abandonment option hypothesis</i>								
Cash	0.861*	1.136*	0.195	0.600	0.560	0.448	1.009	0.190
	(1.691)	(1.763)	(0.317)	(1.200)	(1.023)	(0.777)	(1.493)	(0.262)
Cash flow	1.155	3.618	2.208	0.825	0.665	-0.882	0.490	-0.545
	(0.467)	(1.143)	(0.708)	(0.343)	(0.251)	(-0.313)	(0.152)	(-0.142)
Standard deviation of cash flow	-11.885*	-15.617**	-17.117*	-11.599*	-12.790*	-10.509	-5.491	-21.380*
	(-1.858)	(-2.125)	(-1.779)	(-1.846)	(-1.827)	(-1.457)	(-0.733)	(-1.854)
Leverage	-0.812*	-0.903	-1.033*	-1.015**	-0.654	-0.982*	-0.858	-0.911
	(-1.715)	(-1.463)	(-1.835)	(-2.105)	(-1.272)	(-1.857)	(-1.515)	(-1.391)
Dividend payer	-0.219	-0.041	-0.282	-0.224	-0.206	-0.156	-0.332	-0.396**
	(-1.464)	(-0.211)	(-1.607)	(-1.463)	(-1.330)	(-0.841)	(-1.480)	(-2.000)
Book-to-market	0.094	0.189	-0.018	-0.046	0.060	0.010	0.583**	0.012
	(0.441)	(0.617)	(-0.066)	(-0.212)	(0.259)	(0.043)	(2.266)	(0.037)
Prior stock performance	0.970***	0.668	0.934**	0.997***	0.979**	1.156***	0.618	1.904***
	(2.619)	(1.427)	(2.068)	(2.667)	(2.567)	(2.933)	(1.261)	(3.624)
Standard deviation of returns	-1.959	1.226	4.381	-1.546	-3.122	0.387	-7.283	-7.245
	(-0.255)	(0.120)	(0.482)	(-0.195)	(-0.367)	(0.046)	(-0.605)	(-0.627)
Ln(illiquidity)	-0.183**	-0.157	-0.213**	-0.182**	-0.210**	-0.171**	-0.012	-0.217
	(-2.384)	(-1.606)	(-2.046)	(-2.315)	(-2.466)	(-2.016)	(-0.116)	(-1.292)
<i>Timing option hypothesis</i>								
Financial sophistication	-0.223	-0.299	-0.168	-0.220	-0.166	-0.231	-0.271	-0.296
	(-1.433)	(-1.461)	(-0.923)	(-1.382)	(-0.998)	(-1.337)	(-1.142)	(-1.424)
Ln(Market Cap)	-0.312***	-0.206	-0.382**	-0.369***	-0.394***	-0.301**	0.004	-0.501**
	(-2.722)	(-1.321)	(-2.547)	(-3.196)	(-3.140)	(-2.386)	(0.029)	(-2.443)
Ln(Age)		-0.082						
		(-0.445)						
Repurchase timing			1.221**					
			(2.018)					
<i>Blackout window hypothesis</i>								
Blackout window (days)	0.001**	0.002***	0.002**	0.001*	0.001	0.001**	0.001**	0.001*
	(2.425)	(2.940)	(2.215)	(1.855)	(1.312)	(1.998)	(2.110)	(1.887)
8-K reporting frequency				0.042**				
				(2.302)				
<i>Litigation risk hypothesis</i>								
Litigation risk					0.007			
					(0.001)			
<i>Payout at 10b5-1 enactment</i>								
No active repurchase program						0.521**		
						(2.011)		
No dividend						0.367		
						(1.220)		
No payout						-0.362		
						(-1.097)		
<i>Controls</i>								
Standard deviation of repurchases	0.143**	0.092	0.185***	0.140**	0.124**	0.147**	0.163**	0.227***
	(2.458)	(1.280)	(2.816)	(2.361)	(2.039)	(2.299)	(2.147)	(2.973)
Repurchase frequency	0.208	0.469*	0.052	0.266	0.311	0.312	-0.119	0.435
	(0.955)	(1.813)	(0.198)	(1.227)	(1.283)	(1.321)	(-0.415)	(1.571)
Institutional ownership	-0.027	-0.095	-0.029	0.069	-0.143	-0.017	0.559	-0.291
	(-0.079)	(-0.219)	(-0.066)	(0.193)	(-0.378)	(-0.044)	(1.207)	(-0.495)
Dilution	-0.285	-1.351	-0.345	-0.497	-0.334	-0.073	0.778	
	(-0.186)	(-0.581)	(-0.168)	(-0.315)	(-0.197)	(-0.042)	(0.397)	
EPS bonus dummy							0.479**	
							(2.103)	
Options								-3.461
								(-0.829)
Observations	4,202	2,189	2,686	4,099	3,327	3,806	2,375	2,451
Pseudo R-squared	0.0663	0.0672	0.0700	0.0662	0.0663	0.0687	0.0534	0.0781

Table 5: Hazard models of preset plan adoption

Using our sample of repurchasing firms between 2004 and 2014, this table presents Cox proportional hazard model of the duration to Rule 10b5-1 plan adoption. The duration to adoption is the number of calendar days from the end of 2003 to the first time the firm adopts a Rule 10b5-1 plan. If the firm enters the sample after 2003 we calculate duration as the number of days from the end of the first calendar year in Compustat. All variables are defined in Appendix A; continuous variables are winsorized at the 1st and 99th percentiles. We also include industry fixed effects based on Fama and French (1997) 12 industry classifications. Z-statistics (in parentheses) are based on robust standard errors clustered by firm. ***, **, * represent significance at the 0.01, 0.05, and 0.10 levels, respectively.

	Dependent variable: Duration to first Rule 10b5-1 plan adoption							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
<i>Abandonment option hypothesis</i>								
Cash	0.736** (2.037)	0.285 (0.740)	0.160 (0.355)	0.582 (1.558)	0.630 (1.596)	0.338 (0.963)	0.614 (1.206)	0.319 (0.665)
Cash flow	1.020 (0.527)	1.143 (0.563)	0.028 (0.012)	1.051 (0.543)	1.578 (0.747)	0.314 (0.165)	-1.104 (-0.415)	-2.010 (-0.736)
Standard deviation of cash flow	-10.251** (-2.085)	-10.935** (-2.253)	-11.695* (-1.665)	-11.464** (-2.260)	-10.171* (-1.927)	-5.927 (-1.314)	4.903 (0.834)	-5.596 (-0.779)
Leverage	-0.503 (-1.584)	-0.764** (-2.131)	-0.649 (-1.554)	-0.686** (-2.095)	-0.501 (-1.426)	-0.654** (-2.061)	-0.911* (-1.655)	-0.415 (-1.005)
Dividend payer	-0.253** (-2.007)	-0.145 (-1.034)	-0.361** (-2.210)	-0.259** (-1.992)	-0.191 (-1.402)	-0.316** (-2.323)	-0.422* (-1.957)	-0.272* (-1.729)
Book-to-market	0.314* (1.888)	0.269 (1.445)	0.176 (0.800)	0.219 (1.260)	0.264 (1.424)	0.128 (0.819)	0.293 (1.152)	0.075 (0.314)
Prior stock performance	0.321 (0.840)	-0.560 (-1.467)	0.206 (0.396)	0.302 (0.766)	0.440 (1.092)	0.371 (1.003)	0.482 (1.039)	1.183** (2.163)
Standard deviation of returns	4.361 (0.700)	-0.315 (-0.046)	4.126 (0.557)	4.768 (0.740)	2.287 (0.320)	2.550 (0.434)	-53.901*** (-4.515)	-10.950 (-1.194)
Ln(illiquidity)	-0.155** (-2.566)	-0.072 (-1.104)	-0.159* (-1.816)	-0.135** (-2.241)	-0.167** (-2.286)	-0.100* (-1.685)	-0.036 (-0.393)	0.039 (0.369)
<i>Timing option hypothesis</i>								
Financial sophistication	-0.272** (-2.136)	-0.326** (-2.109)	-0.176 (-1.115)	-0.283** (-2.200)	-0.353** (-2.448)	-0.267** (-2.122)	-0.408* (-1.712)	-0.355** (-2.257)
Ln(Market Cap)	-0.203** (-2.241)	-0.082 (-0.787)	-0.213* (-1.672)	-0.221** (-2.424)	-0.260** (-2.575)	-0.149 (-1.631)	0.022 (0.175)	-0.011 (-0.080)
Ln(Age)		-0.598*** (-5.736)						
Repurchase timing			1.070* (1.909)					
<i>Blackout window hypothesis</i>								
Blackout window (days)	0.000 (0.902)	0.002*** (2.745)	0.001 (1.467)	0.000 (0.517)	0.000 (0.151)	0.001* (1.844)	-0.001 (-1.237)	0.000 (0.483)
8-K reporting frequency				0.058*** (3.880)				
<i>Litigation risk hypothesis</i>								
Litigation risk					-3.817 (-0.818)			
<i>Payout at 10b5-1 enactment</i>								
No active repurchase program						0.398** (2.308)		
No dividend						0.206 (1.000)		
No payout						-0.419* (-1.821)		
<i>Controls</i>								
Standard deviation of repurchases	0.131** (2.520)	0.055 (0.864)	0.149** (2.544)	0.125** (2.321)	0.116** (2.058)	0.079 (1.395)	0.024 (0.304)	0.136* (1.936)
Repurchase frequency	-0.180 (-1.048)	-0.318 (-1.579)	-0.495** (-2.191)	-0.166 (-0.960)	-0.191 (-1.020)	-0.334* (-1.933)	-0.542** (-2.080)	-0.371* (-1.734)
Institutional ownership	0.385 (1.309)	0.318 (0.990)	-0.104 (-0.257)	0.477 (1.589)	0.323 (0.991)	0.392 (1.327)	0.204 (0.475)	0.685 (1.499)
Dilution	0.950 (0.866)	2.192 (1.638)	1.642 (1.031)	0.683 (0.609)	1.090 (0.891)	2.586** (2.298)	3.377** (2.512)	
EPS bonus dummy							0.392** (1.975)	
Options								4.863* (1.705)
Observations	4,006	2,102	2,514	3,911	3,144	3,729	2,395	2,414
Pseudo R-squared	0.736**	0.285	0.160	0.582	0.630	0.017	0.614	0.319

Table 6: Shock to cost of adopting a preset repurchase plan

Using our sample of firms that announce a repurchase, this table report logit regressions modeling the decision to adopt a Rule 10b5-1 plan relative to an open market repurchase without a Rule 10b5-1 component during the financial crisis. The dependent variable equals one if the firm announced at least one Rule 10b5-1 repurchase program during the year and zero otherwise. *Trend* is a count variable equal to 1 for observations in 2004, 2 for observations in 2005, etc. *Financial crisis* is an indicator variable equal to 1 for announcements made during 2008 or 2009. All variables are defined in Appendix A; continuous variables are winsorized at the 1st and 99th percentiles. All specifications include fixed effects for Fama and French (1997) 12 industry classifications. Z-statistics are reported in parentheses and are based on robust standard errors clustered by firm. ***, **, * represent significance at the 0.01, 0.05, and 0.10 levels, respectively.

	Dependent variable: Rule 10b5-1 indicator							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Trend	0.163*** (9.236)	0.175*** (7.305)	0.151*** (6.437)	0.167*** (9.269)	0.176*** (9.211)	0.146*** (7.559)	0.258*** (3.289)	0.118*** (4.635)
Financial crisis	-0.363*** (-3.334)	-0.368*** (-2.705)	-0.276** (-2.142)	-0.342*** (-3.093)	-0.408*** (-3.431)	-0.408*** (-3.471)	-0.527*** (-2.923)	-0.461*** (-3.236)
Ln(Age)		-0.292** (-2.088)						
Repurchase timing			1.102** (2.146)					
8-K reporting frequency				0.045*** (2.782)				
Litigation risk					2.307 (0.617)			
No active repurchase program						0.472** (2.203)		
No dividend						0.287 (1.157)		
No payout						-0.312 (-1.139)		
EPS bonus dummy							0.257 (1.274)	
Options								-2.524 (-0.724)
Additional controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	4,625	2,435	2,952	4,502	3,678	4,129	2,497	2,692
Pseudo R-squared	0.0765	0.0813	0.0711	0.0763	0.0696	0.0718	0.0515	0.0630

Table 7: Univariate analysis - Abnormal returns around preset repurchase announcements

This table reports five-day cumulative abnormal returns around repurchase announcements. We remove observations with earnings announcements during this five-day window. Panel A shows mean abnormal returns by type of repurchase announcement. Table 1 explains our categorization of announcements. Panel B examines the difference in abnormal returns between groups of preset repurchase plans and open market repurchase plans that do not include a preset component. Significance of mean abnormal returns is assessed using a *t*-test or propensity score matching, as indicated. We use the five nearest neighbors identified from the logit regressions in Table IA3 as matched control firms then calculate the difference in means. ***, **, * represent significance at the 0.01, 0.05, and 0.10 levels, respectively.

Panel A: Abnormal returns at announcement by type of repurchase

	Rule 10b5-1					
	All	Boilerplate	Expected	Partial	Pure	OMR
Mean	1.531	1.147	2.044	1.932	2.385	1.129
<i>t</i> -stat	7.276	4.256	4.237	2.891	3.879	13.046
N	842	512	124	94	112	4,274

Panel B: Differences in means controlling for firm characteristics using propensity score matching

	Rule 10b5-1			
	Expected, Partial, & Pure - OMR	Expected, Partial, & Pure - OMR	Partial & Pure - OMR	Pure - OMR
All - OMR	0.222	0.88 **	1.047 **	1.436 ***

Table 8: Do Rule 10b5-1 repurchases substitute for dividend increases?

Using the full, unconditional sample of firm-years created by merging our repurchase announcement sample with non-repurchasing firm-years, this table presents models of dividend increases as a function of repurchase activity, with a focus on the differential substitution effect of Rule 10b5-1 repurchases. Models (1) and (2) report results from Tobit regressions modeling dividend increases. In Model (1) dividend increases are defined as the maximum of zero and the change in dividends, scaled by assets, from fiscal year $t-1$ to year t ; in Model (2) we also require unscaled dividends to increase. Models (3) and (4) are logit regressions modeling the likelihood of a dividend increase. In Model (3) dividend increases are defined as any increase in dividends, scaled by assets, from year $t-1$ to year t ; to be classified as a dividend increase; in Model (4), we additionally require unscaled dividends to increase. *Repurchases* are total repurchases, scaled by assets, in fiscal year t . *Rule 10b5-1* is an indicator variable that takes a value of one if a firm announced a Rule 10b5-1 as part of its repurchase program during fiscal year t . *Prior stock performance* equals the return on the company's stock during fiscal year $t-1$, net the return on the value-weighted CRSP index over the same period. All other variables are measured at the end of fiscal year $t-1$ and defined in Appendix A. All continuous variables are winsorized at the 1st and 99th percentiles. We include year and Fama and French (1997) 12 industry fixed effects in all specifications. T-statistics or Z-statistics are reported in parentheses and are based on robust standard errors clustered by firm. ***, **, * represent significance at the 0.01, 0.05, and 0.10 levels, respectively.

	Tobit models		Logit models	
	$\Delta\text{Div}/\text{Assets} > 0$	$\Delta\text{Div}/\text{Assets} > 0 \ \&$ $\Delta\text{Div} > 0$	$\Delta\text{Div}/\text{Assets} > 0$	$\Delta\text{Div}/\text{Assets} > 0 \ \&$ $\Delta\text{Div} > 0$
	(1)	(2)	(3)	(4)
Repurchases/Assets	0.017** (2.216)	0.017** (2.169)	2.321*** (4.123)	1.968*** (3.530)
Repurchase/Assets x Rule 10b5-1	-0.063*** (-3.103)	-0.066*** (-3.088)	-5.641*** (-3.481)	-5.630*** (-3.324)
Rule 10b5-1	-0.000 (-0.151)	0.000 (0.099)	0.011 (0.096)	0.035 (0.304)
Cash	0.005*** (2.700)	0.004* (1.815)	-1.023*** (-6.905)	-1.113*** (-7.329)
Cashflow	0.116*** (6.436)	0.109*** (6.242)	4.285*** (8.077)	4.206*** (7.912)
Leverage	-0.007*** (-4.663)	-0.008*** (-5.078)	-0.488*** (-4.562)	-0.577*** (-5.307)
Book-to-market	-0.000 (-0.398)	-0.001 (-0.973)	0.104*** (2.624)	0.054 (1.329)
Prior stock performance	0.002*** (5.510)	0.003*** (6.605)	0.209*** (7.136)	0.255*** (8.681)
Standard deviation of returns	-0.446*** (-15.615)	-0.459*** (-15.573)	-43.576*** (-19.978)	-44.193*** (-19.765)
Ln(Market Cap)	0.001*** (8.900)	0.001*** (9.233)	0.199*** (16.360)	0.196*** (16.417)
p-values from F-tests				
Repurchases/Assets + Repurchase/Assets x Rule 10b5-1	-0.046** [0.020]	-0.049** [0.018]	-3.320** [0.035]	-3.662** [0.026]
Observations	36,619	36,723	36,619	36,723
Log likelihood	13,413	12,035	-17,603	-17,190

Table 9: How have preset repurchases changed payout decisions?

Use the full, unconditional sample of firm-years created by merging our repurchase announcement sample with non-repurchasing firm-years, this table presents multinomial logit models of dividend increases and repurchases in the pre-Rule 10b5-1 period (1990-2000) and the post-Rule 10b5-1 period (2004-2014), as well as the difference in coefficients across the two periods. The base group is firm-years with zero repurchases and no increase in dividends. The other groups include: (i) firm-years with dividend increases but zero repurchases, (ii) firm-years with dividend increases and positive repurchases, and (iii) firm-years with no dividend increase but positive repurchases. Dividend increases are cases in which the change in dividends, scaled by assets, from fiscal year $t-1$ to year t is positive. Positive repurchases imply a positive repurchase value inferred from the cash flow statement following Banyl, Dyl, and Kahle (2008). Independent variables are measured at the end of fiscal year $t-1$ and defined in Appendix A. All continuous variables are winsorized at the 1st and 99th percentiles. We include industry fixed effects based on Fama and French (1997) 12 industry classifications. Z-statistics (in parentheses) are based on robust standard errors clustered by firm; p-values associated with differences are in brackets. ***, **, * represent significance at the 0.01, 0.05, and 0.10 levels, respectively.

	Pre-Rule 10b5-1 period (1990-2000)			Post-Rule 10b5-1 period (2004-2014)			Difference		
	Dividend increase	Dividend increase & Repurchase	Repurchase	Dividend increase	Dividend increase & Repurchase	Repurchase	Dividend increase	Dividend increase & Repurchase	Repurchase
Cash	0.447 (1.449)	0.735** (2.534)	0.981*** (6.234)	0.088 (0.526)	0.661*** (4.043)	0.337*** (3.138)	-0.359 [0.337]	-0.074 [0.842]	-0.644*** [0.003]
Cash flow	3.408*** (2.895)	6.910*** (5.537)	6.907*** (11.569)	3.640*** (5.543)	5.219*** (7.092)	3.329*** (7.466)	0.231 [0.893]	-1.693 [0.28]	-3.575*** [0.000]
Standard deviation of cash flow	0.667 (0.654)	-5.189* (-1.955)	-4.546*** (-3.795)	-0.081 (-0.125)	-5.339*** (-3.558)	-2.950*** (-3.601)	-0.747 [0.618]	-0.159 [0.968]	1.600 [0.404]
Leverage	0.210 (1.053)	-0.801*** (-3.743)	-0.983*** (-7.705)	-0.066 (-0.557)	-0.680*** (-5.449)	-0.353*** (-3.949)	-0.276 [0.267]	0.121 [0.679]	0.629*** [0.001]
Dividend payer	3.200*** (25.656)	2.981*** (21.922)	-0.143** (-2.311)	2.756*** (42.149)	2.537*** (39.957)	-0.188*** (-4.327)	-0.444*** [0.004]	-0.444*** [0.006]	-0.045 [0.603]
Book-to-market	0.256*** (3.324)	0.025 (0.267)	-0.019 (-0.504)	0.031 (0.673)	0.060 (1.062)	-0.048 (-1.583)	-0.226** [0.012]	0.036 [0.773]	-0.029 [0.574]
Prior stock performance	0.466*** (5.985)	0.217** (2.569)	-0.319*** (-7.250)	0.300*** (6.011)	0.345*** (6.204)	-0.044 (-1.204)	-0.166** [0.058]	0.128 [0.195]	0.275*** [0.000]
Standard deviation of returns	-21.446*** (-5.993)	-21.273*** (-5.363)	-10.433*** (-5.926)	-17.602*** (-8.577)	-36.796*** (-15.630)	-17.561*** (-12.023)	3.873 [0.409]	-15.534*** [0.003]	-7.131*** [0.008]
Ln(illiquidity)	0.086** (2.395)	0.040 (1.024)	-0.030 (-1.357)	0.083*** (5.012)	0.080*** (4.456)	-0.016 (-1.081)	-0.003 [0.942]	0.04 [0.403]	0.014 [0.637]
Ln(Market Cap)	0.169*** (3.138)	0.128** (2.246)	-0.036 (-1.027)	0.194*** (7.392)	0.273*** (9.966)	0.034 (1.458)	0.025 [0.702]	0.145** [0.046]	0.070 [0.142]
Blackout window (days)	-0.001 (-0.381)	0.003 (0.802)	-0.001 (-0.328)	-0.000 (-0.491)	0.007*** (34.581)	0.007*** (37.860)	0.001 [0.755]	0.004 [0.434]	0.008*** [0.004]
Standard deviation of Repurchases	-0.015 (-0.387)	-0.007 (-0.221)	0.063*** (3.015)	0.029 (1.218)	0.034 (1.623)	-0.003 (-0.174)	0.045 [0.372]	0.042 [0.346]	-0.065** [0.022]
Repurchase frequency	-0.445** (-2.357)	3.748*** (27.831)	3.774*** (35.456)	-0.280*** (-2.691)	4.205*** (53.376)	4.440*** (64.876)	0.166 [0.501]	0.457** [0.013]	0.666*** [0.000]
Institutional ownership	0.011 (0.052)	0.171 (0.830)	0.709*** (5.481)	0.037 (0.361)	0.533*** (5.066)	0.449*** (5.558)	0.026 [0.915]	0.361 [0.166]	-0.261 [0.131]
Dilution	2.035*** (3.972)	0.702 (1.168)	-0.653* (-1.839)	1.652*** (2.992)	2.330*** (4.247)	0.778* (1.910)	-0.385 [0.621]	1.626** [0.071]	1.432** [0.019]
Dividend premium	-0.218 (-0.601)	0.284 (0.854)	-0.300 (-1.500)	0.707* (1.749)	-0.599 (-1.493)	0.712** (2.313)	0.908** [0.091]	-0.880 [0.109]	1.015*** [0.008]
Market returns	0.150 (0.459)	0.504 (1.634)	-0.220 (-1.133)	0.257* (1.712)	-0.486*** (-3.423)	-0.265** (-2.393)	0.104 [0.777]	-0.989*** [0.004]	-0.045 [0.845]
Observations	13,288			33,005					
Pseudo R-squared	0.282			0.347					

Appendix A: Variable definitions

This appendix defines variables used in our empirical analysis. All continuous variables are winsorized at the 1st and 99th percentile.

Variable name	Description	Hypothesis
8-K reporting frequency	The total number of 8-Ks filed by the company in the 6 month period following the repurchase announcement.	Blackout window
Blackout window	The minimum number of days over the past 12 quarters during which the firm was likely to observe a blackout window, calculated as the sum of the days elapsed between each quarter end and the release of earnings for that quarter.	Blackout window
Book-to-market	Total common equity over market capitalization.	Abandonment option
Cash	Cash and short-term securities scaled by assets.	Abandonment option
Cash flow	Operating income before depreciation scaled by assets.	Abandonment option
Dilution	The difference in the number of common shares used to calculate diluted earnings per share (diluted shares) and the number of common shares outstanding used to calculate basic earnings per share (basic shares), divided by the number of basic shares.	Control
Dividend payer	An indicator variable equal to 1 if total dividends if the firm paid a dividend during the prior fiscal year.	Abandonment option
Dividend premium	The difference in the logs of average market-to-book ratios of dividend-paying and non-dividend-paying stocks, following Baker and Wurgler (2004).	Control
EPS bonus dummy	From Cheng, Harford and Zhang (2015): An indicator variable equal to one if the CEO's bonus is tied to earnings per share. Data span through 2009.	Control
Financial crisis	An indicator variable equal to 1 for announcements made during 2008 or 2009.	N/A
Financial sophistication	An indicator dummy variable equal to 1 if the firm reports a non-missing value for gain/loss on ineffective hedges (HEDGEGL) found in Compustat and zero otherwise.	Timing
Institutional ownership	Shares held by institutions (from Thomson Reuters 13F filings database) as a percentage of shares outstanding, measured at the end of the calendar quarter prior to the announcement.	Control
Leverage	The sum of long-term debt and debt in current liabilities scaled by total assets.	Abandonment option
Litigation risk	Using the model to predict litigation risk from Kim and Skinner (2012) we create a probability of facing a class action lawsuit for each firm from the predicted values of the logit model found in Table IA2 of the Internet Appendix.	Litigation
Ln(Age)	The natural log of the age of the firm, measured as number of years since the firm's IPO year.	Timing
Ln(illiquidity)	The natural log of the Amihud (2002) measure of illiquidity: the ratio of the daily absolute return to the dollar trading volume on that day. We average daily illiquidity for each firm over the	Abandonment option

	period starting 255 trading days prior to the repurchase announcement and ending 46 trading days prior to the announcement.	
Ln(Market Cap)	The natural log of the firm's market capitalization.	Timing
Market returns	12-month buy-and-hold returns on the value-weighted CRSP index.	Control
No active repurchase program	An indicator variable equal to 1 if the firm did not announce a repurchase program from January 1, 1998 to December 31, 2000, and zero otherwise. Require the firm to exist in the year 2000.	Payout at 10b5-1 enactment
No dividend	An indicator variable equal to 1 if the firm did not pay a dividend from January 1, 1998 to December 31, 2000, and zero otherwise. Require the firm to exist in the year 2000.	Payout at 10b5-1 enactment
No payout	An indicator variable equal to 1 if the firm did not announce a repurchase program or pay dividend from January 1, 1998 to December 31, 2000, and zero otherwise. Require the firm to exist in the year 2000.	Payout at 10b5-1 enactment
Options	The sum of all executive unexercised exercisable options and all executive unexercised unexercisable options, scaled by shares outstanding.	Control
Percent shares outstanding sought	The percentage of shares outstanding sought in the share repurchase.	Control
Prior stock performance	The cumulative abnormal return starting 46 trading days prior to the announcement and ending 6 days prior to the announcement.	Abandonment option
Repurchase frequency	The portion of the prior 12 quarters during which the firm repurchased any stock.	Control
Repurchase timing	The percentage difference in repurchase volume-weighted stock price and volume-weighted stock price. The repurchase volume-weighted price is the sum of quarterly shares repurchased times the average quarterly repurchase price per share, divided by the total number of shares repurchased. Volume-weighted price is the trading volume weighted average daily closing price over the prior fiscal year. Positive values are associated with poor repurchase timing and negative values with good timing.	Timing
Standard deviation of cash flow	The standard deviation of quarterly operating income before depreciation scaled by assets calculated over the 12 quarters preceding the repurchase announcement.	Abandonment option
Standard deviation of cash flow (seasonally adjusted)	The standard deviation of seasonally adjusted cash flow calculated over the 12 quarters preceding the repurchase announcement. Seasonally adjusted cash flow is defined as quarterly operating income before depreciation scaled by assets minus Fama-French 49 industry median quarterly operating income before depreciation scaled by assets.	Control
Standard deviation of repurchases	The standard deviation of quarterly repurchases over the previous 12 quarters. Repurchases are calculated as the number of shares repurchase times the average price paid per share.	Control
Standard deviation of returns	The standard deviation of daily stock returns over the period from 255 to 46 trading days prior to the repurchase announcement. We require a minimum of 100 trading days.	Abandonment option
Trend	A count variable equal to 1 for observations in 2004, 2 for observations in 2005, etc.	Control