

Insider Trading and CEO Pay

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Abstract

This Paper presents evidence boards of directors “bargain” with executives about the profits they expect to make from trades in firm stock. The evidence suggests executives whose trading freedom is increased using Rule 10b5-1 trading plans experienced reductions in other forms of pay to offset the potential gains from trading. There are two benefits from trading—portfolio optimization and informed trading profits—and this Paper allows us to isolate them. The data show boards pay executives in a way that reflects the profits they are expected to earn from informed trades. The legal issues about paying using illegal profits are explored. As a matter of policy, the data seriously undercut criticisms of the laissez-faire view of insider trading most closely associated with Henry Manne. At least with respect to classic insider trading (that is, a manager of a firm trading on the basis of information about the firm where she works), if boards are taking potential trading profits into consideration when setting pay, it is difficult to locate potential victims of this trading. Current shareholders should be happy with a deal that pays managers in part out of the hide of future shareholders, and the firm should internalize any costs arising from this payment scheme, since future shareholders should take this into account when deciding whether and what price to buy shares. While there still may be good reasons to prohibit some individuals from trading on material, non-public information, the case for classic insider trading is made much weaker by this data.

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I. INTRODUCTION

This Paper presents evidence boards of directors bargain with executives about the profits they expect to make from informed trades in firm stock. There are two related takeaways. First, the evidence suggests executives whose trading freedom is increased experience reductions in other forms of pay to offset the potential gains from trading. This result is consistent with (and the flipside of) a study by Darren Roulstone, finding firms that restrict trading increase compensation to offset the lost opportunities from trading.¹ While Roulstone finds that firms restricting trading pay more, this Paper finds that firms liberalizing trading pay less. From this, we can conclude that boards take executives' ability to trade profitably in firm stock into account when setting their pay, and, importantly, it is a two-way street. This should not be surprising, since if it were not true it would mean executives were systematically overpaid, earning more pay when trading is limited but not earning less when it is freed up. This result is, however, inconsistent with the managerial power theory of executive compensation. As discussed below, Lucian Bebchuk and others claim executives use trading profits to enrich themselves at the expense of shareholders. The data presented in this Paper call the strong form of this claim into doubt.²

Second, the data also suggest some of the reduction in pay boards impose as a result of liberalizing trading opportunities is to offset expected gains from trades based on material, non-public information. Roulstone's data and result does not differentiate between two reasons for why trading freedom is valuable: the value of liquidity and the value of information asymmetry. Using a new dataset of firms permitting so-called Rule 10b5-1 trading plans, this Paper tries to isolate the information component to test whether boards bargain about informed trades. Firm disclosure choice about Rule 10b5-1 plans provides two groups of firms that sort by expected trading profits based on informed trades, and this allows us to test whether boards anticipate these profits and deduct them from executive compensation. The evidence suggests they do, which speaks to not only theories about how boards set pay but also to issues of insider trading policy.

This Paper presents the theory and evidence of a new component of "implicit compensation," that is the part of compensation that is not explicitly disclosed to the public but is nevertheless part of the pay bargain between board and executive. Regulation of executive compensation generally focuses

¹ Darren Roulstone, *The Relation Between Insider-Trading Restrictions and Executive Compensation*, 41 J. ACCT. RESEARCH 525 (2003) (finding firms restricting executive trading (using black-out windows) pay a 4 to 13 percent premium in terms of total compensation).

² As described below, Bebchuk and others describe the problem of insiders earning unwarranted and unnoticed profits on informed trades as a systematic problem in need of an across-the-board regulatory response. See *infra* Section VI.B.

on the explicit pay executives receive, be it salary, bonuses, stock options, restricted stock, perquisites, or deferred compensation, such as retirement benefits. But since over 60 percent of total pay is delivered using some form of equity, and insiders trade billions of dollars in stock each year,³ there is a missing piece to the pay debate – the compensation insiders implicitly receive through the ability to convert their equity into cash. This Paper provides new evidence that the size of the insider-trading component of implicit compensation is significant: for several hundred firms with active trading by insiders, it amounts, on average, to about 20 percent of total compensation. At the very least, the pay of executives as reported is missing this component.

The Paper also considers the implications and legal issues that flow from the finding that boards appear to bargain with insiders about expected profits from informed trades. The existence of insider-trading implicit compensation allows us to test theories of board governance, the intrafirm efficiency of the pay setting process, as well as to explore issues of the proper disclosure of executive compensation and the best available rules for insider trading. As described below, the SEC's recent attempt to permit insiders to more freely trade for diversification reasons actually exacerbates any problems that may arise from implicit compensation. In addition, and contrary to the claims of the managerial power literature, the data suggests bargaining about insider trading profits results in a reduction in pay that offsets the average expected gains from the trading.

The data also seriously undercut criticisms of the laissez-faire view of insider trading most closely associated with Henry Manne.⁴ In his famous book, Manne argued liberal trading by insiders improves the accuracy of stock prices (thus leading to more efficient capital allocation in the economy) and is the most efficient mechanism for shareholders to compensate managers (by increasing returns to managerial innovation and reducing many of the costs of options). At least with respect to classic insider trading,⁵ if boards are taking potential trading profits into consideration when setting pay, it is difficult to locate potential victims of this trading. Current shareholders should be happy with a deal that pays managers in part out of the hide of future shareholders, and the firm should internalize any costs arising from this payment scheme, since future shareholders should take this into account when deciding whether and what price to buy shares. While there still may be good reasons to prohibit some individuals from trading on material, non-public information, the case for classic insider trading is made

³ See, for example, Henderson et al., "Strategic Disclosure of 10b5-1 Trading Plans," Univ. of Chicago Law & Economics Working Paper, Sept. 2009, available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1137928 (hereinafter, "HJM, STRATEGIC DISCLOSURE") (showing about \$25 billion in trades by insiders under Rule 10b5-1 trading plans in first year of use by each executive).

⁴ See HENRY MANNE, INSIDER TRADING AND THE STOCK MARKET (1966).

⁵ That is, a manager of a firm trading on the basis of information about the firm where she works.

much weaker by this data. And this is consistent with the Supreme Court's suggestion about one theory of insider trading in the recent *O'Hagan* case.⁶ This and other legal issues are discussed after the evidence is presented.

II. COSTS AND BENEFITS OF EQUITY COMPENSATION

Firms compensate executives with equity in the firm in order to reduce agency costs. It is thought managers who are paid like shareholders instead of bureaucrats will choose better projects (from the perspective of shareholders), and be less prone to empire building, wasteful spending, and shirking. Although virtually non-existent in public companies just three decades ago, equity compensation is now the predominate component of executive pay. Over the period of this study (1999-2008), the average public company executive earned more than half their total pay in the form stock options or restricted stock.⁷ Even critics of the current practices of executive compensation generally support the theory of paying with stock to align the interests of managers and shareholders.⁸

Although paying with firm equity may improve manager behavior, it may raise other costs for firms. Most obviously, firms may have to pay more using equity than they would if using cash. Individual executives would prefer cash, all else being equal, since cash can be used to buy other things in addition to shares in the company, and shares given by the firm often come with limits on when they can be sold. Insiders may need to sell shares to fund consumption, especially if a large share of their wealth is tied to firm stock. There is some evidence that consumption-driven sales often arise on short notice, meaning trading restrictions can be quite costly.⁹ Insiders at firms restricting trading frequently ask for permission to trade for liquidity reasons, suggesting there is a demand for non-information trades that is valuable to executives.¹⁰ This means executives will value the ability to convert shares into cash, and, in theory, should have to be compensated for restrictions on their ability to do this.

Another cost arises because of the fact that an executive paid in stock will have some of her wealth and her human capital deployed in the same

⁶ See infra note __ and accompanying text.

⁷ For historical data, see, for example, Kevin J. Murphy, "Executive Compensation," Univ. of Southern Calif. Working Paper (1998), available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=163914. Data for the period of this study is from the ExecuComp database maintained by the University of Pennsylvania.

⁸ See, for example, LUCIAN A. BEBCHUK & JESSE M. FRIED, PAY WITHOUT PERFORMANCE: THE UNFULFILLED PROMISE OF EXECUTIVE COMPENSATION 8 (2006) ("We agree that paying generously to provide desirable incentives can be a good compensation strategy for shareholders. . . . Our concern is simply that executives have partly taken over the compensation machine, leading to arrangements that fail to provide managers with desirable incentives.").

⁹ See C. Bettis et al., "Corporate Policies Restricting Trading by Insiders," 57 J. FIN. ECON. 191 (2000). See also, L.A. Jeng, "Corporate Insiders and the Window of Opportunity," in CORPORATE INSIDERS AND THE WINDOW OF OPPORTUNITY (1999).

¹⁰ See id.

risk environment, resulting in a suboptimal diversification of future wealth. An insider who can trade at all times can optimize her wealth portfolio without limitations, and this can be worth a great deal. Executives often hedge their portfolio by selling off shares they are granted.¹¹ If these insiders cannot do this as freely, this will reduce the value of the shares granted, and therefore increase the amount of shares necessary to achieve the same incentive effects.¹² Insiders likely value shares (or options) they are given at less than the value of those shares to the firm, since the firm values them at their cash value. The difference between the cash value of the stock or options and the executive's value of them is the opportunity cost for the firm of paying in equity instead of cash. In a rational market, we should expect to see firms use options when the gains from the reduction in agency costs from their use outweigh the costs of their use.¹³

Permitting insiders to sell their shares in an attempt to optimize their private wealth portfolio can reduce the opportunity costs for the firm, while preserving incentives for managers to act in the interests of shareholders. Insiders will want to sell all or nearly all of their shares, but will likely be permitted to do so up to the point where the gains to the executive from increasing diversification (that is, reducing the concentration of human and non-human capital in the firm) equal the gains to the firm from incentivizing the executive. The benefit for firms from allowing this trading is that if the executives can optimize their portfolio, the difference between the value of the shares to the firm and the value to the executive will fall. This will reduce the number of shares the firm has to issue to achieve the desired level of incentive.¹⁴ This can be done without large information costs for the board, which presumably knows less about the optimal portfolio mix for an executive than the executive does.

In this model, the board gives options it believes, based on the limited information it has, are necessary to give the proper incentives, and then authorizes the executive to trade a certain number of these options to turn them into cash until the point where the costs to the individual and the firm are about equal. If insiders are allowed time trades to turn shares into cash

¹¹ Eran Ofek & David Yermack, *Taking Stock: Equity-based Compensation and the Evolution of Managerial Ownership*, 55 J. FIN. 1367 (2000).

¹² John Core & Wayne Guay, "When Contracts Require Risk-Averse Executives to Hold Equity: Implications for Option Valuation and Relative Performance Evaluation," Working paper, University of Pennsylvania (2001).

¹³ There is no empirical proof for this claim. It is a claim based on faith in markets for labor and capital doing their work.

¹⁴ In addition, it may relieve the board from having to calculate with precision the optimal amount of equity to be held at any time. Determining the best mix of pay and the amount of equity an executive should hold at any time is a difficult task for the board. Executives have better information than the board about the optimal structure of their portfolio and how they value options. It may therefore be easier for the board to allocate an amount of options it believes, based on its information at the time, is necessary to give the executive the proper incentives, but then permit the executive to trade (within a given tolerance) shares to locally maximize the executive's wealth.

when they need it, and to sell shares until the value they have for the next share given comes closest to value given by firm, then opportunity costs will be at their lowest. Importantly, in this model executives have incentives to sell even if they have no better information than those with whom they are trading. We can call these trades for diversification and consumption reasons: “optimization trades.”

There is a tradeoff in permitting insiders to reduce firm opportunity costs. As trading opportunities increase, other costs for the firm may be generated, thereby reducing any reductions to opportunity costs. One obvious additional cost is the potential that executives will claim to be trading merely for diversification reasons, but will actually have an information advantage vis-à-vis their trading counterparty. We know insiders trade on the basis of informational advantages, earning billions in profits at the expense of outsiders they trade against.¹⁵ This must be because the existing legal regime is imperfect at detecting or deterring informed trading, and because the benefits for firms from tolerating insider trading exceed the costs.¹⁶ We can call these: “informed trades.”

The existence of informed trading is costly both in terms of legal risk and in terms of purely economic terms. Consider legal risk first. Informed trades may impose legal costs on both the insider and the firm. Insiders face civil and criminal penalties if they trade on the basis of material, non-public information.¹⁷ Firms face their own, entity-level risks from insider trading too. For instance, trades by insiders are commonly used to satisfy the scienter element of class action lawsuits alleging securities fraud committed by the firm. Although individual defendants do the speaking (on behalf of the firm), the trading, and suffer reputational penalties as a result of the suit, the firm bears most of the financial and other costs of the litigation, including paying for the legal expenses and (likely) the liabilities of individual defendants. Executives may not fully internalize these costs if, as is

¹⁵ See, for example, H. NEJAT SEYHUN, INVESTMENT INTELLIGENCE FROM INSIDER TRADING 61 (1998) (finding stock prices rising significantly after insider purchases and falling significantly following insider sales); see also H. Nejat Seyhun, The Effectiveness of the Insider Trading Sanctions, 35 J. LAW & ECON. 149 (1992) (showing insiders earn nearly 10% in abnormal returns in the year following trades); Steven Huddart & Mark Lang, Information Distribution Within Firms: Evidence from Stock Option Exercises, 34 J. ACCOUNTING & ECON. 3 (2002).

¹⁶ Firms could impose internal controls to reduce the prevalence of informed trading. For instance, firms could ban trading until after the executive leaves the firm, could require trades to be executed at random times or at the unchangeable discretion of a third party, or could require all trades to be approved by the board or general counsel.

¹⁷ There are other rules too. Section 16(b) of the Securities Exchange Act of 1934, the so-called short-swing profit rule, requires statutory insiders to disgorge any profits earned on paired buy and sell transactions within six months. In addition, Rule 14e-3 prohibits anyone from trading on material, non-public information about a pending tender offer.

commonly believed by academics and investors, these suits are random and largely without merit.¹⁸

Firms also incur non-legal or financial costs when insiders trade in firm shares. For instance, the possibility of insiders trading on better information than other market participants may increase the firm's cost of capital. Specialists making markets in a firm's stock in which insiders might be trading will increase the bid-ask spread to compensate for the risk that they are trading at an informational disadvantage, and this will reduce liquidity and raise the firm's cost of capital.¹⁹

The existence of some insiders trading based on superior information may impose costs even on firms whose insiders are not trading on information. If the legal system (be it government or private plaintiffs) imperfectly identifies diversification trades as informed trades, these trades may impose legal risks on the firm. Insofar as it is possible to design a system, either intrafirm or across firms, by which such trades can be identified as such, this cost can be reduced or even eliminated.²⁰ The flip side is also true: insofar as firms cannot credibly commit not to have insiders trade on non-public information, then all firms, regardless of illegal activities by insiders, will pay stockholders a risk premium for the possibility of such trades. If the board does not bargain over the costs executives impose indirectly as a result of their trading, firms may be systematically overpaying them.

In summary, permitting executives to make diversification trades or informed trades has both costs and benefits for firms. Diversification trades may be costly for the firm because they unwind incentives given by the board, and therefore can weaken attempts to align executive and shareholder interests. In addition, these trades may be misidentified as (illegal) informed trades, either *ex ante* (by traders who demand a risk premium) or *ex post* (by lawyers and courts in litigation). Informed trades expose not only individuals but firms to legal and financial risk. On the benefit side, trading may reduce the overall cost of equity compensation from the perspective of the firm, because it can reduce the opportunity costs of each share granted, and from the executive, because it allows the executive to optimize her wealth portfolio at any given time.

¹⁸ For a summary of the literature and an analysis of the impact of legislation designed to increase the ratio of meritorious to meritless lawsuits, see Marilyn F. Johnson, et al., *Do the Merits Matter More? The Impact of the Private Securities Litigation Reform Act*, 23 *J LAW ECON & ORG* 627 (2007).

¹⁹ See, for example, Dale Morse & Neal Ushman, *The Effect of Information Announcements on the Market Microstructure*, 63 *ACCT REV* 247, 249 (1983) ("[T]he bid/ask spread should be positively related to . . . the likelihood of private information existing . . .").

²⁰ The SEC tried to do this with Rule 10b5-1, but, as discussed below, it failed. Some firms have tried too by making public announcements about restrictions on trading to specific periods, or by requiring authorization by the general counsel or board for any trades.

Given the (large, ambiguous, and locally variant) costs and benefits of allowing insiders to trade, we should observe boards and executives bargaining about if managers can trade, and, if so, when, how much, with whose permission, and other details.²¹ As discussed above, the tradeoffs are complicated, and the answers are unlikely to be the same across firms or across time. We observe in fact some firms banning trading altogether, some restricting it, and some where insiders trade in great quantities.

III. BARGAINING ABOUT TRADING

There are three general choices firms can make about when and how insiders can trade. The first choice is to prohibit insiders from making any trades or permits trades only with specific authorization from either the board of directors or the general counsel. The second choice is to give insiders discretion about when they can trade, but restrict trades during certain times when insiders are likely to possess material, non-public information, that is, where informational asymmetries between insiders and outsiders is likely to be greatest. These restrictions, called “blackout windows,” are typically the 30 (or so) days before a firm’s quarterly earnings announcement. The third choice is to impose few or no restrictions on trading. Almost all firms today fall into the second group.

This heterogeneity in restrictions provides an opportunity to examine the impact firm choice about insider trading freedom has on the compensation bargain firms strike with their executives. If firms are bargaining with executives, and are aware of trading behavior, then we should expect them, all else being equal, to pay more when insiders are less free to trade. After all, the ability to trade shares is worth something to executives, either because insiders can best optimize their portfolio at any given time (optimization trades) or because insiders can earn abnormal returns based on private information (informed trades). Consistent with the optimization value, we should also expect firms to tailor the size of their option and stock grants (and target levels of stock ownership for executives) based on trading freedom. This is because insiders who can locally optimize will value each share given at closer to its inherent value for the firm, and thus the firm will need to give the insider fewer shares to achieve the same incentive results.

As mentioned above, nearly all firms use blackout windows to limit executives to trading in brief periods following the release of firms’ earnings reports to investors. This means insiders can trade only narrow periods of time when they are least likely to know things the market does not know. Theory predicts this imposes large costs on firms, since these restrictions are

²¹ If we observe no bargaining, this would be relatively strong evidence of the managerial-power theory of executive compensation. See, for example, BEBCHUK & FRIED, *PAY WITHOUT PERFORMANCE*, supra note 4. Evidence of bargaining, on the contrary, does not refute the managerial-power theory, but offers a way of testing its strength.

costly for executives.²² In recognition of this fact and in an attempt to reduce these costs, the SEC promulgated Rule 10b5-1, which allows, which allows insiders to reduce firm litigation risk by precommitting to future trades. In effect, these plans are a safe way in which firms and insiders can unwind the limitations imposed by blackout windows. The restrictions in blackout windows and the unwinding of them in Rule 10b5-1 plans allow us to test whether when these changes to trading are implemented boards adjust executive compensation in response. Let us consider each of them in turn.

A. Bargaining about Blackout Windows

In a hypothetical bargain between an executive and the board of directors, the executive has a reservation wage below which she will not work, and the board must (at least) meet this when setting her pay. Boards meet the reservation wage with some combination of cash compensation and equity compensation.²³ Inherent in the calculation on both sides is some expectation about what the executive will do with the shares granted by the firm. If insiders expect to earn a certain amount from trading the shares they are given, either in terms of optimization or informed trades, these profits should be a component of the reservation wage calculation. We can therefore think of an executive's total compensation according to:

$$P = C + T + O$$

where P is total pay, C is cash compensation (comprised of salary and bonus), T is trading profits, and O is other compensation, such as perquisites, health and retirement payments, etc. Further,

$$T = OT + IT,$$

where, OT is profits from optimization trades and IT is profits from informed trades. If P must be set at a level that meets the executive's reservation wage, and the firm and the executive contract about the size of trading profits (OT + IT), then we should expect C and O to vary depending on the level of restrictions. A board imposing blackout windows on executives should expect the level of trading profits, T, to fall, therefore requiring an increase in cash compensation, other compensation, or the number of shares granted (such that the expected gains from each share are the same as before). In short, changes in the opportunities to trade should increase the executive's demand for other forms of compensation.

²² This is Roulstone's finding that firms compensate executives for the costs of imposing blackout windows. See ROULSTONE, INSIDER-TRADING RESTRICTIONS, *supra* note 1.

²³ The typical compensation contract also includes, among other things, perquisites, deferred compensation, health and retirement benefits, and contributions to long-term incentive plans.

It is important to note here that the equation above is an estimate of the value of the total pay to the executive. This means that T will be the executive's private estimate of the expected value of the shares depending on the executive's planned trading strategies. Reported data about executive pay, by contrast, considers the value of the stock and options at their market value, according to an estimate from the Black-Scholes formula. This means that we should expect the level of reported pay to increase as T falls, and vice versa.

Research by Darren Roulstone finds just this: when executives are restricted in their ability to trade, they are given more cash and other forms of compensation.²⁴ This data shows that the parties to the executive's compensation contract price the details about expected executive trading.²⁵ Roulstone exploits the fact that not all firms during his study period imposed blackout windows to test whether firms compensate insiders for the lost trading opportunities. He finds that "firms that restrict insider trading pay a premium in total compensation relative to firms not restricting insider trading, after controlling for economic determinants of pay."²⁶ Specifically, firms restricting insiders' ability to trade pay about 13 percent more in total compensation than firms that permit insiders to trade more freely.²⁷

Roulstone's findings suggests boards and executives bargain about trading behavior, but do not show how complete this bargaining is (that is, do the increased cash payments fully offset the lost trading opportunities) or whether the bargaining is about lost profits expected from optimized trades, informed trades, or both. These are important and yet unanswered questions. The offset issue implicates theories about executive compensation and managerial power over the pay-setting process. If bargaining is more or less complete, then this suggests a rather arm's length relationship between the average board and the average executive. Alternatively, the degree of bargaining may vary with board power vis-à-vis managers, thus allowing us to test measure of governance, such as board composition.

The type-of-trades issue is important for two reasons. First, informed trades are generally illegal, and determining whether boards are compensating insiders for their ability to earn abnormal returns will tell us something about corporate governance and insider trading law. Second, as noted above, the SEC believed that with Rule 10b5-1 it was encouraging optimization trades but not informed trades, and unpacking the two trading strategies using the Rule as an exogenous change to firm behavior allows us

²⁴ See ROULSTONE, INSIDER-TRADING RESTRICTIONS, *supra* note 1.

²⁵ *Id.* at 526.

²⁶ *Id.*

²⁷ *Id.* Roulstone also finds that firms restricting trading "use more incentive-based compensation and their insiders hold larger equity incentives relative to firms that do not restrict insider trading." This is consistent with the theory above about the cost arising from the inability of insiders to optimize their portfolio. Insiders who cannot trade as liberally should receive more shares than those who can rebalance their portfolio, all else being equal. This is what Roulstone finds.

to determine whether this belief was shared by boards. Rule 10b5-1 as practiced will also allow us to estimate the completeness of bargaining and unpack the trading profits, T, into constituent components, OT and IT.

Fortunately, a recent SEC rule allows us to compare the propensity of executives to trade on inside information, and thus make some progress in determining whether boards bargain over informed trading profits as well as optimization profits, and, if so, their success at doing so.

B. Bargaining about 10b5-1 Plans

The other contractual mechanism for adjusting insider-trading propensity is firm-level authorization of so-called “Rule 10b5-1 trading plans.” In 2000, the Securities Exchange Commission promulgated Rule 10b5-1 to give firms a way to permit executives to more readily diversify their firm-specific holdings.²⁸ The Rule gives executives an affirmative defense if they commit to future trades so long as they do not possess material, nonpublic information when they commit to trade, and regardless of whether they do when they execute the trades.

Regulators expected 10b5-1 plans to be used by insiders to execute uninformed, diversification trades, but not informed trades.²⁹ They expected to increase opportunities for optimization trading (OT) but to leave unchanged, and perhaps, decrease the value of informed trading (IT). Regardless of whether this prediction is borne out, the Rule should increase the value of insiders’ shares. There are two reasons for this.

1. Unwinding Blackout Windows

Rule 10b5-1 plans reduce trade-related litigation risk for firms by providing an affirmative defense in cases in which the executive possesses

²⁸ Linda Chatman Thomsen, SEC Director, Division of Enforcement stated recently that “the idea [of Rule 10b5-1] was to give executives opportunities to diversify or become more liquid through the use of plans with prearranged trades without facing the prospect of an insider trading investigation.” See Linda Chatman Thomsen, Speech by SEC Staff: Opening Remarks Before the 15th Annual NASPP Conference, October 10, 2007, available at www.sec.gov/news/speech/2007/spch101007lct.htm.

²⁹ Specifically, the Rule applies if the insider can show that “before becoming aware of the information” the insider: (1) “entered into a binding contract to purchase or sell the security; instructed another person to purchase or sell the security for the [insider’s] account, or adopted a written plan for trading securities”; (2) put in the plan “. . . the amount of securities to be purchased or sold and the price at which and the date on which the securities were to be purchased or sold; . . . a written formula or algorithm . . . for determining the amount of securities to be purchased or sold and the price at which and the date on which the securities were to be purchased or sold; or [did] not permit the [insider] to exercise any subsequent influence over [transactions]”; and (3) did not “alter[] or deviate[] from the contract, instruction, or plan to purchase or sell securities (whether by changing the amount, price, or timing of the purchase or sale), or enter[] into or altered a corresponding or hedging transaction or position with respect to those securities.” 17 CFR § 240.10b5-1(c)(1)(C).

non-public information on the date of the trade but does not “use” it because the trade was planned at a time when the insider did not have the information. This reduction in risk means that the firm need not worry as much about trades made during blackout windows, since the goal of the blackout windows was simply to reduce expected litigation costs from trades executed during that time.³⁰ As long as trades made within blackout windows were planned outside of the restricted period, the firm should be indifferent in terms of legal risk. This means that authorizing executives to use 10b5-1 plans means blackout windows are no longer necessary, and that executives can freely trade on all available trading days.

This means the shares held by insiders in firms that allow 10b5-1 plans should be more value, all else being equal, than the same shares held by insiders in firms that do not allow use of the plans – that is, where trading is still restricted by blackout windows. The freedom to sell at any time is valuable to executives, even if they do not have private information about the value of the shares at that time, since the ability to trade permits the executive to maintain a more optimal portfolio of wealth at any given moment. For instance, an executive might need to increase the percentage of cash in her portfolio in order to pay for consumption or might want to decrease the percentage of firm stock in her portfolio to reduce her overall risk.³¹ These are optimization trades (OT in the above equation).

We should expect the use of the Rule to change executive compensation bargains. Plans allow insiders to unwind blackout windows, and Roulstone’s finding implies this is valuable to insiders. Accordingly, the total pay of insiders at a firm permitting 10b5-1 trading plans should fall after a firm authorizes their use, since insiders will now value the shares they hold more than they did when their trading was more limited.³² In addition, if

³⁰ HJM, STRATEGIC DISCLOSURE, *supra* note 3. For example, a firm may authorize an executive to enter into a 10b5-1 trading plan on January 1 that commits the insider to trade on March 31, even though the firm may otherwise ban trades in the period right before the firm announces its first-quarter earnings on April 1st.

³¹ The ability to borrow against shares may be limited because the pledgee is likely to value the shares at a large discount. This is because the pledgee steps into the shoes of the pledgor, who may be restricted in the type or amount of sales that can be made, and because default on the loan may be highly correlated with a drop in the value of the stock. In addition, if the pledgee needs to force the sale of large numbers of shares in a fire sale, this may cause the value of the collateral to drop. Finally, pledgees are likely to discount shares or options because of the concern about information asymmetries between the pledgor, who is an insider, and the pledgee. It is likely for these reasons that many firms ban insiders from using shares as collateral. For a recent media account of these issues, see Reed Abelson, “Insiders’ Share Sales on Margin on the Rise,” NY TIMES, Oct. 19, 2008, available at <http://www.nytimes.com/2008/10/20/business/20pay.html>.

³² We should expect executives in firms that do not authorize 10b5-1 plans to be paid more than executives in firms that do, since the in-plan insiders can be expected to earn greater profits from trading their shares. In the nomenclature above, T is greater for executives that are authorized to use Rule 10b5-1 than for executives who cannot use rule. Accordingly, holding an executive’s reservation wage constant, executives with greater T should see a commensurate reduction in the value of S and/or B.

we examine the pay at comparable firms, pay should be lower in the firm using 10b5-1 plans than in the firm not using the plans, all else being equal.³³ This would basically be a retest of Roulstone's finding that the imposition of blackout windows is correlated with an increase in other pay. If firms unwind blackout windows by permitting the use of an SEC rule, does the increase in pay Roulstone found go away?

If pay is not different either over the pre-Rule/post-Rule period, or across 10b5-1/non-10b5-1 firms, then we can conclude that either the Rule is not effective at liberalizing trading opportunities, or, perhaps, contra-Roulstone, that managers are able to dominate the pay-setting process so that gains in one form of compensation are not offset by reductions in other forms of compensation. There is a literature suggesting that wages are often sticky, rising when markets change in a positive direction, from the perspective of the employee, but not falling in similar amounts when markets change in a negative direction.³⁴ The potential one-way ratchet of pay, coupled with potential manager dominance of the pay-setting process, might explain persistent wages in the face of increased trading flexibility for insiders.

2. Lowering the Cost of Informed Trading

Rule 10b5-1 not only allows executives to increase the times when they can trade, but it may offer them a way to earn profits from informed trades. If the Rule is imperfect, either because of a loophole or because of an error in application by courts or plaintiffs lawyers, it may shield informed trades from scrutiny. For instance, if it is more difficult for the government or private plaintiffs to prove the elements of an insider trading case when a plan is used, say because the inference of trading based on information is more difficult if the timing of the trading decision is further removed from the time of trading, then the Rule may insulate informed trades somewhat. If legal risk is (accidentally) reduced for informed trades, the Rule can be valuable to executives who will be able to sell when in possession of private information that the future value of the shares will be lower. This is informed trading (IT in the above equation).

Alan Jagolinzer shows the Rule also allows executives to earn considerable abnormal returns from informed trades.³⁵ Jagolinzer finds that insiders using 10b5-1 plans earn significant abnormal returns compared with insiders not using the plans. As above, this offers an opportunity to retest the Roulstone's finding that boards compensate insiders for reductions in trading freedom. The additional benefit from the Jagolinzer data is that it is

³³ For example, the econometric analysis reported below tries to account for other determinants of pay by controlling for industry, firm size, economic performance, and other variables.

³⁴ See *infra* note __ and accompanying text.

³⁵ See HJM, STRATEGIC DISCLOSURE, *supra* note 3.

about informed trades (IT), rather than optimization trades (OT). This means that we may be able to unpack the Roulstone finding of about 13 percent for T, the sum of OT and IT, since we now have some traction on the existence of informed trades.

The problem is, however, that we need a mechanism to sort between firms where informed trades are more likely. This is because the Roulstone finding says nothing about informed trades. It could be, for instance, that the imposition of blackout windows is costly for executives primarily because of the reduction in optimization trades, primarily because of the reduction in informed trades, or some combination of both – the data does not say. If there is a way to separate firms into those where informed trades are more likely under Rule 10b5-1 plans, however, this should allow us to compare the impact that the adoption of the Rule at the firm level has on pay. In short, firms where informed trading is much less likely under Rule 10b5-1 plans would likely pay executives solely for the freedom to engage in optimization trades, whereas firms where informed trading is much more likely under these plans would likely pay executives for both the opportunity to engage in optimization trades and informed trades.

New research provides precisely this separating equilibrium that allows us to sort firms into optimization-trading-only firms and optimization-and-informed-trading firms. Todd Henderson, Alan Jagolinzer, and Karl Muller (HJM) find that abnormal returns of insiders using Rule 10b5-1 trading plans are increasing in the specificity of disclosure of the plans.³⁶ On average, insiders at firms that disclose the use of 10b5-1 plans by insiders earn significant abnormal returns (IT), while insiders at firms that do not disclose the use of 10b5-1 plans exhibit trading patterns consistent with only optimization trades (OT).

Firms permitting the use of Rule 10b5-1 plans but not disclosing their use (the “non-disclosure group”) seem to use the Rule in the way the SEC intended, while executives at firms making some disclosure of the use of 10b5-1 plans (the “disclosure group”) seem to use the Rule to do some combination of optimization trades and informed trades. Firms that make disclosures about trading plans do so because the specificity of public disclosure creates a stronger litigation prophylactic, which is increasingly necessary as the probability of informed trading increases.³⁷

³⁶ Id.

³⁷ As HJM surmise, this disclosure choice is based on a tradeoff between the benefits and costs of disclosure. Disclosure (and the more the better) increases the value of the litigation deterrence, since only publicly disclosed plans can deter suits from being filed, and only publicly disclosed plans can be admitted (as public documents) at the motion to dismiss stage before discovery costs increase. On the other hand, detailed disclosure increases the commitment value to trade in a particular way, since observers can determine ex post whether insiders have followed through on their plan. In addition, it may allow market participants to front run the insider’s planned trades and take any profits for themselves. From this model, we can determine that insiders with a high risk of suit and no plans to change their planned trades – those who are certain of a large negative price drop, for instance – are likely to make detailed disclosures, while those with a lower, but nonzero, risk

If we compare the change in pay of firms within each disclosure group (non-disclosure versus disclosure) over the period before and after adoption of a trading plan, a theory of (at least somewhat) informed board bargaining would predict the pay of firms in the disclosure group would fall by more than the pay of firms in the nondisclosure group, since the executives in firms disclosing the use of 10b5-1 plans can be expected to earn larger profits from trading. To see this, consider two firms, Firm A and Firm B. At t_1 Firm A and Firm B both restrict insider trading using blackout windows. Firm A pays its CEO a total wage of WA_1 and Firm B pays its CEO a wage WB_1 . At t_2 Firm A and Firm B both authorize their CEOs to use 10b5-1 plans. Accordingly, at t_3 we expect the total reported compensation of the CEOs to change to reflect the increased trading profits possible with use of the plans. Now imagine Firm A discloses the existence of its CEO's plan, while Firm B does not. From this disclosure choice, we can conclude that the CEO of Firm A is expected to earn greater profits from trading shares than the CEO of Firm B. (This is the finding of Jagolinzer and HJM.) Accordingly the change in reported compensation for the CEO of Firm A ($WA_3 - WA_1$) should be different than the change in compensation for the CEO of Firm B ($WB_3 - WB_1$), controlling for the other determinants of compensation, such as economic performance of Firm A and Firm B. Specifically, the reported pay of the CEO of Firm A should rise less (fall more) than the CEO of Firm B over the period t_1 to t_3 , since the CEO of Firm A can earn more in expectation from sales of stock during that time period.

3. The Completeness of Bargaining

Rule 10b5-1 thus presents a nice opportunity to revisit the optimal contracting versus managerial power debate. If we can estimate the abnormal returns executives in the disclosure partition earn from informed trading, we can then compare this with the offset these insiders receive to their total pay to determine whether the bargaining fully accounts for the expected profits, only partially does so, or whether managers are able to earn additional profits without significant changes to their wages.

If the offset is incomplete, it may be because of manager dominance of the pay setting process, as claimed by proponents of the managerial power hypothesis, or because of informational deficiencies of the board, or because of the stickiness of wages, or for some other reason or combination of these reasons. The theory provides numerous equally plausible alternatives. On the other hand, if the offset is more or less complete, it would suggest a fairly well informed board about the impact of the Rule and the expected trades of insiders, as well as actual bargaining about how to meet an executive's reservation wage.

of suit and valuing the option of being able to change their plans – those with uncertainty about future price drops – are likely to make less specific disclosures. See *id.*

IV. DATA

In order to unpack the components of insider trading profits to test whether boards take the profits from informed trades into consideration when setting pay, we exploit prior research on the use of 10b5-1 trading plans. We start with the dataset of HJM for firms using 10b5-1 trading plans from 2000 to 2006. This dataset includes 2934 firms using plans over this time period. Estimation samples are constrained by the availability of price and returns data from CRSP, insider transaction data from Thomson Financial, institutional ownership data from CDA/Spectrum, governance data from Equilar, and earnings performance data from Compustat. In addition, firms were excluded when there were not five years of financial data and if there were not data for both the year before and the year after a 10b5-1 plan was used for the first time. This yields a total of 638 firm observations, including firms making explicit disclosures of 10b5-1 usage and firms for which their use is implied, as per the methodology of HJM.³⁸ This difference is crucial for the analysis, because as HJM show, insiders making explicit disclosures earn significantly greater abnormal returns than insiders not making disclosures of 10b5-1 usage. This difference provides the mechanism for testing bargaining about potential informed trading profits.

Disclosure and nondisclosure firms are statistically similar in size and performance (Table 1). The median disclosure firm has slightly greater growth prospect and greater market value, but earns slightly less in operating income and is somewhat smaller in asset size. The mean values for these two groups of firms are not statistically different along these dimensions.

³⁸ See *id.*

Table 1: Comparing Economics Performance of Disclosure and Nondisclosure Firms

Economic performance	Disclosure	Nondisclosure	T-test (p value)†
Market value (\$, millions)			
Average	8,286	8,489	0.75
Median	1,921	1,489	
Operating income			
Average	805	816	0.22
Median	198	205	
EPS			
Average	1.33	1.27	0.02**
Median	1.29	1.23	
Book/market			
Average	0.38	0.59	0.67
Median	0.34	0.47	
Net income			
Average	318	288	0.01***
Median	75	65	
Revenues			
Average	5,052	5,495	0.38
Median	1,112	1,546	
Assets			
Average	4,973	5,431	0.27
Median	993	1,508	

† Two-tailed, paired t-test

* Statistically significant at the 10% level

** Statistically significant at the 5% level

*** Statistically significant at the 1% level

Table 2 shows CEO compensation is also comparable across disclosure and nondisclosure firms. There is no statistically significant difference in the average total compensation of disclosure and nondisclosure firms or in the mix of pay across the two groups. Based on the data in these two tables, we can be confident that the disclosure and nondisclosure group are relatively similar in terms of firm size, industry, profitability, managerial talent, and so forth. This allows us to examine changes in compensation across various time periods and be confident that the changes are not driven by the fact that the firms in question are radically different.

Table 2: Comparing Compensation of Disclosure and Nondisclosure Firms

Compensation	Disclosure	Nondisclosure	T-test (p value)†
Total compensation (\$, 000)			
Average	6,223	5,028	0.74
Median	3,554	3,086	
Salary			
Average	671	714	0.01***
Median	610	672	
Bonus			
Average	686	728	0.01***
Median	378	392	
Options granted			
Average	3,081	2,378	0.11
Median	1,159	904	
Pay mix (perf./total)			
Average	0.68	0.66	0.73
Median	0.77	0.73	
Insider ownership (pct.)			
Average	0.026	0.028	0.08*
Median	0.003	0.003	
Shares outstanding			
Average	273	211	0.25
Median	74	63	

† Two-tailed, paired t-test

* Statistically significant at the 10% level

** Statistically significant at the 5% level

*** Statistically significant at the 1% level

Another cut of the data is to look at the pay of firms using 10b5-1 plans and firms not using them. This will allow us to test whether the liberalization of trading policies with the Rule creates significant changes in executive pay. In order to compare the pay at firms using the Rule and those not using the Rule, a matched set of non-plan firms was created. Each of the firms using 10b5-1 plans was matched with a firm in the same industry (four-digit SIC code) and of similar size, based on assets and revenues.³⁹ This matched set of non-plan firms was then limited to the years of inquiry for the plan firms. For example, if Firm A, which had an insider first trade using a 10b5-1 plan in 2002, is matched with Firm B, which never had an insider trade under a plan, then the matched dataset includes the years 2001 through 2003 for Firm B.

The matched set of firms is comparable to the in-plan firms. The average total compensation is \$5.2 million, the average value of options given is \$2.9 million, and the average salaries, bonuses, and other metrics are all

³⁹ Similar here means within 20 percent of the particular firm at issue.

similar to those of the in-plan firms.⁴⁰ Economically, the firms are also similar. The average market value (\$7.9 billion), revenues (\$5.5 billion), operating income (820 million), and net income (190 million) are all comparable to the in-plan firms. These mean comparisons of plan and non-plan firms are not statistically significant, meaning we can be confident the groups are similar along these dimensions.⁴¹

V. EMPIRICAL ANALYSES

A. Difference-in-Difference

We compare the pay of executives disclosing their use of Rule 10b5-1 trading plans with the pay of executives not disclosing their use of Rule 10b5-1 trading plans.⁴² Specifically, we are interested in how the pay of executives changes when the firm they work for authorizes them to trade using Rule 10b5-1. We can do this by comparing the change in pay from the year before the first use of a plan with the pay in the year after the first use of a plan (that is, $\text{Pay}_{t-1} - \text{Pay}_{t+1}$, where t is the year in which the executive first used Rule 10b5-1 to make trades).

We expect the change in pay for disclosure firms to be different than the change in pay for nondisclosure firms, since as HJM show, the executives at firms making disclosures about 10b5-1 plans can be expected to earn greater profits from trading than executives at firms not making disclosures. Specifically, HJM group firms into three categories, with increasing levels of disclosure specificity: nondisclosure (or implied disclosure), limited disclosure, and specific disclosure. They find the nondisclosure group earns no abnormal returns in the six months following insider trades under 10b5-1 plans. That is, the stock price change of the more than 1000 firms making no disclosure of 10b5-1 plans is as likely to be positive as it is to be negative – it is akin to a coin flip. In contrast, the stock price for firms making limited disclosure is significantly negative following insider 10b5-1 sales, allowing insiders to earn abnormal returns of about 12 percent per year on average. The smaller group of specific disclosure firms experiences even greater stock price drops following insider sales, giving these insiders abnormal returns of nearly 25 percent. The takeaway is that disclosure choice is a good predictor of expected abnormal returns for insiders. This is because insiders at firms that disclose the use of plans have greater opportunities to trade based on inside information. Disclosure choice flows from the greater potential for insider trading returns, and therefore should be associated with larger changes in pay as trading opportunities expand and contract, either by law or by contract.

⁴⁰ A comparison of median values, not reported here, shows the same result.

⁴¹ These results are in unreported t-tests.

⁴² The data include only CEOs are the same person in the two periods examined in the study.

As shown on Table 3, the average and median change in total pay is less for disclosure firms (a combination of the limited and specific groups from HJM) than nondisclosure firms.⁴³ Total pay rises 27 percent year to year for nondisclosure firms, while only 18 percent for disclosure firms. The difference in compensation is explainable primarily by changes in the value of options granted. While the cash compensation is comparable across the disclosure partition, executives at the median nondisclosure firm saw the value of the stock options granted increase by 18 percentage points from the pre-plan to post-plan year, while executives at the median disclosure firm saw the value of the stock options granted decrease by 15 percentage points. This larger increase in total pay for nondisclosure firms is initially consistent with the prediction that firms will take the expected profits from insider trading, including informed trades into consideration when setting pay. If the disclosure firm executives are expected to earn greater trading profits than the nondisclosure firm executives, then we would expect them to need less explicit pay to meet their reservation wage.

Table 3: Change in Compensation Across Disclosure Partitions (Pre-plan year to Post-plan year)

Compensation	Disclosure	Nondisclosure	Disclosure relative to nondisclosure	T-test (p value)
Total pay				
Average	-2%	6%	-	0.03**
Median	18%	27%	-	
Mix (Perf./Total)				
Average	-1%	1%	-	0.48
Median	1%	4%	-	
Salary				
Average	9%	9%	=	0.53
Median	8%	12%	-	
Options value				
Average	-29%	-7%	-	0.41
Median	-15%	18%	-	

† Two-tailed, paired t-test

* Statistically significant at the 10% level

** Statistically significant at the 5% level

*** Statistically significant at the 1% level

This difference could be explained, however, by factors unrelated to the fact that during the intervening year the firm authorized executives to use Rule 10b5-1 trading plans and the chief executive officer of the company

⁴³ For the present study, the limited and specific disclosure group are combined into a single disclosure group, and these firms are compared with firms in the nondisclosure group of HJM.

first used a trading plan to make a trade. For instance, although disclosure and nondisclosure firms are similar in market value, asset size, and economic performance, disclosure firms appear to have greater growth prospects as shown by comparing book-to-market values across the disclosure and nondisclosure firms. In addition, it is possible that small variations in economic performance could explain differences in pay across the disclosure partition. For instance, Table 1 shows that nondisclosure firms earn a bit more in operating income,⁴⁴ and this might explain differences in pay.

A first way of testing the potential confounding effects of economic performance is to examine the average and median changes in performance across the disclosure partition. If changes in firm economic performance are the reason why disclosure firms saw smaller pay increases relative to nondisclosure firms, then we should expect to see the change in economic performance for disclosure firms to be worse than for nondisclosure firms.

The opposite is true. As shown on Table 4, the average and median disclosure firm performs as well as or outperforms the average and median nondisclosure firm across all economic performance metrics. In fact, disclosure firms experienced larger increases in market value, operating income, EPS, and net income than nondisclosure firms. The most significant of these are the change in market value, which is the best predictor of changes in total executive pay,⁴⁵ earnings-per-share, and net income, all of which are statistically significant.

This difference-in-difference data is inconsistent with a performance-only explanation for the change in pay from pre to post year across the disclosure partition. This data is consistent with the hypothesis described above: executives at disclosure firms are expected to earn greater trading profits in the year(s) following the deployment of a Rule 10b5-1 plan, and therefore should see reductions in their explicit compensation, conditional on economic performance.

⁴⁴ Nondisclosure firms earned about \$816 million in operating income on average, compared with \$805 million for disclosure firms. The results are, however, not statistically significant.

⁴⁵ Unreported univariate regressions show that the change in market value is statistically significant, and is consistently the best predictor of changes in executive pay across all several thousand firms in the HJM database.

Table 4: Change in Economic Performance Across Disclosure Partitions (Pre-plan year to Post-plan year)

Economic performance

	Disclosure	Nondisclosure	Disclosure relative to nondisclosure	T-test (p value)
Market value				
Average	14%	1%	+	0.05**
Median	47%	21%	+	
Operating income				
Average	25%	14%	+	0.6
Median	49%	11%	+	
EPS				
Average	66%	7%	+	0.03**
Median	47%	4%	+	
Book/market				
Average	-9%	-1%	+	0.96
Median	-7%	-2%	+	
Net income				
Average	252%	46%	+	0.08*
Median	91%	29%	+	
Revenues				
Average	21%	12%	+	0.67
Median	23%	24%	=	

† Two-tailed, paired t-test

* Statistically significant at the 10% level

** Statistically significant at the 5% level

*** Statistically significant at the 1% level

B. Regression

We can further test the difference-in-difference results by estimating a linear regression for determinates of the change in pay from the pre-plan year to the post-plan year for each firm.

$$\Delta \text{Total}_{(t+1)-(t-1)} = \alpha_0 + \alpha_1 \text{Disclosure} + \alpha_2 \Delta \text{MarketValue}_{(t+1)-(t-1)} + \alpha_3 \Delta \text{Assets}_{(t+1)-(t-1)} + \alpha_4 \Delta \text{NetIncome}_{(t+1)-(t-1)} + \alpha_5 \Delta \text{BM}_{(t+1)-(t-1)} + \alpha_7 \Delta \text{InsiderOwn}_{(t-1)} + \varepsilon$$

where: “disclosure” is dummy variable, set to 1 if the firm made an explicit disclosure of 10b5-1 use (disclosure group) and 0 if the firm’s use of 10b5-1 was implied (nondisclosure group),⁴⁶ and where the other variables are

⁴⁶ The methodology and dataset of disclosure firms is taken from HJM, see HJM, STRATEGIC DISCLOSURE, *supra* note 3.

financial and accounting determinants of pay.⁴⁷ Industry and year fixed effects are included in the regression.

The results of the ordinary-least-squares linear regression support the proposition that disclosure is negatively correlated with the change in pay (Table 5). The financial determinants of pay are consistent with the: the change in pay for firms is positively correlated with changes in market value and asset value (98% confidence interval), and negatively correlated with changes in book-to-market value (95% confidence interval). Firms that grow and are worth more can be expected to compensate executives accordingly, and firms with greater growth prospects can as well.

Disclosure of Rule 10b5-1 trading plans is also a statistically significant determinate of the change in pay (95% confidence interval). This is consistent with the implicit-compensation hypothesis. The coefficient on the disclosure dummy variable is negative, meaning the use and disclosure of a Rule 10b5-1 trading plan is associated with negative changes in the amount of pay for CEOs. Since disclosure choice is associated with greater expected insider trading profits (especially from informed trades), this means the data suggest changes in pay are negatively correlated with expected insider trading profits. Firms where insiders are likely to earn significant abnormal returns from informed trading (in addition to those from optimization trades) see smaller increases in pay than firms where insiders are likely to engage only in optimization trades. This is consistent with the findings from the difference-in-difference analysis reported above, and suggests that boards are bargaining with executives about their ability to earn greater trading profits through less risky informed trading as a result of the litigation prophylactic from disclosure of 10b5-1 plans.

⁴⁷ The analysis follows the methodology from the original work on this subject by Darren Roulstone, see Roulstone, *Insider-Trading Restrictions*, supra note 1 (Table 5). In this equation, $\Delta\text{MarketValue}_{(t+1)-(t-1)}$ is the change in market value of the firm from the pre to post 10b5-1 year; $\Delta\text{Assets}_{(t+1)-(t-1)}$ is the change in assets of the firm from the pre- to post period; $\Delta\text{NetIncome}_{(t+1)-(t-1)}$ is the change in net income of the firm from the pre to post period; $5\Delta\text{BM}_{(t+1)-(t-1)}$ is the change in the ratio of assets to the sum of the market value of equity and the book value of liabilities from the pre to post year; and $7\Delta\text{InsiderOwn}_{(t+1)-(t-1)}$ is the change in the percentage of stock owned by the insider from pre to post year.

Table 5: Results of OLS Regression

Linear Regression						
Regression Statistics						
<i>R</i>	0.37					
<i>R Square</i>	0.14					
<i>Adjusted R Square</i>	0.12					
<i>Standard Error</i>	6293.09					
<i>Total Number Of Cases</i>	638					
	<i>Coefficients</i>	<i>Standard Error</i>	<i>LCL</i>	<i>UCL</i>	<i>t Stat</i>	<i>p-level</i>
Intercept	1347.6	1194.9	-1439.4	4134.7	1.13	0.26
Market value	0.2	0.0	0.1	0.2	6.70	0.00
Disclosure	-1219.8	601.0	-2621.6	182.0	-2.03	0.04
Assets	0.5	0.1	0.2	0.7	4.61	0.00
Net income	0.0	0.1	-0.2	0.1	-0.51	0.62
Book to market	-1166.5	597.0	-2558.9	225.9	-1.95	0.05
Percent insider ownership	-11943.9	8702.8	-32241.7	8353.8	-1.37	0.17
<i>T (2%)</i>	2.3					
<i>LCL - Lower value of a reliable interval (LCL)</i>						
<i>UCL - Upper value of a reliable interval (UCL)</i>						

We can get a rough idea of the size of the tradeoff between explicit and implicit compensation by looking at the magnitude of the coefficient on the disclosure dummy variable, since this reflects the best estimate of the influence of that variable on CEO pay. The coefficient for disclosure (-1,220) suggests firms making disclosure of Rule 10b5-1 plans (and thus aware that insiders have the potential to earn significant abnormal returns), pay the chief executive officer more than a million dollars less in the year following disclosure than in the year before disclosure.⁴⁸ For the average (disclosure) firm in the sample, this amounts to about a 20 percent reduction in total compensation in the year following disclosure of a 10b5-1 plan relative to the year prior to its first use.

We will see below this offset in compensation is roughly comparable with the actual average trading profits earned by CEOs of disclosure firms from other research.⁴⁹ It seems that firms take expected trading profits, which are obviously influenced by the law and the contracts firms write in the shadow of the law, into account when setting CEO pay.

⁴⁸ Compensation data in the sample are reported in thousands of dollars and the variable for this coefficient is a dummy (either 0 or 1), so a coefficient of 1,220 translates to about \$1.2 million.

⁴⁹ See Section IV.B.

C. Plan versus non-plan firms

The results of a comparison between the pay of executives at firms using 10b5-1 plans and those at firms not using these plans supports, albeit not as powerfully, the conclusion that boards are bargaining about expected trading profits. The median change in pay for matched, non-plan firms over the relevant time periods was 19 percent (-2 percent average) compared with 23 percent (3 percent average) for plan firms. At first glance, this seems inconsistent with the result of Roulstone and the evidence presented above from comparing the pay across the disclosure partition – we expect insiders with increased trading opportunities (plan insiders) to be compensated less on a relative basis than insiders who remain restricted by blackout windows (non-plan insiders). But, as above, the baseline of pay from which changes based on the liberalness of the trading regime will be made is determined by economic factors, such as changes in market value.

If we compare the economic performance of plan and non-plan firms, we find that plan firms significantly outperform non-plan firms. The median change in market value over the pre-plan to post-plan period for plan firms is 35 percent (6 percent average), compared with 16 percent (-8 percent average) for non-plan firms. As noted above, change in market value is the best predictor of the change in pay delivered in a given year, and firms using 10b5-1 plans saw their market value increase more than twice as much as non-plan firms. And, yet, the change in pay for firms using plans and those not using plans was comparable. This suggests, albeit somewhat more weakly than Roulstone's finding and the one above, boards take plan profits into consideration when setting pay. If they did not, we would have expected to see the firms using plans to increase pay more than they did.

A simple linear regression of the determinants of the change in pay, including the change in market value, change in assets, change in income, change in revenues, and whether the firm authorized the use of 10b5-1 plans yields inconclusive results. The 10b5-1 plan variable (a dummy variable set to 1 for firms using plans and 0 for firms where insiders do not use plans) is not statistically significant, whereas market value and other economic determinants are at various confidence levels. This suggests the effect of plan choice is weak, the other determinants are much stronger, or that the matched set of firms is misspecified or not the best comparable set of firms.

D. Robustness check

In order to test the robustness of the main finding – firms where expected trading profits are greater see significantly different and negative changes in pay relative to firms where expected trading profits are less – the pay of these two groups of firms are compared in periods before the adoption of Rule 10b5-1 trading plans. If the adoption and disclosure of a Rule 10b5-1 plan is a significant event and causes an observable difference in the change in pay between the two groups, the change in pay in periods

before the adoption of such trading plans should not be statistically different between the two groups. Instead, the change in pay should be driven by economic factors, such as change in market value or firm income.

To conduct this test, we compare data for pay and performance for the disclosure and non-disclosure groups in the three-year period immediately prior to the first adoption of a Rule 10b5-1 plan. So if Firm X first had an executive use a 10b5-1 plan for the first time in 2001, the relevant years for the analysis above were 2000 (the year before) and 2002 (the year after). For this robustness check, we compare pay in 1997 and 1999, which gives us a similar time period and a time period not influenced by the existence of a 10b5-1 trading plan. This time period selection methodology is used for both the firms in the disclosure and nondisclosure groups.

From the original dataset of 638 firms, we eliminated firms that did not have compensation or performance data during the three-year period before the first use of a Rule 10b5-1 plan. The dataset for the robustness check therefore consists of 545 firms; 345 firms in the nondisclosure group and 205 firms in the disclosure group.

The difference-in-difference results show compensation to be correlated with economic performance in ways consistent with the results presented above. The CEO of the median firm in the nondisclosure group saw pay rise by about 20 percent over the three-year period before the use of a 10b5-1 plan, while the CEO of the median firm in the disclosure group saw pay rise by about 40 percent. Already we can see a difference between the pre-10b5-1 period and the 10b5-1 period, where the pay of firms in the disclosure group increased less than those in the nondisclosure group. And, unlike the case above, performance seems to explain this difference. The performance of firms in the disclosure group outperform those in the nondisclosure group: market value increased by 6 percent for the firms in the nondisclosure group and 15 percent for firms in the disclosure group; net income increased about 20 percent for the firms in the nondisclosure group and nearly 27 percent for firms in the disclosure group. In short, pay and performance seem roughly correlated, unlike in the 10b5-1 period.

In both periods (the 10b5-1 period and the pre-10b5-1 period) the firms in the disclosure group saw market value grow by more than double those firms in the nondisclosure group.⁵⁰ But compensation changes differed across the two test periods. In the pre-10b5-1 period, CEOs of disclosure firms, which outperformed nondisclosure firms, saw their pay increase more than nondisclosure firms, while in the 10b5-1 period, CEOs of disclosure firms, which outperformed nondisclosure firms, saw their pay increase less than nondisclosure firms. This is consistent with the result that trading plans generate implicit compensation in the 10b5-1 period but not in the pre-10b5-1 period. If the result in the 10b5-1 period were explainable by

⁵⁰ In the pre-10b5-1 period, the median disclosure firm grew 2.6 times faster than the median nondisclosure firm; in the 10b5-1 period, the median disclosure firm grew 2.2 times faster than the median nondisclosure firm.

unobservable differences across the two groups that were not related to the 10b5-1 trading plans, we would expect similar differences in the correlation between performance and pay over the two periods.

An unreported regression analysis of the determinants of pay (following the same methodology as for the 10b5-1 period reported above) confirms this result. Consistent with the findings above, economic performance metrics, such as change in market value, change in asset size, and change in net income, are positively correlated with changes in pay, and all are statistically significant at the one percent level.⁵¹ But, the disclosure dummy variable is not statistically significant in the pre-10b5-1 period, as it is in the 10b5-1 period. This means while the firms in the disclosure group experience significant differences in pay compared with the nondisclosure group in the period in which these firms are using 10b5-1 trading plans, the two groups of firms are the same in terms of the correlation between performance and pay when they are not using these trading plans. In other words, economic performance predicts pay before firms adopt 10b5-1 plans, but does not when they use these plans, because insiders using them are earning implicit compensation from trading. This supports the conclusion above that firms in the disclosure group take the expected profits from the use of 10b5-1 plans into account when setting CEO pay.

VI. DISCUSSION

The data presented above supports the hypothesis that boards bargain with executives about profits earned from trading in firm shares. This is consistent with the earlier findings of Roulstone, who presented data showing restricting insider trading was associated with an increase in the pay for insiders. The empirical analyses presented in this Paper show liberalizing opportunities for insider trading is associated with a decrease in pay for insiders, relative to what it would have been otherwise.

In addition, the results presented herein show the change in pay based on the unwinding of trading restrictions is correlated with the profits insiders are expected to make from informed trades. Insiders at firms where prior work shows informed trading is more likely and where, in expectation, insiders are likely to earn abnormal returns from this trading, we see statistically significant differences in pay compared with insiders at firms where prior work shows informed trading is much less likely. In other words, there is evidence firms and executives bargain about insider trading profits,

⁵¹ The coefficient for “market value” is positive (0.16) and is statistically significant at the 1 percent level (p value = <0.01); the coefficient for “assets” is positive (0.36) and is statistically significant at the 1 percent level (p value = <0.01); and the coefficient for the “disclosure” dummy is not statistically significant (0.61). The other coefficients are not statistically significant. This means the typical determinants of pay (that is, market value and asset size) are significant determinants of pay across the two groups of firms in the pre-10b5-1 period, but there is no correlation between the fact of being in the groups and changes in pay over the period in question.

both from optimization trades and informed trades, and that these profits are considered in meeting an executive's reservation wage.

The data suggest several interesting lines of inquiry. First, is the bargaining about insider trading profits complete or do managers nevertheless exploit trading opportunities to extract more wealth from shareholders? This question speaks to the literature on managerial power versus optimal contracting in the setting of executive pay, as well as the literature on the stickiness of wages. Second, what is the legality of this implicit compensation as a matter of federal securities law? And, finally, what are the implications for board governance and decisionmaking?

A. The Completeness of Bargaining

The existence of implicit compensation appears to offer a powerful counterargument to the claim by some scholars that, on average, boards and executives do not bargain at arm's length about pay. The ability of CEOs to earn undisclosed profits from insider trading is a central component of Lucian Bebchuk and Jesse Fried's managerial power theory of executive compensation.⁵² Bebchuk and Fried observe that executives earn money by selling shares, and then claim executives "camouflage [insider trading] transactions" from the board and shareholders in order to earn compensation beyond what they deserve.⁵³ They argue:

These [insider-trading] profits . . . provide extra value to executives that does not show up in any of the firm's accounting information or compensation figures disclosed to shareholders. . . . Thus, the cost of these hidden insider trading profits to shareholders is likely to go unnoticed.⁵⁴

According to the managerial power theory, the board does not know about insider-trading profits, and therefore cannot take them into consideration in setting the executive's wage.⁵⁵ The result is the board may systematically overpay executives. Bebchuk and Fried claim the existence of insider-trading profits is "difficult to explain from an optimal contracting perspective, [but] is easily explained under the managerial power approach."⁵⁶

For the existence of trading profits to support the managerial-power hypothesis, their claim must be that the board does not take even the possibility of insider-trading profits into account when setting executive pay.

⁵² See Lucian A. Bebchuk et al., *Managerial Power and Rent Extraction in the Design of Executive Compensation*, 69 U CHI L REV 751, 831 (2002).

⁵³ *Id.*

⁵⁴ *Id.*

⁵⁵ This may be true even if the board knows that insiders earn illegal profits on average, since it may not know the profits made by particular executives, and therefore may set the wage too high.

⁵⁶ *Id.*

If the board does take the profits into account,⁵⁷ the existence of insider-trading profits does not implicate the validity of the pay-setting process, since the board would in fact be bargaining with the executive, at some degree of arm's length. The insider-trading profits may raise issues about the firm's compliance with accounting and disclosure requirements of state corporate law and federal securities laws, but they do not, without more, say anything about whether the board did a good job for shareholders in bargaining over executive pay. If it is true, however, that the board does not consent and is not aware of these profits, it may support a claim about a manager dominated pay-setting process, since executives will be systematically overpaid.⁵⁸

The data presented above is some evidence boards are aware of insiders' trading proclivities and ability to earn abnormal returns, and bargain (albeit perhaps imperfectly) about these gains. This bargaining is, however, not generally disclosed and may in fact be surreptitious given the potential negative implications of the underlying conduct. Although it may be rational for the board to engage in this bargaining, disclosing it may be irrational, as it would expose the executive and the firm to costs they do not otherwise have to bear. This obviously raises issues about the completeness of firm disclosures about pay and the efficacy of existing pay disclosure rules.

The managerial power theory may have some traction if bargaining is not complete or even nearly so. But we can, based on this data, reject the strong form of the managerial power thesis. For the strong form to be true, there would have to be no difference in pay across disclosure partitions. If there were no difference, we could conclude boards did not rationally reduce pay based on the ability to earn abnormal returns.⁵⁹ The evidence presented above suggests the boards did know and did offset executive pay to account for some of these profits. So the strong form of the managerial power thesis seems less plausible.

A weaker version of the managerial-power theory, however, might argue bargaining exists but is incomplete, perhaps woefully so. Say an insider is able to earn implicit compensation of \$100 from Rule 10b5-1 trades, but sees total explicit pay reduced by only \$10. This might suggest some managerial power over the pay setting process, although there are other competing explanations. Economists generally view wages as sticky, although there are not great theoretical explanations for why this is the case.⁶⁰ We are all familiar with this phenomenon – lawyers, for instance, say

⁵⁷ This may be based on particular facts or just applying a general average.

⁵⁸ This argument is consistent with the view that information about a firm is the property of the firm, and that insiders should not be able to appropriate it for their use without the consent of the board.

⁵⁹ and therefore did not either know about the way the Rule could be abused (as the SEC appears not to have known) or were powerless to prevent insiders from paying themselves even more.

⁶⁰ For a useful summary of the debate, see TRUMAN F. BEWLEY, *WHY WAGES DON'T FALL DURING A RECESSION* (1999) (concluding based on interviews with over 300 business and

starting salaries at big law firms rise dramatically during the dot.com boom, but they did not fall proportionately when the bubble burst. If bargaining about insider-trading profits is incomplete, it may simply be because of a similar phenomenon. There is some evidence for this in the data. The salary of executives across the disclosure partition does not change much from pre to post year, but the number and value of options does. Salaries may be sticky. Option value, on the other hand, may not really be changing other than to say that the Black-Scholes value does not capture the true value to the executive. Or, it may be the case that the firm believes the trading profits are less valuable in expectation than \$100 from the firm's perspective. This may be because of executive-specific risk from trading, from the value of certain cash versus speculative profits, or other reasons.

So what we need for a test of the completeness of bargaining is some measure of the amount of implicit compensation (that is, the amount of expected insider-trading profits) and the reductions in pay. The ratio of these should provide a rough measure of the completeness of bargaining. In the example above, a \$10 reduction in pay for \$100 in expected profits (a ratio of 10 percent), would show greater managerial power than a \$90 reduction in pay for \$100 in expected profits (a ratio of 90 percent). The data presented in this Paper do not decisively answer the question of the completeness of bargaining. But, combining the data from this study and that from the HJM study allows us to do a back-of-the-envelope calculation to estimate whether the offsets we observe are greater, less than, or equal to the expected profits from insider trades under Rule 10b5-1 plans.

HJM report that the average insider sold about \$8 million in shares in the one-year period following the first observed disclosure of a 10b5-1 plan trade.⁶¹ These are actual observed sales in the marketplace. HJM also find the average insider was able to earn abnormal returns of about 12 percent over a one-year period on these sales. This means the average insider could earn about \$1 million in abnormal returns from these 10b5-1 trading plan sales.⁶² This is roughly equal to the amount of implicit compensation offset against pay suggested by the regression coefficient for disclosure choice.⁶³ The coefficient on the disclosure dummy (variable = 1 or 0) is -1219, which means disclosure (variable = 1) is associated with a reduction in pay of about \$1.2 million. This suggests a ratio of managerial power of 80 percent. There is some imprecision in both the estimate of the average trading profits and the regression coefficient, so these estimates can be said to be roughly equal. This is not conclusive evidence, and the estimates are very rough. But the magnitudes are suggestive that the offset in compensation is within the range of expected profits insiders earn. It is much less likely in light of this data that

labor figures that firms balance gains from reduced wages against decreases in morale that might result).

⁶¹ See HJM, STRATEGIC DISCLOSURE, *supra* note 3, Table 2.

⁶² \$8 million times 12 percent equals \$960,000.

⁶³ See Table 5 *supra*.

the offset is far less than the profits insiders earn from informed trading. This suggests that the claims about camouflaged profits being evidence of executive dominance of the pay-setting process are much weaker than they appear.

B. Securities Law Issues

There are two large securities law issues presented by the existence of implicit compensation. The first is whether board recognition of expected executive profits from informed trades runs afoul of insider trading law. The second is whether implicit compensation is consistent with existing federal disclosure laws and rules.

1. Insider trading

This Paper presents evidence boards are aware of profits insiders expect to make on the basis of informational asymmetries. Although it was common knowledge before this study that some insiders were earning abnormal returns,⁶⁴ this study documents that boards were aware that, in expectation, specific insiders were likely to trade on inside information, and adjusted their pay accordingly. Importantly, these trades may be illegal under various insider-trading theories. Accordingly, we are confronted with the issue of whether boards were in effect authorizing illegal conduct, and whether this is a violation of the securities laws.

Under the “classical theory” of insider trading, executives trading in company stock on the basis of non-public information violate section 10(b) of the Securities Exchange Act of 1934 and Rule 10b-5 promulgated thereunder.⁶⁵ The Supreme Court has held that the executive’s role of trust and confidence “gives rise to a duty to disclose [or abstain from trading] because of the ‘necessity of preventing a corporate insider from ... tak[ing] unfair advantage of ... uninformed ... stockholders.’”⁶⁶ By agreeing to implicitly pay executives with profits from trading against outsiders with less information, the board is in effect paying the executive with cash from future shareholders instead of from current ones. And, arguably, taking “unfair advantage” of them to reduce the cash expenses of current shareholders.

If the insider were engaging in this conduct without board approval, it would unquestionably be illegal under the classical theory of insider trading. Executives trading on non-public information violate federal securities laws. But there is something interesting about the fact that the board authorized the trading and took it into account when setting the executive’s pay. These are not secret profits. The board disclosed the fact that the executive was

⁶⁴ See SEYHUN, INVESTMENT INTELLIGENCE, *supra* note 10.

⁶⁵ *Chiarella v. United States*, 445 U. S. 222, 228-231 (1980) (summarizing settled case law on question of company insiders trading on material informational advantage).

⁶⁶ *Id.* at 228-229 (citation omitted)

given shares, that the executive was free to trade the shares, and that the trades would be given extra protection against insider trading liability by virtue of the application of the affirmative defense provided by Rule 10b5-1. One could argue outsiders who traded in firm stock were on notice about the possibility of informed trading by insiders. If this is true, then it seems more difficult to say the insider was trading against “uninformed stockholders.” To be sure, the people they trade against are uninformed about the specific facts – e.g., a key drug will not be approved and therefore the stock price will likely fall – but they are arguably informed about the possibility of trading on this information deficit. Prospective shareholders should thus be willing to pay less for the shares based on the probability of trading at an information disadvantage, and therefore the advantage of the insiders would not be unfair, but would be paid for in advance.

This is just a way of saying that if the firm is internalizing the costs of insider trading, say by seeing its shares traded in less liquid markets because of the risk of insider trading and therefore seeing its cost of capital rise, then it is more difficult to make out the case for regulation.⁶⁷ There is some support for this in the Supreme Court’s insider-trading jurisprudence. In interpreting the “misappropriation theory” of insider trading, the Court suggested that board authorization might convert illegal into legal trading.⁶⁸ The misappropriation theory covers cases where the trader, such as lawyer working for the firm, could be deemed to have taken property that belonged to the firm, in this case, the information about the price decline, for personal use. In *United States v. O’Hagan*, a case involving a lawyer using information from a partner about a pending corporate takeover, the Court remarked in a footnote:

the textual requirement of deception precludes § 10(b) liability when a person trading on the basis of nonpublic information has disclosed his trading plans to, or obtained authorization from, the principal—even though such conduct may affect the securities markets in the same manner as the conduct reached by the misappropriation theory.⁶⁹

The case imagined in *O’Hagan* is not even as strong as that of implicit compensation, because in the former the world need not know about the authorization, while in the latter it does.⁷⁰

⁶⁷ Another argument for regulation is firm based. Firms might prefer broad insider trading laws because of the inability for firms to commit to not trade on inside information. As a result of this inability, all firms would face higher costs of capital, including firms whose insiders were not trading.

⁶⁸ See *United States v. O’Hagan*, 521 US 642, 652-53 (1997).

⁶⁹ *Id.* at 659 n. 9.

⁷⁰ This assumes the Court did not require disclosure to take advantage of this defense. In the Rule 10b5-1 context, the firm need not disclose, but as HJM show, the firms

There is no obvious reason why the authorization theory in *O'Hagan* should not insulate classic trading as well. There is arguably no deception in a case in which the firm discloses insiders are likely to be trading based on informational advantages. In fact, the classical theory proscribes that insiders disclose or abstain from trading. Although the disclosure element is typically thought to require disclosure of the facts underlying the trade, for example, the discovery of an ore deposit, as discussed above, the generic disclosure about insider propensity to trade on inside information may achieve the same kind of price adjustment and cost internalization on average. There will be cases in which the ex ante price difference will not turn out to be a sufficient compensation for the informational advantage in the particular case, but the outsiders would, on average, be compensated for this risk. The argument for authorization as a prophylactic here is thus economic instead of statutory.

This is especially true for diversified shareholders. As noted above, paying implicit compensation is simply a wealth transfer from future shareholders of the firm to current shareholders of the firm. Diversified shareholders are as likely to be current shareholders of a firm as they are future shareholders of the firm, and therefore there should be no systematic wealth effects. Shareholders who have to pay less for executive talent in one firm have to pay more in another firm, simply by virtue of when they enter the shareholder pool. On average, shareholders should be indifferent.

The other typical objection to insider trading is it will make markets less liquid and efficient because individual shareholders will not trust the market to be fair, viewing it instead as a place for privileged individuals to extract wealth from less privileged ones. This argument is weaker, however, in a world where the possibility of trading is disclosed ex ante. If traders know about the potential for informed insiders to be on the other side of a transaction, this risk should be priced by the market, and the firm should internalize these costs. In addition, the unfairness is ameliorated by the fact that the insiders are paying for any insider trading gains by reducing other forms of compensation in approximately equal amounts.

There are reasons to believe, however, that this economic story does not hold up very well in the case of trading under Rule 10b5-1 plans. The argument for insider trading is premised on an assumption that insider trades provide valuable information to the market and therefore lead to more accurate short-term prices for securities. It is puzzling, after all, that those with the most knowledge about a security are the ones forbidden from trading on that information. So, to take a classic example, if an insider knows that a secret geology report shows a large mineral deposit on firm land, allowing the insider to buy undervalued shares moves the price upwards toward the price it will be when the information is revealed. Improved pricing accuracy helps ensure that capital is allocated efficiently in the

that do not disclose generally do not see insiders earn abnormal returns. See HJM, STRATEGIC DISCLOSURE, *supra* note 3

market and reduces the probability trades made prior to the public revelation of the information are made at inaccurate prices.

These benefits might be especially valuable in the 10b5-1 case, because disclosure of a pre-commitment to trade may provide the insiders' information to the market well in advance of when it otherwise would. The attenuation from the time of the trade may cut the other way, however, since plan initiation is a very noisy signal about values at some unknown future time. When an insider trades based on inside information, an outsider observing this trade may confidently conclude that the price is unlikely to rise in the near future. For pre-commitment trades, however, this is not true, and this fact will diminish the value of the insider's disclosure. For example, if the stock price of Acme Inc. is \$10 on January 1, and the CEO enters into a 10b5-1 plan with planned sales sometime over the next year, it is possible that the CEO knows that the stock is likely to rise to \$30 by June before falling on bad news to \$5 in September. This means that it is only the insider's trade, and not the insider's disclosure that is likely to be valuable in the way that proponents of insider trading legalization argue is beneficial.

These benefits, however, may be reduced for informed trades made through 10b5-1 trading plans. Consider the two scenarios discussed in HJM: trades based on uncertain future bad news (where firms make limited disclosures) and trades based on certain long-term bad news (where firms make specific disclosures). In the first scenario, the trades contain no easily discernable information about a firm's future stock price. An insider with very high (but not perfect) confidence about future good news might use a 10b5-1 trading plan as insurance against even very unlikely bad news, since the insider can terminate planned trades based on newly received information that the good state of the world will result. Given the relatively costless option embedded in the current formulation of the Rule, the only thing that can be discerned from the entering into of a plan is that sometime many months in the future, an insider believes there is a non-zero chance that the firm might have some bad news. While this may be somewhat valuable, rarely are outsiders 100 percent confident about a firm's future, and the additional value of a 10b5-1 trading plan is therefore near zero. After all, it might be that the insider believes there is a one percent chance of bad news in six months, which would hardly be enough to move the market price.

This conclusion is supported by the fact that HJM find no discernable market reaction to insider's disclosure of the existence of 10b5-1 trading plans. The data show the market does not consider the disclosure of a 10b5-1 trading plan a meaningful signal about the value of a firm's future stock price. One-, three-, and five-day cumulative abnormal returns surrounding disclosure are all indistinguishable from zero. This is because disclosure is a very noisy signal. It may be viewed as providing some or all of the following litigation prophylactic benefits, a signal of good governance, a negative

prediction about the future value of the firm's stock price that is different from zero, but not measurably so.⁷¹

In the other scenario, an insider makes a specific disclosure based on a strong belief about negative news in the future, likely of quite large magnitude. This type of disclosure is much more meaningful in terms of information provided to the market, since it is not an option but a sure bet about the future stock price. There are some problems, however, even with this. First, even these disclosures are noisy, since, as noted above, not all specific disclosures evince a belief about future value. About half of the specific disclosures observed in HJM were benign in nature and provided no prediction about future value. This could be because the insider making the disclosure did so for non-strategic reasons, such as risk aversion or a belief in disclosure as an inherent good. Whatever the case, the value of any disclosure is reduced.

The disclosure might still be valuable, since outsiders could now deduce that there is, say, a 50 percent chance of a large drop in the stock price within one year. But this isn't socially valuable information, although it may be privately valuable to outsiders. The private value is obvious from the data: an outsider could have sold short a portfolio of firms that made specific disclosures, and the data suggest that it would have earned a nearly 25 percent abnormal return within one year. Without other observable data that would allow an outsider to distinguish between opportunistic and benign disclosures, however, any information gains would be offset (fully or mostly) by information losses from the firms that are not inaccurately priced at the time of disclosure. This would be so if, as it likely is the case, there are costs imposed on individual firms and the market as a whole that are not captured by the net economics of a portfolio of shorting transactions. So, although there may be some information value, its quality will be degraded such that it may be (and is likely to be) insufficient to justify the costs of the Rule.

In summary, the biggest criticism of Rule 10b5-1 plans along this dimension seems to be that they allow insiders to trade closer in time to the time when the information will be disclosed to the market anyway, and thus reducing the value of price correction that comes with insider trading. As shown above, the litigation prophylactic value of the plans means the risk of prosecution is lower trades by an executive on a particular day. Imagine a disclosure that will be made on May 1, and the executive is somewhat confident about it on March 1. In a world without trading plans, the insider will want to trade on the information as soon as possible, because the closer in time the trade is to May 1, the more likely the liability for insider trading. Trading plans, however, allow the insider to enter into the plan on March 1, and to plan the trade much closer to May 1, even April 30 say, with the ability to update (e.g., cancel the planned trades) as confidence increases. This

⁷¹ There may be some threshold confidence level (of certainty times magnitude) below which entering into a plan is too costly, but given the ease and low cost of entering into these plans, this must be very, very low.

reduced the information component of insider trades and the price-accuracy component of insider trading.

So while there is a plausible story about how implicit compensation would help reduce some of the problems of insider trading and therefore be an efficient component of executive pay, a more careful consideration of how the Rule works in practice shows how the informational value of insider trades may be much lower in the case of 10b5-1 trades. The Rule does, however, make insider trading more likely, as HJM show, and in ways that seem to be neutral from the perspective of shareholders. Under current law, however, this puts boards into an extremely difficult situation. We will return to this below.

2. Disclosure

Another related issue presented by the existence of implicit compensation is the adequacy of disclosures about executive compensation. The SEC requires firms to disclose, in extensive detail, the compensation of the CEO and other top executives. In a recent change to increase the amount of disclosure, the SEC wrote that the rules are “intended to provide investors with a clearer and more complete picture of the compensation earned by a company’s principal executive officer.”⁷² But the rules do not require disclosure about executives’ implicit compensation, and, as shown above, this may be significant in terms of dollar amounts and the legality of this form of compensation.

In terms of stock options and grants, the current rules require shares be reported at fair market value as of the date of the grant. The grant date fair value is determined by accounting rule FAS 123R, under which stock is valued at its market price and options are reported in terms of their Black-Scholes value. The value of options under the Black-Scholes formula, however, is based on the value of *any* option with the characteristics of the one held by the executive. The option value does not consider the value to a particular executive based on that executive’s personal or firm-imposed circumstances. For instance, the Black-Scholes value of an option to buy a share of stock in General Electric is the same whether Joe Q. Public holds the share or GE’s CEO Jeffery Immelt holds it. But Mr. Immelt and Mr. Public are in very different positions vis-à-vis the ability to convert that option to cash and the ability to and likelihood of beating the market based on superior information.

Consider three firms: Firm A restricts executives from trading until they retire, unless given approval by the board of directors; Firm B permits executives to trade, but not during blackout windows of 60 days prior to earnings announcements; and Firm C allows executives to trade at any time.

⁷² See SEC Release, “Executive Compensation and Related Person Disclosure,” 17 CFR Parts 228, 229, 232, 239, 240, 245, 249, and 274, November 7, 2006, available at <http://www.sec.gov/rules/final/2006/33-8732a.pdf>.

All else being equal, each of these firms will report the exact same Black-Scholes value, despite the fact that the executives will have widely different individual valuations. This difference arises because the ability to trade is valuable to executives, and is shown in the data presented above. Implicit compensation arises because the reported value of an executive's equity compensation does not necessarily (if ever) represent the expected value the executive is likely to receive from the equity when it is converted to cash. If the option value as reported to shareholders is perfectly realized by the executive, then implicit compensation is zero, and the issue fades away. We know, however, valuations vary significantly from realized gains.

The market roughly tracks the three examples above, with some firms imposing no restrictions on trading, some banning it, and most falling somewhere in between. In general these policies are not publicly available, but can be inferred only through observing in detail firm trading behaviors. There is no requirement to disclose the existence of blackout windows or the use of Rule 10b5-1 trading plans. In theory firms have incentives to disclose this, since presumably the reason for the policy is that it increases firm value. But when interacted with insider trading law as applied, this may no longer be the case. Given the value to insiders from the ability to trade, the heterogeneity in firm policies about trading, the relative paucity of information about specific firm policies, and the imperfection in legal enforcement of insider trading law, we cannot accurately calculate the value of implicit compensation from publicly available information.⁷³ After all, firms will not disclose the size of profits insiders earn from informed trades, although they may take these into consideration when setting insider pay. Moreover, if the bargaining is imperfect, insiders may be able to use their power over the board to earn more than their marginal contribution to firm value.

So we have a situation in which the reported value of executive compensation is not an accurate reflection of the actual compensation bargain, and arguably even the public disclosure of the circumstances leading to the divergence may be insufficient for the market to accurately determine the true value of pay. Although this problem existed prior to Rule 10b5-1, the Rule increases the magnitude and frequency of implicit compensation that can be earned.

But it is not at all obvious this is problematic. Even if it is true that the market cannot perfectly determine the total pay of individual executives (explicit plus implicit compensation), the role of the board in the labor

⁷³ If Firm A, Firm B, and Firm C all report compensation in cash and securities to their CEOs of \$1 million, but do not publicly disclose the trading restrictions they impose, we cannot know the CEOs' expected compensation. We can reasonably assume that the ability to trade is worth something to executives, either based simply on liquidity or the ability to time trades based on private information, and therefore that the CEO of Firm C will be able to earn more compensation in a given year than the CEO of Firm B, who will in turn be able to earn more compensation in a given year than the CEO of Firm A.

market seems to provide a check on any abuse by the executives from the lack of transparency. Remember, Bebchuk and Fried's objection was not that insiders earn profits from trading, but that they allegedly earned secret profits from trading. If bargaining over implicit compensation is relatively complete, as shown above, then shareholders should be largely indifferent to the shortcomings of disclosure rules to capture implicit compensation. Shareholders may see pay reductions that are not actually pay reductions, but there may be a recognition in the market about this offset. In addition, unless shareholders are inclined to act on this reduction, it is not clear what harm flows from this for shareholders.

There may be reasons why shareholders or society care about absolute levels of pay irrespective of performance, however, and these may not be as well captured by disclosure rules in a world of implicit compensation. For instance, pay tables disclosed by firms may show total pay of \$10 million, but the compensation bargain may reflect a market wage of \$12 million, with \$2 million coming from trading profits. As noted above, while this form of compensation existed before Rule 10b5-1, the Rule changes the size of the difference and the number of firms paying substantial amounts in this way.

The easiest way to solve this problem is to require firms to disclose, in summary form, profits from insiders' trades. This data is already available to some extent, since insiders are required to disclose changes to their ownership of equity on Form 4 within two business days after any transactions. Those interested can calculate these amounts in rough terms. But this data is not summarized as part of the SEC's handy summary tables firms are required to disclose. Adding a line for "profits from insider sales in the prior year" would be a helpful addition to the SEC's disclosure requirements.

Given the questionable legality of the practice of implicit compensation, requiring more disclosure of it may simply stamp it out, and this may or may not be a good thing. After all, if insiders are going to trade anyway, making them give back some money as a result seems like a sensible policy.

An alternative is to increase the transparency of trading activities. Simply requiring more disclosure of the use of 10b5-1 plans is not an obvious solution. The SEC could reconsider the proposal it tabled that would have required firms to disclose the existence of a plan used by any executive within two days of adoption using a Form 8-K disclosure. Disclosure sounds benign in the abstract – who can be opposed to having more information about the use of plans – but the data suggests it may backfire and have unintended consequences. Remember that the firms/insiders least likely to be abusing the Rule are the ones not making any disclosures of the existence of their plans. These firms/insiders chose not to disclose for some reason, and therefore requiring them to do so would likely increase their costs of using a plan. We should therefore expect fewer firms/insiders in this group to enter into fewer plans on the margin, with the result of removing some of

the benefits of the Rule without changing any of the costs.

C. Corporate Governance

The payment of implicit compensation seems consistent the well-accepted board goal of maximizing firm value. As mentioned above, the board is reducing payments by current shareholders (and thus increasing firm value by that amount) as a result of the ability of executives to earn profits from trades against outsiders. The optimization component of implicit compensation, what Roulstone estimates at about 13 percent of total pay, is unobjectionable from any perspective. Giving executives the ability to trade, and offsetting their pay in an amount equal to their expected gains, is a Pareto improvement, since current shareholders pay less for executive talent and future shareholders receive shares in a bargain in which no side to the transaction is expected to outperform the other. The SEC had this win-win situation in mind when it passed Rule 10b5-1.

The inability to limit Rule 10b5-1 to optimization trades, however, complicates board decisionmaking. From the perspective of current shareholders the payment of implicit compensation for informed trades may not only make economic sense but it may be an imperative. As discussed above, allowing insiders to trade, including on inside information, made be the cheapest way to pay, considering all costs, including potential legal costs. This may be because the board makes the deliberate calculation of the costs and benefits of restricting trading, or it may simply be because the board believes it is powerless to prevent insiders from trading, since there are no legal duties for it to monitor executives' private behavior and, in any event, such attempts may be very expensive and fruitless. In either case, if the board is aware that executives are earning abnormal returns from trading and the board is unable to efficiently prevent them from doing so, it is perfectly rational for the board to reduce the expected costs of such trading (that is, authorize the use of 10b5-1 trading plans) and to offset pay as a result of expected gains.

The problem arises because the board is arguably complicit in illegal activity by the executives. For instance, we wouldn't defend a board decision for a pharmaceutical firm to sell heroin, even if it was a based on a business judgment that the benefits exceeded the costs. The same would be true of board actions designed to conceal the CEO's hobby of robbing banks. In this case, the board is not necessarily aiding and abetting the illegal trades, but it does have the power to make such trades much less likely. The board could, for instance, have a policy banning the insider from trading or from using a 10b5-1 plan, either of which would make it much less likely (but not impossible) that the insider would be able to earn abnormal returns from informed trades. This decision would undoubtedly raise the costs of management talent for current shareholders, but it would reduce the probability that future shareholders would be defrauded. As mentioned above, this may be a bargain that even future shareholders might not want.

This is because diversified shareholders are as likely to be current shareholders as future ones, and implicit compensation may encourage the optimal level of risk taking.

To see why what we can call “insider insurance” embedded in Rule 10b5-1 plans might be efficient and desirable for shareholders, consider the following example. Sue, the CEO of Acme, Inc., has 100 shares of vested stock; the stock is trading at \$10 per share. Sue has the choice of two projects: Project A has a 70 percent chance of increasing the stock price to \$15 in one year, and a 30 percent chance of decreasing the stock price to \$8 over the same period; Project B has a 70 percent chance of increasing the stock price to \$20, and a 30 percent chance of decreasing the stock price to zero. Diversified, risk-neutral shareholders prefer Project B, since its expected value (\$14) exceeds that of Project A (\$13).⁷⁴ Sue, however, prefers Project A, since the 30 percent chance of failure in Project B will result in not only economic losses, but also likely her job. Here we see classic agency cost problems – managers interests are not fully aligned with those of shareholders.

The early termination option embedded in Rule 10b5-1, however, can help align these incentives by increasing the economic returns to Sue from choosing Project B, perhaps enough to overcome the potential of losing her job. To see this, consider Sue’s payoffs from the sale of all her stock at the end of one year. Pre-Rule, Sue would earn \$290 from Project A and \$400 from Project B.⁷⁵ Although based on purely stock profits Sue would prefer Project B (along with shareholders), as noted above, Sue’s risk aversion with respect to her job may mean this monetary difference is insufficient to persuade her to choose Project B.

With the Rule, however, Sue can earn more from Project B, maybe even enough to overcome her expected losses from employment. Her payoffs increase to \$350 from Project A but even more so to \$700 from Project B. This is because she can avoid any losses from the 30 percent bad states of the world by planning sales trades in advance and then letting them execute in the bad states of the world or terminating them in the good states of the world.⁷⁶ In other words, choosing Project B increases Sue’s expected payoffs

⁷⁴ These expected values are simply the stock price for each state of the world times the probability of that state of the world (that is, for Project A: $70\% \times \$15 + 30\% \times 8 = \13 ; and for Project B: $70\% \times \$20 + 30\% \times \$0 = \$14$).

⁷⁵ For Project A, Sue earns \$500 in the good state of the world ($\$15 - \10×100 shares), which occurs 70 percent of the time; and -\$200 in the bad state of the world ($\$8 - \10×100 shares), which occurs 30 percent of the time. The sum of these is expected values is \$290 ($\$350 + -\$60 = \290). For Project B, Sue earns \$1000 in the good state of the world ($\$20 - \10×100 shares), which occurs 70 percent of the time; and -\$1000 in the bad state of the world ($\$0 - \10×100 shares), which occurs 30 percent of the time. The sum of these expected values is \$400 ($\$700 - \$300 = \400).

⁷⁶ For Project A, Sue earns the same as in the pre-Rule case for the good state of the world (\$350), but in the bad state of the world, she can avoid the \$60 in expected losses by planning trades at \$10 per share in advance, and letting them execute when the probabilities resolve themselves (but are not publicly disclosed) in a negative way. Sue’s expected value

by 38 percent in the pre-Rule world, but over 100 percent in the world with the Rule. Whether or not this increased economic return will be sufficient to overcome a CEO's risk aversion with respect to employment will vary by firm, by individual, and over time, but *ceteris paribus*, the existence of the Rule helps align shareholder and manager interests.⁷⁷

But it seems clear that implicit compensation is a bargain that is illegal under current law. In addition, the use of Rule 10b5-1 as a way of increasing trading may be less desirable than simple legalization of insider trading, since it increases not only the frequency of optimization trades but also the possibility of informed trades, and without the salutary effects of plain-vanilla insider trading. So the issue about the efficiency of board governance simply goes back to the debate about the legalization of insider trading generally.

The data reveal three final points are worth making about board governance. First, the amount of implicit compensation is not correlated with the level of insider ownership.⁷⁸ This suggests manager power of the pay setting process in this case is not influenced significantly by how much of the firm is owned by the CEO. The dataset includes firms with significant ownership stakes, and yet there is no evidence that these CEOs are more likely to dominate the board in a way that increases their ability to extract economic rents from shareholders.

Second, the amount of implicit compensation is not correlated with the level of institutional ownership. Numerous studies purport to show a positive influence of the existence of large, institutional shareholders on board governance.⁷⁹ The fact that large blockholders, especially activist ones, serve a salutary function in board decision making is practically a truism in academic legal circles. But there is no obvious answer about what "better" is in the case of insider trading. From the perspective of shareholders, the efficient answer may be to encourage insiders to violate the law. In support of this claim, this study finds no significant role of institutional investors in the decision to adopt Rule 10b5-1 trading plans or to pay implicit compensation.⁸⁰ It is also possible institutional shareholders were unaware

from Project A is thus \$350. For Project B, Sue earns the same as in the pre-Rule case for the good state of the world (\$1000), but in the bad state of the world, she can avoid the \$300 in expected losses through insider insurance. Sue's expected value from Project B is thus \$700.

⁷⁷ A related point is insiders may be less likely to surreptitiously unwind equity incentives they have been given through derivatives or other hedging transactions. For these reasons, many of which will be firm-specific, any general reform may be overinclusive and destructive of social welfare.

⁷⁸ In unreported regressions, the independent variable "percent insider ownership" is statistically insignificant.

⁷⁹ See Ronald J. Gilson & Reinier Kraakman, *Investment Companies as Guardian Shareholders: The Place of the MSIC in the Corporate Governance Debate*, 45 *STAN. L. REV.* 985, 1006-09 (1993) (reporting empirical studies purporting to show "mildly positive relationship between active large-block shareholders and corporate performance").

⁸⁰ In unreported regressions, the independent variable "percent institutional ownership" is statistically insignificant.

of the issues, and this is supported somewhat by the fact there was no significant market reaction to the disclosure of Rule 10b5-1 trading plans.

Finally, the data suggest the board was relatively better informed about the expected use of Rule 10b5-1 trading plans than the SEC that wrote the rule. If we take the SEC at its word that Rule 10b5-1 was intended to encourage optimization trades but not informed trades, then the SEC made a mistake – the Rule encourages both types of trades. The evidence in this Paper suggests boards were aware of this potential in the Rule.

VII. CONCLUSION

This Paper provides evidence that boards and executives bargain about pay in ways not previously realized. Exploiting the propensity to trade on insider information revealed by disclosure choice in applying a recent SEC rule, the data show executives who are more likely to earn abnormal returns see their pay reduced relative to insiders who do not expect to earn abnormal returns. From this, we can conclude several things. First, the wages of executives are not completely sticky. Just as wages rise when trading options are restricted, as shown by Roulstone, so too do wages fall when trading options are liberalized. Second, boards bargain about not only opportunities for diversification and optimization trades, but also about profits from informed trades. Since these trades are likely illegal under current law, this raises issues about potential board liability for engaging in what may be a rational and efficient firm strategy, but that may have social costs. Third, the bargain struck between boards and executives about informed trades seems to approximately offset any expected gains. This means that the implicit compensation bargain is more consistent with the theory of optimal contracting about executive pay than with the theory of managerial power. Finally, although the data may say good things about the bargaining environment about pay, the case for permitting this sort of trading to continue is quite weak. Whatever benefits exist from a liberal insider-trading regime are reduced in situations where insiders use Rule 10b5-1 plans.