

Identifying Control Motives in Managerial Ownership: Evidence from Antitakeover Legislation

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This study uses the introduction of second-generation antitakeover legislation as a natural experimental setting to infer the value that managers place on the control rights conferred by stock ownership. We conjecture that managers will reduce their stockholdings in the post-legislation period because they can ensure their prior level of control while holding fewer risky shares. Using a variety of specifications, we find robust evidence consistent with this “revealed preference” hypothesis. Further demonstrating the key role played by control considerations in managers’ stockholding decisions, the reductions in ownership are concentrated in management teams with higher levels of initial ownership and in firms without poison pills.

The traditional view of stock ownership is that it provides managers incentives to improve firm value [e.g., Jensen and Meckling (1976)]. Subsequent studies have highlighted another role of stock ownership, namely that it provides managers control over the use of corporate resources and insulates them from the disciplinary forces of the market for corporate control [e.g., Morck, Shleifer, and Vishny (1988), Stulz (1988), Prendergast (2002)].¹ Because control cannot be directly measured, Morck, Shleifer, and Vishny (1988) use the empirical relationship between

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¹ Jensen and Ruback (1983) define control as the ability of managers to retain their jobs and pursue projects without interference from raiders, outside shareholders, etc.

managerial ownership and firm performance to infer the control and the incentive effects. A drawback of such ownership–performance tests is that they do not account for the endogenous nature of managerial ownership and firm performance [Jensen and Warner (1988), Himmelberg, Hubbard, and Palia (1999)]. This article takes a different approach. It uses a revealed preference argument to isolate the corporate control value that managers place on stock ownership, by examining managerial behavior following an exogenous control-related shock—the passage of antitakeover laws by various states in the 1980s. The key advantage of this natural experiment is that a precise structural equilibrium model, which accounts for the endogeneity of managerial ownership is not necessary. All that is required is a specification of a reduced-form model of the equilibrium level of managerial ownership, along with a conjecture about how this equilibrium level changes in the context of the exogenous shock [Angrist and Krueger (2001)].

In the mid-to-late 1980s, several states enacted legislation that increased the difficulty of launching a successful takeover bid on firms incorporated in those states. These laws are collectively referred to as second-generation antitakeover legislation, and their passage is widely viewed as an exogenous event [Bertrand and Mullainathan (1999a,b, 2003), Garvey and Hanka (1999)].² As a result of the weakened power of outsiders following the passage of these laws, managers in firms incorporated in these states can maintain their existing level of control while holding fewer shares. Given the cost to managers of share ownership, due to the risk of random stock price fluctuations and the concentration of wealth in an undiversified asset [Aggarwal and Samwick (1999), Hall and Murphy (2002)], we conjecture that managers will respond to the passage of antitakeover laws by reducing their shareholdings.

We test this prediction on *Forbes 500* firms in the time period 1984–1991. We find that, following the passage of antitakeover laws, directors and officers of firms incorporated in the enacting states significantly reduced their ownership levels. In a reduced-form model that controls for firm characteristics, our results indicate a drop of around 12.3% in the median level of ownership. The proportion of inside directors owning at least 5% of shares also declined significantly post-passage.

We next examine the cross-sectional variation in the management team's ownership response to antitakeover laws. We conjecture that, at

² These antitakeover laws are denoted as second-generation because they were adopted by the states after the Supreme Court struck down the first generation of antitakeover laws in 1982. As we explain in Section 1, the second-generation antitakeover laws took several forms. Some states granted shares not held by the suitor firm the right to decide whether the suitor's shares may vote on the takeover. Other states required the acquirer to pay a fair price for shares purchased for takeover purposes, with fair price defined, e.g., as the maximum the acquirer paid for shares acquired in the preceding two-year period. Finally, some states enacted laws prohibiting a bidder from takeover activities for a specified number of years unless the target board voted otherwise.

low ownership levels, management's control is sufficiently tenuous that the marginal effect of antitakeover laws is not enough to induce the relinquishment of stock. In support of this hypothesis, we find that the post-passage decline in ownership holds only for management with high levels of initial ownership. Second, examining investor reaction to the passage of antitakeover laws, prior studies, such as Karpoff and Malatesta (1989), find that these laws had little effect on firms that had internal antitakeover amendments (poison pills), suggesting that these devices had already effectively entrenched current management. Consistent with this, we find that the post-passage decrease in management ownership is concentrated in firms without poison pills.

Our corporate control discussion thus far relies on managers and potential raiders as the two key players. However, in a series of studies, Bertrand and Mullainathan (1999a,b, 2003) argue that antitakeover laws also weaken the power of shareholders to discipline managers, who then fail to maintain previous levels of operational efficiency and also extract higher pay. To the extent this increase in pay occurs through higher levels of option grants, managers could be selling shares post-passage simply to rebalance risk [Ofek and Yermack (2000)]. We therefore explicitly control for option grants in our regression, and find that our results are robust to the inclusion of such periodic pay regressors.

Collectively, our results demonstrate the significant role that control considerations play in managers' stockholding decisions, thus confirming Harris and Raviv's (1988) and Stulz's (1988) theoretical analyses of the control value of stock ownership to managers. A common theme in those two studies is that managers facing a potential takeover will exchange the equity of non-contending shareholders for debt. This exchange, *ceteris paribus*, reduces the number of outstanding shares and increases the fractional share of management ownership. Consistent with the converse of this idea, Garvey and Hanka (1999) provide evidence that managers reduced debt levels after the passage of antitakeover legislation. We show that, apart from such *indirect* reductions in ownership share via unlevering, managers *directly* reduced their ownership stakes after the passage of antitakeover laws by selling their stock. Our study is also related to the literature that examines control-related managerial behavior directly around various (potentially endogenous) corporate events.³ Complementing these studies, our analysis derives managers' revealed preference for control by analyzing changes in their shareholdings around the time of an exogenous control shock.

³ Borokhovich, Brunarski, and Parrino (1997) examine CEO pay around the passage of firm-specific antitakeover amendments. Amihud, Lev, and Travlos (1990) and Ghosh and Ruland (1998) argue that, in choosing the mode of corporate acquisition (stock versus cash), managers take into account the control implications of their resulting ownership stakes in the combined firm. Dann and DeAngelo (1988) find that target firm managers amass shares to repulse hostile bidders.

The remainder of the article is structured as follows. Section 1 develops our hypotheses and describes the institutional aspects of antitakeover laws. Because managerial ownership plays roles other than corporate control, Section 1 also discusses several alternative hypotheses. Section 2 describes our data. Section 3 presents the results using panel regressions with one observation per firm-year. Section 4 presents the results using a firm-specific managerial ownership changes specification, which yields one observation per firm. We provide concluding comments in Section 5.

1. Hypothesis Development

1.1 Model

An empirical test of an endogenous variable, such as managerial ownership can take one of two forms. First, using theory as a guide, one can develop a full structural model of managerial ownership that incorporates both control and incentive or risk effects. However, the results of structural equations are sensitive to the specification and the choice of instruments that are typically difficult to motivate [Himmelberg, Hubbard, and Palia (1999, Section 5.2), Angrist and Krueger (2001)]. An alternative approach is to use the institutional context of a natural experiment, which obviates the need for a structural model. One only needs to specify a reduced-form equilibrium model of the endogenous ownership variable, and test how the exogenous shock changes this variable. Also, as Angrist and Krueger (2001, p. 78) note, the response to the shock is likely to be heterogeneous across firms, which the empirical researcher can use to conduct cross-sectional variation or comparative statics tests. This is the approach we pursue.

1.2 Main hypotheses

We begin with a brief description of antitakeover laws; more detailed discussions can be found in several prior studies [Karpoff and Malatesta (1989), Comment and Schwert (1995), Bertrand and Mullainathan (2003)]. In 1982, the Supreme Court dismissed the first generation of antitakeover laws in 37 states on the grounds of excessive jurisdictional reach (*Edgar v. Mite Corp.*). Subsequently, in the mid-to-late 1980s, several states introduced the next or the second generation of antitakeover statutes. In 1987, the Supreme Court ruled that these were enforceable so long as they did not prevent compliance with the 1968 Williams Act (*Dynamics v. CTS*). This ruling led to further adoption of such legislation around the country (Table 1).

The second-generation antitakeover laws mainly took three forms: control share acquisition (CS), fair price (FP), and business combinations (BCs). While there are differences across states, the laws overall are as

follow. Control share acquisition laws give shares not held by the suitor firm the right to decide whether the suitor's shares may vote on the takeover. The acquirer must deliver a statement disclosing his identity, intent, and terms of acquisition, upon which other target shareholders vote to grant voting rights to the acquirer's shares. Fair price laws require the acquirer to pay a fair price for shares purchased for takeover purposes. The fair price is calculated using rules such as the maximum the acquirer paid for shares acquired in the preceding two-year period. In essence, this law impedes takeover by making the acquirer pay a high price for shares while also impeding two-tier offers. Finally, business combination laws prohibit a bidder from takeover activities for a specified number of years unless the target board votes otherwise. Even after the passage of the moratorium or the freeze-out period, the bidder needs to satisfy fair price provisions.

Many studies argue that these laws have been effective in deterring takeovers, thus increasing the power and entrenchment of existing managers [Jensen (1988), Karpoff and Malatesta (1989), Shleifer and Vishny (1990), Romano (1992), Szewczyk and Tsetsekos (1992), Bertrand and Mullainathan (1999a, 2003)]. Comment and Schwert (1995) find that takeover premiums increased post-passage, suggesting that outsiders find it more costly to launch takeovers.⁴ The passage of these laws thus provides a natural *exogenous* shock to the market for corporate control.⁵

The weakening of outsiders' takeover power due to antitakeover laws suggests that managers do not need to hold as many shares as before to ensure their control. Because share ownership is risky [Aggarwal and Samwick (1999)], our main prediction is that managers will reduce their shareholdings post-passage.

We further explore our control-based conjecture for managerial stock sales with cross-sectional variations on our hypothesis. Morck, Shleifer, and Vishny (1988) find that the entrenchment effect or the control benefit of managerial ownership arises only after the manager has reached a threshold level of ownership. To the extent control benefits are the prime motivating factor for managers who maintain a high level of ownership, the marginal benefits of antitakeover laws should be the greatest

⁴ Comment and Schwert (1995) find that the number of takeovers did not change post-passage, casting some doubt on the effectiveness of antitakeover laws. However, Schwert (2000, note 1) extends Comment and Schwert's (1995) sample period and reverses this conclusion. Garvey and Hanka (1999) theoretically show that these laws can be a deterrence to outsiders, even if the equilibrium number of takeovers remains unchanged. In their model, managers realize that antitakeover laws reduce outsiders' power to discipline them, and therefore begin to pursue self-serving goals. This, in turn, increases the gains to outsiders from successful takeovers, by increasing the amount of managerial slack that can be eliminated. In equilibrium, the gains and costs must be balanced, leaving the number of takeovers potentially unchanged.

⁵ Comment and Schwert (1995, p. 23) note that some of the laws were passed to protect particular firms in play. The number of such firms, however, is very small. Garvey and Hanka (1999) find that only nine firms in their sample of 1203 firms had this potential endogeneity problem. We therefore assume, as they do, that the laws were essentially exogenous in nature.

for them. Consequently, we test whether managers with higher shareholdings are more likely to reduce their ownership after the passage of antitakeover laws. In other words, we conjecture that, at low ownership levels, the management's control is sufficiently tenuous that the marginal effect of antitakeover laws is not enough to force management to relinquish its stock.

Our discussion thus far has focused on state-legislated antitakeover laws, primarily because of their exogenous nature. In addition to these laws, many firms (287 firms in our sample) adopted antitakeover amendments or poison pills in our sample period to deter raiders. In contrast to antitakeover laws, which arise from a source *external* to the firm, poison pills are *internal* antitakeover mechanisms. Empirical studies find that managers adopt antitakeover defenses to retain control [Field and Karpoff (2002)], and investors perceive poison pills to be an effective entrenchment device for managers, turning significantly bearish upon poison pill adoption [Malatesta and Walkling (1988)].⁶ In a context related to our study, Karpoff and Malatesta (1989) find that investors' negative reaction to the adoption of antitakeover laws was limited to firms without poison pills. Their result suggests that poison pills act as effective substitutes for antitakeover laws. Analogously, Comment and Schwert (1995) find that while firms incorporated in states with antitakeover laws are more likely to adopt poison pills, there is little investor reaction to the adoption of poison pills for firms in states with antitakeover laws. This substitution effect provides a natural source of cross-sectional variation for our hypothesis. Accordingly, we test whether antitakeover laws have a weaker effect on managerial ownership in firms that have adopted poison pills.

1.3 Alternative hypotheses

Managerial ownership is determined by simultaneous equilibrium in many markets: labor markets for managers, product markets for the firm's inputs and outputs, and capital markets that investors use for both valuation and corporate control. The shock of the antitakeover law can potentially affect these markets simultaneously to varying degrees, all of which then affect managerial ownership. Our main hypotheses assume that the first-order effect of antitakeover laws is on the corporate control market, and our discussion so far has relied on the corporate control relation between managers and potential raiders. However, such an exogenous shock is also likely to change the relation between managers and shareholders. Bertrand and Mullainathan (1999a,b, 2003) argue that antitakeover laws weaken the power of shareholders to discipline managers,

⁶ Other studies find limited evidence of investor reaction to poison pills [Ryngaert (1988)]. Daines (2001, p. 544) argues that limited investor reaction to the adoption of poison pills does not imply that pills are ineffective, but rather that investors anticipate the adoption of such devices.

implicitly arguing that shareholders are unable to re-contract away completely the adverse agency effects of antitakeover laws. In particular, Bertrand and Mullainathan (1999b) find that managers increase their pay post-passage.⁷ To the extent this increased pay increases the risk on the manager through excessive ownership of shares and options, the manager is likely to reduce his share ownership by selling his shares [Ofek and Yermack (2000)]. Our reduced-form specification that uses total managerial stockholdings as the dependent variable of choice, and firm characteristics and firm performance as regressors, absorbs other aspects of compensation such as option grants indirectly through firm characteristics. Nevertheless, we control for this effect explicitly in one set of tests by including periodic stock options granted as a regressor.

The view that antitakeover laws exacerbate traditional agency problems is not universally held. Stein (1988) notes that, absent takeover protection, managers may become too concerned about boosting stock price through myopic actions in order to make it costly for a raider to acquire the firm. So, one could wonder whether our findings reflect an attempt by shareholders to force managers to own relatively more shares pre-passage, when myopia problems are higher. However, this reasoning is flawed. The manager in Stein's model is not concerned about losing control to a raider. Instead, given his ownership stake, he wants to make sure that the raider does not underpay for her acquisition. Toward this goal, the manager engages in myopic behavior, which is a costly and credible signal that causes investors to *increase* the share price. In effect, the price formation process is the *cause*, not the solution to managerial myopia in Stein's model, and forcing managers to hold more shares exacerbates, rather than resolves, the myopia problem.

Moving from shareholder-manager contracting issues to shareholder valuation of the firm, another potential alternative explanation for empirical results consistent with our hypothesis is one based on information effects. That is, managers initially held on to shares in anticipation of future takeover rents, and sold shares after the passage of antitakeover laws realizing that such takeovers were unlikely to materialize. This argument assumes that the stock price before the passage of antitakeover laws did not incorporate any takeover rents, that is, that managers were privately informed about potential takeovers. We believe it is unlikely that managers had such private information about raider activity, because raiders have every incentive to purchase their shares secretly, both in

⁷ Barnhart, Spivey, and Alexander (2000) do not find that dollar CEO pay as a percentage of stock return is affected by antitakeover laws for their sample. However, they limit their examination to a cross-sectional regression of 253 firms during a period where 80% of their sample already had an active state antitakeover law. Borokhovich, Brunarski, and Parrino (1997) find that CEO pay increases after the adoption of firm-specific antitakeover amendments, but these amendments are endogenous in that they are adopted by the firms themselves [see Bertrand and Mullainathan (1999b)].

order to receive a low price [Grossman and Hart (1980)] and to preclude management from adopting defensive moves. This notion is consistent with the theoretical models of Stulz (1988) and Harris and Raviv (1988), which assume that managers have no private information about raiders. It is also consistent with the fact that a primary thrust of the antitakeover laws was to prevent raiders from buying shares in secret, and to alert management to their activities.⁸

Finally, control-based theories of managerial ownership note another effect of managerial ownership: the manager can extract a higher takeover premium from bidders [Stulz (1988), Harris and Raviv (1988)]. Stulz, Walkling, and Song (1990) find that targets with higher managerial ownership secure greater takeover gains in multiple-bidder contests. Antitakeover laws could further increase the bargaining power of managerial ownership and allow managers to extract so much rent from bidders that the expected premiums for current shareholders (including managers) could increase even as the probability of takeover declines. If this were in fact the case, we would expect managers to hold on to their shares in anticipation of these future rents. This prediction is, of course, contrary to our hypothesis, and is testable in our empirical analysis.

We use two different empirical specifications to test our hypotheses. Our first set of regressions assumes that managerial ownership level is driven by a variety of firm and industry characteristics [see, e.g., Demsetz and Lehn (1985)], and we examine the incremental effect of antitakeover laws in a panel regression of firm-years. As an alternative to using firm characteristics to explain ownership levels, our second set of tests uses the firm itself as its own control in a multivariate setting. We examine how managerial ownership in each firm changes across the passage of the antitakeover laws. This approach results in one observation per firm. Similar results across two such different specifications would increase our confidence in our findings.

2. Data

2.1 Data sources

Antitakeover laws were passed in the mid-to-late 1980s, so we focus on the period from 1984 to 1991. We use *Forbes 500* firms as our sample, for several reasons. First, Mitchell and Mulherin (1996, p. 199) find that 57% of large U.S. firms were either takeover targets or restructured on their

⁸ In any event, several studies have found that insider sales do not reflect any private information [e.g., Heath, Huddart, and Lang (1999)]. A recent, comprehensive study by Lakonishok and Lee (2001) found that insiders' ability to predict returns was limited to small firms, and occurred for insider purchase activities, not sales. Their findings suggest that the managerial private information hypothesis is weakest in our setting of large firms and insider sales.

own between 1982 and 1989. Another advantage of large firms is that alternative explanations for insider sales, such as managerial private information have weak support in such firms [Lakonishok and Lee (2001)]. Third, this sample of firms encompasses a large number of industries and states of incorporation. Finally, we have detailed compensation data for these firms. To be included in our sample, a firm had to be listed at least four times between 1984 and 1991 in the *Forbes 500* ranking based on sales, assets, net income, or market capitalization, and publicly traded for four consecutive fiscal years. The four-year criterion represents a trade-off between the data requirements for panel data analysis and potential survivorship bias [Comment and Schwert (1995), Yermack (1995)].⁹

Our sources for adoption years of antitakeover laws in various states are Bertrand and Mullainathan (1999b, 2003). Our sources of data on managerial ownership and firm characteristics are the annual firm proxy statements, 10-Ks, and *Forbes* annual surveys of CEO compensation. This is the same dataset used in prior studies such as Yermack (1995). We use Comment and Schwert's (1995) dataset for poison pill adoptions. We collect stock price and takeover data from CRSP, and obtain data on takeover attempts by searching the *Wall Street Journal Index*. We use COMPUSTAT for financial items, and following Bertrand and Mullainathan (1999a), also for state incorporation data, supplemented by Compact D/SEC and proxy statements. Firms for which the required CRSP or COMPUSTAT data are not available are excluded from the sample. This process generates 587 firms in 44 states, representing 144 three-digit and 57 two-digit SIC code industries.¹⁰

2.2 Descriptive statistics

Table 1, provides the adoption year of the first of the second-generation antitakeover laws in different states, as well as the number of sample firms incorporated in each state. Because our study examines long-run differences in managerial behavior pre- and post-passage, we do not need the precise day of passage, unlike event studies such as Karpoff and Malatesta (1989). Table 1 indicates variation in adoption years across states as well as the distribution of the sample across states (none of our firms changed their state of incorporation during the sample period). As with other studies, about half the firms in our sample are incorporated in Delaware [Karpoff and Malatesta (1989), Garvey and Hanka (1999), Daines (2001)]. Table 1 also indicates that several states passed no antitakeover laws. Firms in those states provide an automatic control subsample for our

⁹ Schwert (2000) notes that the issue of nonrandom data availability, or sample selection bias, affects his takeover study and most other studies in this area.

¹⁰ We have more than 500 firms because the *Forbes 500* rankings change over time.

Table 1
Descriptive statistics: States and laws

State	Number of sample firms incorporated in the state	Year of passage of the first second- generation antitakeover law	State	Number of sample firms incorporated in the state	Year of passage of the first second- generation antitakeover law
Alabama	1		Mississippi	1	1985
Arizona	3	1987	Missouri	8	1984
California	4		Montana	1	
Colorado	4		Nebraska	2	1988
Connecticut	6	1984	Nevada	6	1987
Delaware	279	1988	New Jersey	23	1986
DC	2		New Mexico	2	
Florida	11		New York	39	1985
Georgia	6	1985	North Carolina	6	1987
Hawaii	4	1985	Ohio	26	1990
Idaho	2	1988	Oklahoma	1	1987
Illinois	6	1984	Oregon	5	1987
Indiana	10	1986	Pennsylvania	25	1989
Iowa	2		Rhode Island	2	1990
Kansas	3	1988	South Carolina	3	1988
Kentucky	5	1987	Tennessee	5	1988
Louisiana	1	1985	Texas	7	
Maine	3	1988	Utah	2	1987
Maryland	19	1983	Virginia	16	1985
Massachusetts	10	1987	Washington	5	1990
Michigan	12	1984	West Virginia	1	
Minnesota	3	1984	Wisconsin	5	1985

Data are for 587 *Forbes* 500 firms over 1984–1991 and are obtained from proxy statements, 10-Ks, and *Forbes* annual surveys on executive compensation. Stock price and takeover data are from CRSP. Accounting data and incorporation locations of the firms are from COMPUSTAT, supplemented by Compact D/SEC and proxy statements. Source: Bertrand and Mullainathan (1999b).

tests. Overall, the data exhibit considerable cross-sectional and time-series variation.

Bertrand and Mullainathan (1999b, 2003) argue that business combination laws were the most stringent of the three laws, and focus only on their passage. They rely on Karpoff and Malatesta (1989), who find that investor reaction was the most negative to the announcement of the passage of BC laws. However, the passages of various antitakeover laws were likely triggered by one another. Such correlation means that a law with lower investor reaction may not be necessarily weaker—investors may have anticipated the passage of this law upon observing the passage of a previous law.¹¹ Other papers, therefore, do not distinguish between the different laws, and look at every form of antitakeover legislation passed in a certain time period [Garvey and Hanka (1999), Barnhart, Spivey, and Alexander (2000)]. Consistent with this, we take no a priori

¹¹ Karpoff and Malatesta (1989, p. 312) note that the interpretation of their findings depends on one's assumptions about such investor anticipation.

Table 2
Descriptive statistics: Characteristics of the sample

Variables	Number of observations	Mean	SD	25th percentile	Median	75th percentile
AfterLAW	4654	0.453	0.498	0.000	0.000	1.000
Director/officer stock holdings (%)	4392	8.163	12.898	0.700	2.800	18.500
CEO stock holdings (%)	4397	2.389	7.218	0.040	0.150	3.740
Market value of equity (in millions)	4324	2926.373	5658.184	586.556	1318.260	2114.088
Annual stock return	4464	0.176	0.388	-0.043	0.149	0.361
Market-to-book	4192	1.445	0.817	1.010	1.141	1.527
Firm risk	4408	0.147	0.410	0.041	0.078	0.139
Leverage	4224	0.656	0.223	0.500	0.646	0.855
Block (%)	4393	9.593	13.774	0.000	6.300	11.400
Target	4654	0.030	0.170	0.000	0.000	0.000
Taken	4654	0.025	0.155	0.000	0.000	0.000

Data are for 587 *Forbes* 500 firms over 1984–1991 and are obtained from proxy statements, 10-Ks, and *Forbes* annual surveys on executive compensation. Stock price and takeover data are from CRSP. Accounting data and incorporation locations of the firms are from COMPUSTAT, supplemented by Compact D/SEC and proxy statements. All monetary items are restated into a constant dollar of 1991 using the Consumer Price Index at the end of the fiscal year. *AfterLAW* is a dummy variable equal to 1 starting one year after the passage of the first second-generation antitakeover law by the state in which the firm is incorporated and zero otherwise. *Director/officer stock holdings* represents the percentage of common stock beneficially held by the directors and officers. *CEO stock holdings* represents the percentage of common stock owned by the CEO. *Market-to-book* is the ratio of the market value of equity plus book value of debt to the book value of assets. *Firm risk* is the sample variance of daily logarithmic stock returns for the last 120 trading days of the fiscal year. *Leverage* is total debt divided by total assets. *Block* is the percentage of common stock of the largest block not directly owned by a director of the board; if the block is less than 5% we code it as zero. *Target* is a dummy equal to 1 if the firm receives a bid offer within a year or has an open bid offer, and zero otherwise. *Taken* is a dummy equal to 1 if the firm is taken over within two years, and zero otherwise. The tests are two-tailed.

stand on the effectiveness of the different forms of laws. Instead, we focus on the changes in managerial shareholding around the time of passage of the *first* piece of second-generation antitakeover legislation in the firm's state of incorporation. To the extent the passage of subsequent laws in a given state is eased by the enactment of the first law, we believe it is the first law that represents a truly exogenous shock. Accordingly, we define a dummy variable *AfterLAW* for each firm that takes a value of unity in the years after the year of the passage of the corresponding state's first antitakeover law.¹²

Table 2 provides several descriptive statistics. The variable *AfterLAW* has a mean of 0.45, indicating the data is relatively evenly spread pre- and post-passage (recall that *AfterLAW* will always be zero for firms in states without antitakeover laws, pulling the mean toward zero). The main economic advantage of using a dataset that encompasses several years pre- and post-passage is that it enables us to capture *medium-run permanent* effects, and not *transient* effects.

Prior control studies, such as Morck, Shleifer, and Vishny (1988) typically use total officer and director ownership as a measure of managerial

¹² We demonstrate the robustness of our results to several reformulations of this measure in Section 3.4.

ownership. Table 2 provides information on total director and officer beneficial shareholdings.¹³ The mean (median) holdings are 8.2% (2.8%), indicating a significant level of holdings by the management team of the firm. These levels are comparable to those reported by Morck, Shleifer, and Vishny (1988). However, one issue in the literature is whether these ownership levels are sufficient to give managers control. Prior empirical research suggests that this is indeed the case. In particular, Morck, Shleifer, and Vishny (1988, pp. 301–302) find that managerial entrenchment occurs at approximately the median level of ownership in their sample, which corresponds to board ownership of 5% of equity. Using a “swing vote” argument, Zingales (1994, 1995) also states that low absolute levels of ownership can have disproportionate control value for managers. Harris and Raviv (1988) model this formally. In their model, managers do not personally own sufficient ownership votes to repel outsiders; rather, managerial ownership, in conjunction with the proportion of atomistic shareowners who side with the management in control contests, enables managers to retain control. Zwiebel (1995) uses a similar coalition formation idea to show analytically how relatively small ownership levels can confer substantial control benefits. Finally, Tirole (2000) provides a theoretical model in which managers, because of their private information and expertise relative to outside owners, can exert power with relatively low formal authority or low ownership [also see Barclay and Holderness (1989)]. This literature, combined with our extensive set of tests, increases our confidence in attributing a control motive to our finding that managerial ownership declines after the passage of antitakeover laws.

2.3 Control variables

Our first set of regressions (in Section 3) assumes that managerial ownership level is driven by a variety of firm and industry characteristics [e.g., Demsetz and Lehn (1985)], and we examine the incremental effect of antitakeover laws. Table 2, also includes descriptive statistics on various measures that we include as additional determinants of ownership. Following Demsetz and Lehn (1985), we use firm characteristics such as log of market value to control for the size effect, the market-to-book ratio to control for growth opportunities, and a 120-day stock return variance to control for risk. Ownership changes from year to year can also be driven by stock returns, as managers time option conversions and stock sales to maximize net benefits [Huddart and Lang (1996), Heath, Huddart, and Lang (1999), Ofek and Yermack (2000)]. Following Ofek and Yermack (2000), we include contemporaneous annual stock returns as a control. Finally, the extent to which the firm is in play in the market for corporate control can affect managerial ownership decisions. Following

¹³ This measure is analogous to the one used by Yermack (1996, Tables 4 and 5).

Agrawal and Knoeber (1998), we include two variables: *Target*, a dummy variable for each firm-year indicating whether someone has an outstanding bid for this firm in a given year or if the firm receives a bid within a year, and *Taken*, a dummy variable for each firm-year which indicates whether the firm is taken over within the next two years.¹⁴

Two important additional control variables are leverage and outside block ownership. Harris and Raviv (1988) and Stulz (1988, p. 42) argue that increasing leverage can thwart takeover attempts. Switching to debt reduces the equity base, increasing the concentration of equity in managerial hands. The debt covenants accompanying leverage can also reduce the bidder's ability to restructure the firm post-takeover, making the firm unattractive to the bidder. Debt also forces the firm to disgorge cash regularly, which the bidder may not like. Debt is thus a potential substitute to the manager holding shares for insulating himself from the market for corporate control. Therefore, we include debt as a control. Similar to Garvey and Hanka (1999), we use total debt divided by total assets as our measure of leverage.

Large outside owners potentially represent a greater threat to management in corporate control contests. Grossman and Hart (1980) argue that it is cheaper for raiders to acquire shares from large shareholders because of free-riding problems with atomistic shareholders, who would much rather hold on and share takeover gains instead of tendering to the raider. The raider's buyout of a large owner also eliminates this owner from the corporate control contest and the raider becomes more powerful [Barclay and Holderness (1989, p. 374)]. Consequently, in the presence of large owners, managers may have higher levels of ownership. We measure the percentage shareholdings of the largest outside owner if this owner has more than a 5% stake, and code a zero otherwise (SEC 13D and 13G filings are not required of owners owning less than 5%).

3. Results

3.1 Main results

In this section, we assume that managerial ownership level is driven by a variety of firm and industry characteristics, and examine the incremental effect of antitakeover laws. Since director and officer stock holdings as a percentage of total shares outstanding is highly skewed (see Table 2), we use $\ln(1 + \text{stock holdings})$ as the dependent variable.¹⁵

¹⁴ Note that a firm that is taken over in the future may not currently be a target, and a firm that is currently a target may not be successfully taken over. Therefore, the two measures, *Target* and *Taken*, can and do have independent variation.

¹⁵ Adding unity to the ownership share enables us to take logs of those firm-years where the management owns zero shares.

Table 3

Descriptive statistics: Correlation between the passage of antitakeover laws and managerial shareholdings

		AfterLAW	ln[1+director/ officer stock holdings (%)]	ln[1+CEO stock holdings (%)]
AfterLAW	ρ	1.000	-0.034	-0.051
	p -value	—	.023	.001
	N	4654	4392	4397
ln[1+director/officer stock holdings (%)]	ρ		1.000	0.702
	p -value		—	.000
	N		4392	4391

Data are for 587 *Forbes* 500 firms over 1984–1991 and are obtained from proxy statements, 10-Ks, and *Forbes* annual surveys on executive compensation. Stock price and takeover data are from CRSP. Accounting data and incorporation locations of the firms are from COMPUSTAT, supplemented by Compact D/SEC and proxy statements. All monetary items are restated into a constant dollar of 1991 using the Consumer Price Index at the end of the fiscal year. *AfterLAW* is a dummy variable equal to 1 starting one year after the passage of the first second-generation antitakeover law by the state in which the firm is incorporated and zero otherwise. *Director/officer stock holdings* represents the percentage of common stock beneficially held by the directors and officers. *CEO stock holdings* represents the percentage of common stock owned by the CEO. The tests are two-tailed.

Because less than 1% of the dependent variable observations are zero, we use OLS [with AR(1) Newey-West corrected standard errors] instead of Tobit analysis.¹⁶ For multivariate analysis, we use OLS panel data analysis with fixed-effect two-digit SIC dummies, as well as year dummies to control for time trends.¹⁷ The advantage of this specification is that it controls for across-industry variation as well as variation caused by secular trends (year dummies can incorporate nonlinear time trends such as mean reverting secular trends; Section 3.4 tests for treatment-specific time trends).¹⁸ Our use of ownership levels as the dependent variable, along with the employment of industry-level indicator variables, is consistent with the approach in Demsetz and Lehn (1985).

The univariate correlations in Table 3, show that total management ownership (director and officer shareholdings) and CEO ownership decline significantly after the passage of the antitakeover laws. Similar to the univariate tests, the multivariate results in the first column of Table 4, indicate a significant decline in ownership, with a coefficient on

¹⁶ Our choice of the OLS regression technique is consistent with Ofek and Yermack (2000). We also reestimated our regressions using a Tobit specification and found very similar results. This is consistent with Greene (2000, Ch. 20), which indicates that the marginal Tobit effects and OLS coefficients are typically similar.

¹⁷ Variance inflation factors (VIF) are less than 2 in our regressions, suggesting that multicollinearity is not a serious concern.

¹⁸ To the extent that regulated industries are subject to fewer takeover threats [Mitchell and Mulherin (1996)], managers in such industries may have different reactions to the passage of antitakeover laws. Industry dummies also act as a control for the effects of regulation.

Table 4

The effect of antitakeover laws on director and officer stock holdings—panel regression with industry and year dummies: Director/officer stock holdings

Dependent variable	ln[1+director/officer stock holdings (%)]		ln[1+director/officer stock holdings (%)]	
Independent variables	β	p	β	p
Intercept (?)	3.099	.000	3.806	.000
AfterLAW (–)	–0.095	.025	–0.108	.016
ln(market value) (–)	–0.274	.000	–0.391	.000
Annual stock return (+)	0.106	.014	0.162	.000
Market-to-book (+)	0.203	.000	0.276	.000
Firm risk (?)	–0.276	.016	–0.305	.017
Leverage (–)	–0.255	.117		
ln(1+Block) (+)	0.263	.000		
Target (?)	–0.288	.004		
Taken (?)	–0.247	.016		
Sample size	4155		4157	
Adjusted R^2	47.26%		38.86%	

Data are for 587 *Forbes* 500 firms over 1984–1991 and are obtained from proxy statements, 10-Ks, and *Forbes* annual surveys on executive compensation. Stock price and takeover data are from CRSP. Accounting data and incorporation locations of the firms are from COMPUSTAT, supplemented by Compact D/SEC and proxy statements. All monetary items are restated into a constant dollar of 1991 using the Consumer Price Index at the end of the fiscal year. *Director/officer stock holdings* represents the percentage of common stock beneficially held by the directors and officers. A *blockholder* is an individual who owns at least 5% of the common stock. An *inside director* is a director of the board who is an officer or a former officer of the firm. An *outside director* is a director of the board who is not an officer, a former officer, or a relative of an officer, and who does not have substantial business relationships with the company. *AfterLAW* is a dummy variable equal to one starting one year after the passage of the first second-generation antitakeover law by the state in which the firm is incorporated, and zero otherwise. *Ln(market value)* is the log of the market value of equity. *Market-to-book* is the ratio of the market value of equity plus book value of debt to the book value of assets. *Firm risk* is the sample variance of daily logarithmic stock returns for the last 120 trading days of the fiscal year. *Leverage* is total debt divided by total assets. *Block* is the percentage of common stock of the largest block not directly owned by a director of the board; if the block is less than 5% we code it as zero. *Target* is a dummy equal to 1 if the firm receives a bid offer within a year or has an open bid offer, and zero otherwise. *Taken* is a dummy equal to 1 if the firm is taken over within two years, and zero otherwise. Year and (two-digit SIC) industry dummies are included, but not reported. The results use AR(1) Newey-West corrected standard errors. The tests are two-tailed.

the *AfterLAW* dummy of -0.095 (p -value = .025).¹⁹ Using the median level of ownership, this implies that the total director/officer shareholdings fall by approximately 12.3% after the passage of the antitakeover laws.²⁰ Given our use of year-dummies, note that this result does not

¹⁹ In our regression of stock levels, we attribute a negative coefficient on a regressor to stock sales because a sale is the most likely explanation for reduction in managerial stock ownership levels. In addition to stock sales, stock ownership levels are also affected by option exercises. Unfortunately, because the SEC did not mandate detailed compensation disclosure in our study's time-period, we do not have option exercise data. However, note that exercises can only *increase* stock holdings. Moreover, in Section 4, we examine sales directly by using insider trading data.

²⁰ The median ownership percentage of 2.8 is transformed into a dependent variable magnitude of $\ln(1 + 2.8)$, or 1.335. A reduction in this of 0.095 after the passage of antitakeover laws leads to a new transformed magnitude of 1.24. In turn, this implies an ownership percentage level of $[\exp(1.24) - 1]$, or 2.456, which represents a 12.3% decline from the median. A similar computation using the mean ownership level of 8.2% yields a reduction in ownership of 10.2%, attesting to the robustness of the magnitude we report.

reflect a time trend. Further, *AfterLAW* becomes unity one year after the passage of the law, so this result is not driven by managers selling in anticipation of the passage of the law (e.g., managers who sell because they do not expect to receive high takeover premiums in the future). Finally, because our sample extends fairly evenly across the pre- and post-passage periods (mean of *AfterLAW* is 0.45), these effects are not transient, but medium-term in nature.

The control variables behave as predicted. Consistent with the size effect, management of large firms is likely to have significantly lower ownership shares. Management of firms with more investment opportunities is likely to have significantly more ownership shares (Demsetz and Lehn 1985). Contemporaneous annual stock returns are significant and positive. This result is consistent with Ofek and Yermack (2000), who find that the number of shares owned by managers increases significantly with stock price [in the columns in Ofek and Yermack (2000, Table II) where this association is negative, it is insignificant]. An important distinction, however, is that prior to 1991, which is the time period covered by this study, managers could not immediately sell shares from option exercises. In this period, Carpenter and Remmers (2001) find that the conversion of options to shares is followed by high stock returns, so that the forced increase in stock ownership coincides with positive stock price performance. Our positive coefficient is also consistent with this evidence.²¹ Finally, managers own significantly more shares in firms with large outside owners, consistent with the view that large outside owners make corporate control contests easier for raiders.

A potential concern with our inclusion of variables that control for leverage, blockholdings, and participation in the market for corporate control is the possibility that these variables might be endogenous to the passage of the antitakeover laws [e.g., Garvey and Hanka (1999)]. The second column of Table 4 presents the results of a regression without the leverage, blockholdings, *Target* and *Taken* regressors. Our results continue to hold; in particular, *AfterLaw* is significantly negative with a magnitude similar to that in the regression with the control variables. For the rest of the paper, we revert to the specification that includes all of our controls.

Morck, Shleifer, and Vishny (1988) argue that control effects are prominent only when the share ownership of the management has reached a certain threshold. We examine such threshold effects by testing whether there is a decline in the proportion of blockholders on the board of directors who own more than 5% of the stock. Table 5 reports the results.

²¹ We include the succeeding year's stock return as an additional regressor to control for the possibility that the manager sells shares because he is privately informed about bad news that becomes public sometime next year. This regressor does not change our results.

Table 5

The effect of antitakeover laws on director and officer stock holdings — panel regression with industry and year dummies: Blockholders on the board (persons who own at least 5% of the stock)

Dependent variable	Number of directors who are blockholders/ board size (%)		Number of inside directors who are blockholders/ board size (%)		Number of outside directors who are blockholders/ board size (%)	
Independent variables	β	p	β	p	β	p
Intercept (?)	14.416	.000	10.047	.000	1.784	.086
AfterLAW (–)	–1.060	.010	–1.326	.001	0.137	.195
ln(market value) (–)	–1.558	.000	–1.214	.000	–0.154	.399
Annual stock return (+)	0.835	.676	0.354	.547	0.339	.211
Market-to-book (+)	1.356	.001	1.321	.000	0.039	.923
Firm risk (?)	0.921	.886	1.729	.306	–0.317	.225
Leverage (–)	–6.658	.001	–5.775	.001	0.409	.009
ln(1+Block) (+)	0.972	.000	1.154	.000	–0.130	.000
Target (?)	–0.702	.481	–0.371	.808	–0.213	.044
Taken (?)	–1.894	.004	–1.097	.075	–0.585	.000
Sample size	4162		4162		4162	
Adjusted R^2	22.05%		21.60%		4.33%	

Data are for 587 *Forbes* 500 firms over 1984–1991 and are obtained from proxy statements, 10-Ks, and *Forbes* annual surveys on executive compensation. Stock price and takeover data are from CRSP. Accounting data and incorporation locations of the firms are from COMPUSTAT, supplemented by Compact D/SEC and proxy statements. All monetary items are restated into a constant dollar of 1991 using the Consumer Price Index at the end of the fiscal year. *Director/officer stock holdings* represents the percentage of common stock beneficially held by the directors and officers. A *blockholder* is an individual who owns at least 5% of the common stock. An *inside director* is a director of the board who is an officer or a former officer of the firm. An *outside director* is a director of the board who is not an officer, a former officer, or a relative of an officer, and who does not have substantial business relationships with the company. *AfterLAW* is a dummy variable equal to one starting one year after the passage of the first second-generation antitakeover law by the state in which the firm is incorporated, and zero otherwise. *Ln(market value)* is the log of the market value of equity. *Market-to-book* is the ratio of the market value of equity plus book value of debt to the book value of assets. *Firm risk* is the sample variance of daily logarithmic stock returns for the last 120 trading days of the fiscal year. *Leverage* is total debt divided by total assets. *Block* is the percentage of common stock of the largest block not directly owned by a director of the board; if the block is less than 5% we code it as zero. *Target* is a dummy equal to 1 if the firm receives a bid offer within a year or has an open bid offer, and zero otherwise. *Taken* is a dummy equal to 1 if the firm is taken over within two years, and zero otherwise. Year and (two-digit SIC) industry dummies are included, but not reported. The results use AR(1) Newey-West corrected standard errors. The tests are two-tailed.

The first column indicates that the overall proportion of blockholder directors falls significantly after the passage of the antitakeover laws (coefficient = -1.06 , p -value = .01). Further examining the source of this decline, the second and third columns of Table 5 indicate that the decline comes primarily from *inside* directors, who are part of the management and run the firm on a daily basis, and who have much to lose in a takeover. This result further supports our control-based inference for changes in managerial ownership after the passage of antitakeover laws.

3.2 Cross-sectional variation

We now explore cross-sectional variation in our hypothesis. In Section 1, we conjectured that the effect of antitakeover laws on managerial shareholding choice is more pronounced for managers with higher levels of

Table 6

The effect of antitakeover laws on director/officer stock holdings as a function of director/officer stock holdings at the end of the year immediately before the passage of antitakeover laws — panel regression with industry and year dummies

Dependent variable	ln[1+director/officer stock holdings (%)]			
	Director/officer stock holdings at the end of the year immediately before the passage of the incorporation state's antitakeover law is less than the sample median (2.7%)		Director/officer stock holdings at the end of the year immediately before the passage of the incorporation state's antitakeover law is greater than or equal to the sample median (2.7%)	
Independent variables	β	p	β	p
Intercept (?)	1.464	.004	2.688	.000
AfterLAW (—)	0.003	.911	—0.093	.082
ln(market value) (—)	—0.122	.000	—0.078	.001
Annual stock return (+)	0.065	.140	0.000	.982
Market-to-book (+)	0.093	.000	0.089	.000
Firm risk (?)	—0.138	.183	0.006	.979
Leverage (—)	0.211	.050	—0.574	.000
ln(1+Block) (+)	0.036	.011	0.334	.000
Target (?)	—0.086	.191	—0.237	.127
Taken (?)	0.027	.773	—0.133	.422
Sample size	1729		1773	
Adjusted R^2	38.18%		43.60%	

Data are for 587 *Forbes* 500 firms over 1984–1991 and are obtained from proxy statements, 10-Ks, and *Forbes* annual surveys on executive compensation. Stock price and takeover data are from CRSP. Accounting data and incorporation locations of the firms are from COMPUSTAT, supplemented by Compact D/SEC and proxy statements. All monetary items are restated into a constant dollar of 1991 using the Consumer Price Index at the end of the fiscal year. *Director/officer stock holdings* represents the percentage of common stock beneficially held by the directors and officers. *AfterLAW* is a dummy variable equal to one starting one year after the passage of the first second-generation antitakeover law by the state in which the firm is incorporated, and zero otherwise. *Ln(market value)* is the log of the market value of equity. *Market-to-book* is the ratio of the market value of equity plus book value of debt to the book value of assets. *Firm risk* is the sample variance of daily logarithmic stock returns for the last 120 trading days of the fiscal year. *Leverage* is total debt divided by total assets. *Block* is the percentage of common stock of the largest block not directly owned by a director of the board; if the block is less than 5% we code it as 0. *Target* is a dummy equal to 1 if the firm receives a bid offer within a year or has an open bid offer, and zero otherwise. *Taken* is a dummy equal to 1 if the firm is taken over within two years, and zero otherwise. Year and (two-digit SIC) industry dummies are included, but not reported. The results use AR(1) Newey-West corrected standard errors. The tests are two-tailed.

ownership. To test this, we partition our sample into two subsamples based on whether the officer and director ownership at the end of the year immediately before the passage of the first law exceeded 2.7% of total shares outstanding, the sample median for firm-years just prior to passage of the laws.²² Table 6 provides the results of this analysis. For the

²² Morck, Shleifer, and Vishny (1988) conjecture that the entrenchment effect decreases once managerial ownership reaches extremely high levels, but their corresponding empirical evidence is *insignificant* at the 10% level in all but one of their tests. Consequently, we do not test a similar conjecture in our setting. Our approach of splitting the sample into two rather than three subsamples mirrors Garvey and Hanka (1999) and Ofek and Yermack (2000).

Table 7

The effect of antitakeover laws on director/officer stock holdings as a function of poison pills — panel regression with industry and year dummies

Dependent variable	ln(1+director/officer stock holdings)			
	Firm-year observations for firms without poison pills before the passage of the incorporation state's antitakeover law		Firm-year observations for firms with poison pills before the passage of the incorporation state's antitakeover law	
Independent Variables	β	p	β	p
Intercept (?)	2.939	.000	3.339	.000
AfterLAW (—)	–0.080	.086	0.117	.214
ln(market value) (—)	–0.276	.000	–0.295	.000
Annual stock return (+)	0.122	.009	0.043	.650
Market-to-book (+)	0.216	.000	0.033	.604
Firm risk (?)	–0.287	.017	–0.442	.035
Leverage (—)	–0.079	.477	–0.370	.219
ln(1+Block) (+)	0.275	.000	0.115	.000
Target (?)	–0.223	.210	–0.305	.002
Taken (?)	–0.275	.019	–0.161	.199
Sample size	3099		717	
Adjusted R^2	50.62%		52.74%	

Data are for 587 *Forbes* 500 firms over 1984–1991 and are obtained from proxy statements, 10-Ks, and *Forbes* annual surveys on executive compensation. Stock price and takeover data are from CRSP. Accounting data and incorporation locations of the firms are from COMPUSTAT, supplemented by Compact D/SEC and proxy statements. All monetary items are restated into a constant dollar of 1991 using the Consumer Price Index at the end of the fiscal year. *Director/officer stock holdings* represents the percentage of common stock beneficially held by the directors and officers. *AfterLAW* is a dummy variable equal to 1 starting one year after the passage of the first second-generation antitakeover law by the state in which the firm is incorporated, and zero otherwise. *Ln(market value)* is the log of the market value of equity. *Market-to-book* is the ratio of the market value of equity plus book value of debt to the book value of assets. *Firm risk* is the sample variance of daily logarithmic stock returns for the last 120 trading days of the fiscal year. *Leverage* is total debt divided by total assets. *Block* is the percentage of common stock of the largest block not directly owned by a director of the board; if the block is less than 5% we code it as zero. *Target* is a dummy equal to 1 if the firm receives a bid offer within a year or has an open bid offer, and zero otherwise. *Taken* is a dummy equal to 1 if the firm is taken over within two years, and zero otherwise. Year and (two-digit SIC) industry dummies are included, but not reported. The results use AR(1) Newey-West corrected standard errors. The tests are two-tailed.

subsample of higher levels of ownership, we find results analogous to those obtained earlier for the full sample, with ownership declining post-passage. In contrast, the coefficient on *AfterLAW* is statistically indistinguishable from zero for the low ownership subsample.²³

Table 7 examines ownership levels by splitting the firms into two subsamples depending on whether the firm had a poison pill in place when its incorporation state passed its antitakeover law. For firms without poison pills, we find that managers decrease their ownership levels significantly (coefficient = -0.08 , p -value = .086). On the other hand, the managers of firms with poison pills make no changes to their ownership

²³ Tobit analysis of the low ownership group gives the same results.

(coefficient = 0.117, p -value = .214), suggesting that these managers are already protected by poison pills. Karpoff and Malatesta (1989) document a similar substitution effect by showing that investor reaction to the passage of antitakeover laws is insignificant for firms with poison pills. Our finding of little change in managerial ownership behavior in such firms in response to the passage of antitakeover laws is consistent with the ex ante investor expectations implied by Karpoff and Malatesta's (1989) findings. Moreover, this poison pill-based cross-sectional variation in managerial ownership behavior is unlikely to be associated with alternative sell-off explanations such as private information, managerial liquidity, or investment preferences, thus making it difficult to impute such motivations to our findings.

3.3 Dynamics of managerial behavior

As discussed in Section 1.3, a potential alternative explanation for our findings is that managers receive more option grants post-passage, and lower share ownership levels post-passage are simply the outcome of the ensuing risk rebalancing process. To the extent we could control for changes in the amount of options awarded to managers before and after the passage of antitakeover laws, we would have more confidence in attributing control motives to changes in managerial shareholdings.

Unfortunately, the *Forbes* dataset does not have option grant data for all officers and directors (mandatory disclosure of compensation by the SEC was limited prior to 1992). However, we do have access to such data for the CEO alone. We therefore rerun our multivariate regressions as before, but using only the CEO's stock holdings as the dependent variable and including CEO option grants as a regressor. From a managerial perspective, Gibbons and Murphy (1992) argue that career considerations also affect managerial compensation and ownership. Accordingly, we include CEO tenure as an additional control in this regression. We note that CEO ownership is cross-sectionally correlated with total management ownership at 0.7 (Table 3), suggesting that results we derive for the CEO may be generalizable to the total management team.

The results are presented in Table 8.²⁴ Note that *AfterLAW* is again significantly negative, with a magnitude of -0.09 (p -value = .008). Our main result of interest thus continues to hold even after incorporating the risk-rebalancing dynamics of the CEO. Moreover, consistent with Ofek and Yermack's (2000) argument that managers sell shares upon receiving option grants, the coefficient on option grants is significantly negative at -0.338 (p -value = .009).

²⁴ Our option grants variable measures grants *within* the year, whereas ownership level is at *year-end*. This timing specification is consistent with Ofek and Yermack (2000), who also examine contemporaneous associations between grants and sales.

Table 8

The effect of antitakeover laws on the relation between CEO option grants and stock holdings — panel regression with firm and year dummies

Dependent variable	ln [1 + CEO stock holdings (%)]	
Independent variables	β	<i>p</i>
Intercept (?)	0.522	.000
AfterLAW (–)	–0.092	.008
ln(1 + CEO option grant) (–)	–0.338	.009
ln(market value) (–)	–0.154	.000
Annual stock return (+)	0.178	.000
Market-to-book (+)	0.089	.002
Firm risk (?)	0.252	.010
Leverage (–)	–0.155	.132
ln(1 + Block) (+)	0.163	.000
ln(1 + Years as CEO) (+)	0.337	.000
Target (?)	–0.103	.466
Taken (?)	–0.082	.406
Sample size	4132	
Adjusted <i>R</i> ²	41.49%	

Data are for 587 *Forbes* 500 firms over 1984–1991 and are obtained from proxy statements, 10-Ks, and *Forbes* annual surveys on executive compensation. Stock price and takeover data are from CRSP. Accounting data and incorporation locations of the firms are from COMPUSTAT, supplemented by Compact D/SEC and proxy statements. All monetary items are restated into a constant dollar of 1991 using the Consumer Price Index at the end of the fiscal year. *CEO stock holdings* represents the percentage of common stock owned by the CEO. *AfterLAW* is a dummy variable equal to 1 starting one year after the passage of the first second-generation antitakeover law by the state in which the firm is incorporated, and zero otherwise. *CEO option grant* is the number of stock options granted to the CEO in the fiscal year as a percentage of the number of common shares outstanding. *Ln(market value)* is the log of the market value of equity. *Market-to-book* is the ratio of the market value of equity plus book value of debt to the book value of assets. *Firm risk* is the sample variance of daily logarithmic stock returns for the last 120 trading days of the fiscal year. *Leverage* is total debt divided by total assets. *Block* is the percentage of common stock of the largest block not directly owned by a director of the board; if the block is less than 5% we code it as zero. *Target* is a dummy equal to 1 if the firm receives a bid offer within a year or has an open bid offer, and zero otherwise. *Taken* is a dummy equal to 1 if the firm is taken over within two years, and zero otherwise. Year and industry dummies are included, but not reported. The results use AR(1) Newey-West corrected standard errors. The tests are two-tailed.

3.4 Sensitivity analyses

Our dependent variable is based on the level of management ownership scaled by total shares outstanding. One possibility is that our results are driven by changes in the denominator. However, in a regression of log of shares outstanding on year dummies and *AfterLAW*, we find that the coefficient on *AfterLAW* is insignificant, suggesting that this is not the case. We also regress log of shares outstanding on the full regression in Tables 4 and 5. *AfterLAW* has a negative coefficient (–0.04, *p* = .02), which works against finding a negative coefficient on scaled managerial ownership.

As sensitivity checks, we conduct several variants of the analysis in the first column of Table 4. To begin, our previous analyses assume that the coverage of the laws took effect upon passage. However, there is some ambiguity surrounding this issue (Comment and Schwert 1995). To examine the sensitivity of our results to this assumption, we implement

new analyses based on alternative assumptions. First, we assume that the validity of the laws was not clear until 1987, when the U.S. Supreme Court ruled affirmatively on the validity of the second-generation laws (*Dynamics v. CTS*). We modify *AfterLAW* to *AfterSUP*, which is a dummy variable equal to 1 if it is after 1987 and after the passage of any antitakeover laws by the state in which the firm is incorporated, and zero otherwise. The results based on this assumption are similar to those reported earlier, with a coefficient on *AfterSUP* in the Table 4 specification of -0.087 ($p = .078$). Second, the variable *AfterLAW* becomes 1 a year after the law is passed. Our rationale for this choice is that any managerial actions just before the law's passage are classified as pre-passage. As a sensitivity check, we re-code *AfterLAW* to be 1 in the year of the law's passage. We find that the coefficient of the new *AfterLAW* in the Table 4 regression is -0.107 ($p = .008$). Finally, we run regressions excluding the observations of firm-years in which the first law was passed. We obtain a similar main effect for the laws of -0.125 ($p = .012$), attesting to the robustness of our findings.²⁵

Bertrand and Mullainathan (1999a) argue that BC laws were the most powerful of the three forms of second-generation antitakeover legislation. We replicate our tests replacing *AfterLAW* by *AfterBC* (an indicator of the passage of BC laws alone). We find similar results, with a significantly negative coefficient on *AfterBC* (coefficient = -0.104 , $p = .012$).

As noted earlier, about half the firms in our sample are incorporated in Delaware. One could argue, therefore, that the results are idiosyncratic to some Delaware effect or a time-period effect, because all Delaware firms receive the shock in the same year. Dropping the Delaware firms removes this effect, and given the variation in the adoption years across states (Table 1), creates a subsample with a more *staggered* time-series pattern of the passage of antitakeover laws. The coefficient of antitakeover laws in the subsample is -0.141 ($p = .004$).²⁶

Firms typically did not choose to optout of antitakeover laws, except in three specific states—Massachusetts, Ohio, and Pennsylvania—whose antitakeover laws were considered especially severe [Subramanian (2001)]. Szewczyk and Tsetsekos (1992) note that firms that opted out of Pennsylvania's antitakeover law (Pennsylvania Senate Bill 1310) recovered a portion of the shareholder's wealth that was lost when the law was first passed. To test the robustness of our results to opt-out considerations, we drop all firms incorporated in these three states. Our results continue to hold in the remaining sample (coefficient of *AfterLAW* = -0.095 , $p = .039$).

²⁵ We also obtain results analogous to those in Table 4, under a median regression estimation technique.

²⁶ As an alternative specification, we ran the tests with the full sample, but with a Delaware dummy. We obtain similar results for this specification as well.

We next address the issue of whether our findings arise due to mean reversion. Note that the control year dummies used in our regressions can incorporate nonlinear time trends, including mean-reverting secular trends. However, to explicitly show that the decreased level of ownership is not an artifact of mean reversion, we also eliminate firms whose management had an *unbroken* nondecreasing trend in ownership levels in the years prior to the passage of the antitakeover laws. The rationale is that these firms are most likely to experience subsequent mean reversion in managerial ownership [Garvey and Hanka (1999, p. 533) conduct a similar test]. In the remaining sample of 457 firms, we find similar results (coefficient of *AfterLAW* = -0.121 , $p = .082$).

Finally, although we have controlled for a time trend, it could be the case that the time-trends vary systematically across legislating and non-legislating states. Following Bertrand, Duflo, and Mullainathan (2004, Section 4), we allow for treatment-specific trends in the regression. We include an indicator that the state passed an antitakeover law, as well as its interactions with year dummies. We obtain an *AfterLAW* coefficient of -0.084 ($p = .031$), reinforcing our main finding.

4. Firm-Level Analyses: Changes Specifications

Section 3 uses firm-year panel regressions. While this specification is predominant in the literature on exogenous shocks, Bertrand, Duflo, and Mullainathan (2004) argue that such panel regressions overstate the significance of the results. Specifically, they show that the overstatement does not arise from group-wise effects or heteroskedasticity, but rather the presence of serial correlation in the indicator variable measuring the exogenous shock.²⁷ In our setting, for example, *AfterLAW* is consecutively zero for several periods and then consecutively 1 for several periods. In the presence of such autocorrelation, each firm-year observation provides little new information, and so a typical panel regression obtains significant results by overstating the number of observations. Although we use AR(1) Newey-West corrected standard errors, Bertrand, Duflo, and Mullainathan (2004) note that such parametric corrections may be insufficient.

One solution proposed by Bertrand, Duflo, and Mullainathan (2004) is the use of block bootstrapping. Block bootstrapping essentially samples blocks of observations, rather than individual observations, with replacement [see, e.g., Hall, Horowitz, and Jing (1995)]. The advantage of block resampling with replacement is that the serial dependence of the data is preserved. An open question in the literature is the optimal choice of block length (the blocks should ideally be chosen to minimize interblock serial

²⁷ Our results in Table 4, e.g., are robust to state-of-incorporation cluster corrections in the standard errors.

dependence). In our context, Bertrand, Duflo, and Mullainathan (2004) suggest the use of states as blocks. Accordingly, we block the data by the state of incorporation and implement the bootstrap procedure for our main regression in the first column of Table 4. We repeat the procedure 100 times and compute the empirical distribution of the *AfterLaw* coefficient. We find a mean coefficient of -0.109 , and a median coefficient of -0.115 . Both coefficients are significantly negative at the $p < .0001$ level, based on the empirical distribution of the 100 block bootstrap samples. Also note that these magnitudes are almost identical to those derived in Table 4.

A second alternative that Bertrand, Duflo, and Mullainathan (2004, Section 4.3) propose is to collapse the multiple observations for each firm into a single observation. In line with this, we next examine the changes in managerial ownership for each firm across the passage of the antitakeover laws. This approach results in one observation per treatment firm (we explain below how we account for control firms). An additional advantage of a changes specification is that fixed and time-invariant group effects cancel out, thus alleviating concerns that such effects might be driving our results.

Given our interest in medium-run effects, we compute for each firm the average managerial ownership, as a percentage of total shares outstanding, in the sample years before the passage of the antitakeover laws in the firm's incorporation state and the average managerial ownership (as a percentage of total shares outstanding) in the sample years *after* the passage of antitakeover laws.²⁸

Since managerial ownership levels are highly skewed (see Section 3), the firm-specific differences in these levels across the passage of the antitakeover laws are also skewed. To alleviate the effect of outliers, we use $\ln(1 + \text{change in managerial ownership})$, similar to our approach of using $\ln(1 + \text{managerial ownership})$ in Section 3. As ownership changes can be either positive or negative, we modify the monotonic transformation to: $\text{sign}(\text{change}) * \ln(1 + |\text{change}|)$. This transformation keeps the sign while attenuating the magnitude of large observations and preserving the magnitude of small observations [note that $\ln(1 + x) \approx x$ for small x]. It is important to note that our results do not depend on this transformation. We obtain similar results for other concave transformations, such as square root [i.e., $\text{sign}(x) * \sqrt{|x|}$] that attenuate the magnitude of observations. We also present nonparametric findings in support of our hypotheses.

Table 9 provides quantile and univariate statistics on the ownership change measure. The average change in director/officer ownership levels is

²⁸ Our results are unchanged if we restrict the sample to firms with at least three observations before and three observations after the passage of the antitakeover laws in the firms' incorporation states.

Table 9

Firm-specific changes in director/officer stock holdings: Overall managerial ownership change after the passage of incorporation state's antitakeover law

Variable	Number of firms	Mean (<i>p</i> -value)	10th %ile	20th %ile	30th %ile	40th %ile	50th %ile	60th %ile	70th %ile	80th %ile	90th %ile
ln(firm-specific change in average director/officer ownership)	467	-.157 (.006)	-1.740	-1.092	-0.626	-0.281	-0.033	0.072	0.288	0.629	1.316

Data are for 587 *Forbes* 500 firms over 1984–1991 and are obtained from proxy statements, 10-Ks, and *Forbes* annual surveys on executive compensation. *Director/officer stock holdings* represents the percentage of common stock beneficially held by the directors and officers. *Change in average director/officer ownership* is average director/officer stock holdings for each firm in the years *after* the passage of the first second-generation antitakeover law in the firm's incorporation state minus average director/officer stock holdings for the same firms in the years *before* the antitakeover law. $\ln(x)$ in the following table is defined as $\text{sign}(x) \times \ln\{1 + |x|\}$, where $\text{sign}(x) = 1$ if $x \geq 0$, and $= -1$, if $x < 0$. The results use White's corrected standard errors. The tests are two-tailed.

significantly negative (mean change = -0.157 , p -value = $.006$). The median is also negative (-0.033), indicating that the managerial ownership decline is prevalent in more than half the sample firms (note that the sign of the median is immune to our log transformation). Finally, note that the magnitudes of the ownership declines in the quantiles below the median and dominate the magnitudes of increases in the corresponding upper quantiles.

A shortcoming of the univariate tests above is that they do not compare ownership change relative to a control firm sample. We use a multivariate test to account for this effect. We define the control sample as firms from nonlegislating states. For each treatment firm under observation, we compute the average ownership change for the control sample over the same period, and use this measure as a regressor. Another implicit assumption in computing firm-specific changes is that the firm is its own control. Nevertheless, it is possible that the firm, while still the same legal entity, could have changed enough over time to be a poor control for itself. Our earlier panel regressions in Section 3 controlled for this possibility by explicitly incorporating various firm characteristics as regressors. We next follow an analogous approach in changes by including changes in firm characteristics as controls for changes in ownership levels. The changes in firm characteristics are computed over the same time period as the ownership level changes. We exclude industry dummies as they do not change over time.

Table 10 presents the multivariate results. After controlling for changes in firm characteristics as well as contemporaneous changes in the control sample ownership, the average drop or the intercept is still significantly negative at -0.19 (p -value = $.045$). Moreover, the magnitude of the coefficient is similar to the univariate drop in Table 9. Tables 11 and 12 conduct

Table 10**Firm-specific changes in director/officer stock holdings: Multivariate analysis of overall managerial ownership change after the passage of incorporation state's antitakeover law**

Dependent variable	ln [change in director/officer stock holdings (%)]	
Independent variables	β	p
Intercept (—)	−0.191	.045
ln(change in market value) (—)	−0.020	.151
Change in annual stock return (+)	−0.017	.934
Change in market-to-book (+)	0.505	.000
Change in firm risk (?)	−0.562	.161
Change in leverage (—)	0.321	.621
ln(change in block) (+)	0.246	.000
Change in target (?)	0.143	.661
Change in taken (?)	−0.315	.411
ln(ownership trend) (+)	−0.573	.184
Sample number of firms	426	
Adjusted R^2	15.31%	

Data are for 587 *Forbes* 500 firms over 1984–1991 and are obtained from proxy statements, 10-Ks, and *Forbes* annual surveys on executive compensation. *Director/officer stock holdings* represents the percentage of common stock beneficially held by the directors and officers. *Change in average director/officer ownership* is average director/officer stock holdings for each firm in the years *after* the passage of the first second-generation antitakeover law in the firm's incorporation state minus average director/officer stock holdings for the same firms in the years *before* the antitakeover law. *Market value* is the market value of equity. *Market-to-book* is the ratio of the market value of equity plus book value of debt to the book value of assets. *Firm risk* is the sample variance of daily logarithmic stock returns for the last 120 trading days of the fiscal year. *Leverage* is the total debt divided by total assets. *Block* is the percentage of common stock of the largest block not directly owned by a director of the board; if the block is less than 5% we code it as zero. *Target* is a dummy equal to 1 if the firm receives a bid offer within a year or has an open bid offer, and zero otherwise. *Taken* is a dummy equal to 1 if the firm is taken over within two years, and zero otherwise. *Change* for the control variables is the average value of the variable for each firm in the years *after* the passage of the first second-generation antitakeover law in the firm's incorporation state minus the average value of the variable for the same firms in the years *before* the antitakeover law. *Ownership trend* for each firm is the upto three-year average of the median of director/officer stock holdings of the control firms (i.e., firms in states without passing any antitakeover laws during 1984–1991) *after* the passage of the first antitakeover law in the incorporation state of the firm under observation minus the upto three-year average of the median of director/officer stock holdings of the control firms *before* the passage of the first antitakeover law in the incorporation state of the firm under observation. Since industry dummies do not change with time, we exclude them. ln(x) in the following table is defined as $\text{sign}(x) \times \ln\{1 + |x|\}$, where $\text{sign}(x) = 1$ if $x \geq 0$, and $= -1$, if $x < 0$. The results use White's corrected standard errors. The tests are two-tailed.

comparative statics by splitting the sample by ownership levels and poison pills, similar to Tables 6 and 7. Table 11 also finds that ownership levels decline significantly for management teams with high ownership (intercept coefficient = -0.38 , p -value = $.017$). At low ownership levels (less than the sample median), the ownership change is insignificant. This suggests, as in our prior results, that the management's control is too tenuous at low ownership levels for the passage of antitakeover laws to have a marginal impact on ownership. Interestingly, we can interpret the -0.38 coefficient as denoting that the managerial ownership level falls by 0.31% of shares outstanding after the passage of antitakeover laws [$\ln(1 + x) = -0.38$ is the approximately the same as $x = -0.31$]. Given the

Table 11

Firm-specific changes in director/officer stock holdings: The effect of antitakeover laws on changes in director/officer stock holdings as a function of director/officer stock holdings at the end of the year immediately before the passage of antitakeover laws

Dependent variable	ln [change in director/officer stock holdings (%)]			
	Director/officer stock holdings at the end of the year immediately before the passage of the incorporation state's antitakeover law is less than the sample median (2.7%)		Director/officer stock holdings at the end of the year immediately before the passage of the incorporation state's antitakeover law is greater than or equal to the sample median (2.7%)	
Independent variables	β	p	β	p
Intercept (—)	0.054	.567	-0.377	.017
ln(change in market value) (—)	0.002	.907	-0.031	.201
Change in annual stock return (+)	0.029	.893	-0.106	.707
Change in market-to-book (+)	-0.003	.980	0.636	.000
Change in firm risk (?)	-0.035	.937	-0.804	.047
Change in leverage (—)	0.714	.183	0.330	.761
ln(change in block) (+)	0.127	.035	0.281	.000
Change in target (?)	0.101	.783	0.323	.595
Change in taken (?)	-0.405	.323	-0.404	.516
ln(ownership trend) (+)	-0.609	.190	-0.183	.814
Sample number of firms	207		219	
Adjusted R^2	3.67%		17.14%	

Data are for 587 *Forbes* 500 firms over 1984–1991 and are obtained from proxy statements, 10-Ks, and *Forbes* annual surveys on executive compensation. *Director/officer stock holdings* represents the percentage of common stock beneficially held by the directors and officers. *Change in average director/officer ownership* is average director/officer stock holdings for each firm in the years *after* the passage of the first second-generation antitakeover law in the firm's incorporation state minus average director/officer stock holdings for the same firms in the years *before* the antitakeover law. *Market value* is the market value of equity. *Market-to-book* is the ratio of the market value of equity plus book value of debt to the book value of assets. *Firm risk* is the sample variance of daily logarithmic stock returns for the last 120 trading days of the fiscal year. *Leverage* is the total debt divided by total assets. *Block* is the percentage of common stock of the largest block not directly owned by a director of the board; if the block is less than 5% we code it as zero. *Target* is a dummy equal to 1 if the firm receives a bid offer within a year or has an open bid offer, and zero otherwise. *Taken* is a dummy equal to 1 if the firm is taken over within two years, and zero otherwise. *Change* for the control variables is the average value of the variable for each firm in the years *after* the passage of the first second-generation antitakeover law in the firm's incorporation state minus the average value of the variable for the same firms in the years *before* the antitakeover law. *Ownership trend* for each firm is the upto three-year average of the median of director/officer stock holdings of the control firms (i.e., firms in states without passing any antitakeover laws during 1984–1991) *after* the passage of the first antitakeover law in the incorporation state of the firm under observation minus the upto three-year average of the median of director/officer stock holdings of the control firms *before* the passage of the first antitakeover law in the incorporation state of the firm under observation. Since industry dummies do not change with time, we exclude them. $\ln(x)$ in the following table is defined as $\text{sign}(x) \times \ln\{1 + |x|\}$, where $\text{sign}(x) = 1$ if $x \geq 0$, and $= -1$, if $x < 0$. The results use White's corrected standard errors. The tests are two-tailed.

median ownership level of 2.8% of shares outstanding, this suggests that managerial ownership falls by about 11%, similar to the magnitudes we report in Section 3. Finally, Table 12 finds that the change in managerial ownership is significant for firms without poison pills (intercept coefficient = -0.187 , p -value = .09), and is insignificant for firms that

Table 12

Firm-specific changes in director/officer stock holdings: The effect of antitakeover laws on changes in director/officer stock holdings as a function of poison pills

Dependent variable	ln [change in director/officer stock holdings (%)]			
	Firms without poison pills before the passage of the incorporation state's antitakeover law		Firms with poison pills before the passage of the incorporation state's antitakeover law	
Independent variables	β	p	β	p
Intercept (–)	–0.187	.092	–0.029	.924
ln(change in market value) (–)	–0.022	.171	–0.023	.402
Change in annual stock return (+)	–0.016	.944	0.138	.756
Change in market-to-book (+)	0.517	.000	0.321	.287
Change in firm risk (?)	–0.440	.312	–1.148	.212
Change in leverage (–)	0.262	.729	0.176	.894
ln(change in block) (+)	0.304	.000	–0.027	.776
Change in target (?)	0.407	.264	–1.498	.087
Change in taken (?)	–0.478	.232	2.678	.027
ln(ownership trend) (+)	–0.548	.241	–2.270	.367
Sample number of firms	349		77	
Adjusted R^2	19.24%		1.27%	

Data are for 587 *Forbes* 500 firms over 1984–1991 and are obtained from proxy statements, 10-Ks, and *Forbes* annual surveys on executive compensation. *Director/officer stock holdings* represents the percentage of common stock beneficially held by the directors and officers. *Change in average director/officer ownership* is average director/officer stock holdings for each firm in the years *after* the passage of the first second-generation antitakeover law in the firm's incorporation state minus average director/officer stock holdings for the same firms in the years *before* the antitakeover law. *Market value* is the market value of equity. *Market-to-book* is the ratio of the market value of equity plus book value of debt to the book value of assets. *Firm risk* is the sample variance of daily logarithmic stock returns for the last 120 trading days of the fiscal year. *Leverage* is the total debt divided by total assets. *Block* is the percentage of common stock of the largest block not directly owned by a director of the board; if the block is less than 5% we code it as zero. *Target* is a dummy equal to 1 if the firm receives a bid offer within a year or has an open bid offer, and zero otherwise. *Taken* is a dummy equal to 1 if the firm is taken over within two years, and zero otherwise. *Change* for the control variables is the average value of the variable for each firm in the years *after* the passage of the first second-generation antitakeover law in the firm's incorporation state minus the average value of the variable for the same firms in the years *before* the antitakeover law. *Ownership trend* for each firm is the upto three-year average of the median of director/officer stock holdings of the control firms (i.e., firms in states without passing any antitakeover laws during 1984–1991) *after* the passage of the first antitakeover law in the incorporation state of the firm under observation minus the upto three-year average of the median of director/officer stock holdings of the control firms *before* the passage of the first antitakeover law in the incorporation state of the firm under observation. Since industry dummies do not change with time, we exclude them. $\ln(x)$ in the following table is defined as $\text{sign}(x) \times \ln\{1 + |x|\}$, where $\text{sign}(x) = 1$ if $x \geq 0$, and $= -1$, if $x < 0$. The results use White's corrected standard errors. The tests are two-tailed.

have adopted poison pills.²⁹ This is again in line with our earlier findings in Section 3.

Our tests of managerial ownership levels and managerial ownership changes make the important implicit assumption that managerial ownership changes occur because managers buy (or receive) and sell stock. We

²⁹ Univariate tests of ownership changes after splitting the sample by ownership levels and poison pills also yield similar results.

next test this assumption directly by examining insider sales using CDA/Spectrum data from Thomson Financial. Similar to Tables 9–12, we use firm-specific changes as well as control sample trends. For each firm in each year, we measure director/officer net sales as the shares sold by all directors or officers minus shares purchased by all directors or officers, as a percentage of common stock outstanding. For each firm, the change in the average director/officer net sales is defined as: average director/officer net sales in the years after the passage of the first second-generation antitakeover law in the firm's incorporation state minus average director/officer net sales in the years before the passage of the law. Given our interest in medium-run effects, we compute averages over several years pre- and post-passage. As is standard in the insider trading literature (Seyhun 1998), only transactions reported in Form 4 (open market transactions) are included in the analyses. Because we cannot precisely classify whether the trades in the year of the passage of the antitakeover law are pre- or post-passage, we drop all such transactions. Finally, as in Tables 9–12, we use logs to attenuate the magnitude of extreme observations.

Table 13 reports the main results. The average change is significantly positive at 0.065 (p -value = .09). The median is also positive at 0.004, suggesting that the increase in insider sales (net of purchases) is prevalent for at least half the sample firms. Table 14 replicates the findings in a multivariate setting and finds even stronger results consistent with our predictions (intercept coefficient = 0.12, p -value = .07).

Tables 15 and 16 report the comparative statics of the main result in Table 14. Similar to Tables 11 and 6, we find strong evidence that the increase in insider sales activities relative to historical levels are significant for firms with high ownership levels (intercept coefficient = 0.19, p -value = .03), and insignificant for firms with low managerial ownership. Similar to Tables 12 and 7, changes in insider sales activities are significantly positive for firms without poison pills (intercept coefficient = 0.12, p -value = .09), but insignificant for firms with poison pills. Overall, the results in this section using firm-specific changes triangulate well with the panel regressions in Section 3. By collectively supporting our premise that the control protection offered by antitakeover laws will cause managers to lower their risky stock ownership levels, our results establish a control-related motive for managerial stock ownership.

5. Conclusion

From a pure risk-sharing perspective, the manager as a risk-averse agent should hold a fully diversified portfolio. Prior studies suggest several answers for why managers hold risky shares. First, managers may be contractually obligated to hold shares for incentive reasons [Aggarwal

Table 13**Director/officer insider trading: Overall insider sales change after the passage of incorporation state's antitakeover law**

Variables	Number of firms	Predicted value	Mean (<i>p</i> -value)	Median
ln (firm-specific change in director/officer net sales)	393	(+)	.065 (.093)	0.004

Data are for 587 *Forbes 500* firms over 1984–1991. Director/officer trading data are from the CDA/Spectrum database. Only transactions reported in Form 4 are included in the analyses. For each firm in each year, *Director/officer net sales* is the shares sold by all directors or officers minus shares purchased by all directors or officers, as a percentage of common stock outstanding. For each firm, *Change in average director/officer net sales* is: the average director/officer net sales in the years *after* the passage of the first second-generation antitakeover law in the firm's incorporation state minus the average director/officer net sales in the years *before* the passage of the antitakeover law. The year of the passage of the antitakeover law is excluded in these computations. $\ln(x)$ is defined as $\text{sign}(x) \times \ln\{1 + |x|\}$, where $\text{sign}(x) = 1$ if $x \geq 0$, and $= -1$, if $x < 0$. The results use White's corrected standard errors. The tests are two-tailed.

Table 14**Director/officer insider trading: Multivariate analysis of overall insider sales change after the passage of incorporation state's antitakeover law**

Dependent variable	ln [change in director/officer net sales (%)]	
Independent variables	β	<i>p</i>
Intercept (+)	0.123	.070
ln(change in market value) (+)	−0.008	.340
Change in annual stock return (−)	−0.133	.143
Change in market-to-book (−)	−0.044	.257
Change in firm risk (?)	−0.113	.297
Change in leverage (+)	−0.100	.538
ln(change in block) (−)	0.015	.419
Change in target (?)	−0.224	.436
Change in taken (?)	0.154	.334
ln(net sales trend) (+)	−7.482	.178
Sample number of firms	371	
Adjusted R^2	1.41%	

Data are for 587 *Forbes 500* firms over 1984–1991. Director/officer trading data are from the CDA/Spectrum database. Only transactions reported in Form 4 are included in the analyses. For each firm in each year, *Director/officer net sales* is the shares sold by all directors or officers minus shares purchased by all directors or officers, as a percentage of common stock outstanding. For each firm, *Change in average director/officer net sales* is: the average director/officer net sales in the years *after* the passage of the first second-generation antitakeover law in the firm's incorporation state minus the average director/officer net sales in the years *before* the passage of the antitakeover law. The year of the passage of the antitakeover law is excluded in these computations. *Market value* is the market value of equity. *Market-to-book* is the ratio of the market value of equity plus book value of debt to the book value of assets. *Firm risk* is the sample variance of daily logarithmic stock returns for the last 120 trading days of the fiscal year. *Leverage* is the total debt divided by total assets. *Block* is the percentage of common stock of the largest block not directly owned by a director of the board; if the block is less than 5% we code it as zero. *Target* is a dummy equal to 1 if the firm receives a bid offer within a year or has an open bid offer, and zero otherwise. *Taken* is a dummy equal to 1 if the firm is taken over within two years, and zero otherwise. *Change* for the control variables is the average value of the variable for each firm in the years *after* the passage of the first second-generation antitakeover law in the firm's incorporation state minus the average value of the variable for the same firms in the years *before* the antitakeover law. *Net sales trend* for each firm is the upto three-year average of the median of director/officer net sales of the control firms (i.e., firms in states without passing any antitakeover laws during 1984–1991) *after* the passage of the first antitakeover law in the incorporation state of the firm under observation minus the upto three-year average of the median of director/officer net sales of the control firms *before* the passage of the first antitakeover law in the incorporation state of the firm under observation. Since industry dummies do not change with time, we exclude them. $\ln(x)$ is defined as $\text{sign}(x) \times \ln\{1 + |x|\}$, where $\text{sign}(x) = 1$ if $x \geq 0$, and $= -1$, if $x < 0$. The results use White's corrected standard errors. The tests are two-tailed.

Table 15

Director/officer insider trading: The effect of antitakeover laws on changes in insider sales as a function of director/officer stock holdings at the end of the year immediately before the passage of antitakeover laws

Dependent variable	ln [change in director/officer net sales (%)]			
	Director/officer stock holdings at the end of the year immediately before the passage of the incorporation state's antitakeover law is less than the sample median (2.7%)		Director/officer stock holdings at the end of the year immediately before the passage of the incorporation state's antitakeover law is greater than or equal to the sample median (2.7%)	
Independent variables	β	p	β	p
Intercept (+)	0.070	.551	0.193	.032
ln(change in market value) (+)	-0.009	.453	-0.011	.312
Change in annual stock return (-)	-0.147	.263	-0.113	.368
Change in market-to-book (-)	0.035	.468	-0.068	.156
Change in firm risk (?)	-0.107	.208	-0.179	.322
Change in leverage (+)	-0.289	.311	-0.057	.845
ln(change in block) (-)	0.002	.939	0.033	.223
Change in target (?)	-0.335	.393	0.114	.498
Change in taken (?)	0.219	.244	0.102	.701
ln(net sales trend) (+)	-2.373	.642	-11.726	.253
Sample number of firms	184		187	
Adjusted R^2	0.13%		1.60%	

Data are for 587 *Forbes* 500 firms over 1984–1991. Director/officer trading data are from the CDA/Spectrum database. Only transactions reported in Form 4 are included in the analyses. For each firm in each year, *Director/officer net sales* is the shares sold by all directors or officers minus shares purchased by all directors or officers, as a percentage of common stock outstanding. For each firm, *Change in average director/officer net sales* is: the average director/officer net sales in the years *after* the passage of the first second-generation antitakeover law in the firm's incorporation state minus the average director/officer net sales in the years *before* the passage of the antitakeover law. The year of the passage of the antitakeover law is excluded in these computations. *Market value* is the market value of equity. *Market-to-book* is the ratio of the market value of equity plus book value of debt to the book value of assets. *Firm risk* is the sample variance of daily logarithmic stock returns for the last 120 trading days of the fiscal year. *Leverage* is the total debt divided by total assets. *Block* is the percentage of common stock of the largest block not directly owned by a director of the board; if the block is less than 5% we code it as zero. *Target* is a dummy equal to 1 if the firm receives a bid offer within a year or has an open bid offer, and zero otherwise. *Taken* is a dummy equal to 1 if the firm is taken over within two years, and zero otherwise. *Change* for the control variables is the average value of the variable for each firm in the years *after* the passage of the first second-generation antitakeover law in the firm's incorporation state minus the average value of the variable for the same firms in the years *before* the antitakeover law. *Net sales trend* for each firm is the upto three-year average of the median of director/officer net sales of the control firms (i.e., firms in states without passing any antitakeover laws during 1984–1991) *after* the passage of the first antitakeover law in the incorporation state of the firm under observation minus the upto three-year average of the median of director/officer net sales of the control firms *before* the passage of the first antitakeover law in the incorporation state of the firm under observation. Since industry dummies do not change with time, we exclude them. $\ln(x)$ is defined as $\text{sign}(x) \times \ln\{1 + |x|\}$, where $\text{sign}(x) = 1$ if $x \geq 0$, and $= -1$, if $x < 0$. The results use White's corrected standard errors. The tests are two-tailed.

and Samwick (1999)]. On a related note, the ownership of risky shares by a risk-averse insider provides a signaling benefit to the capital markets [Leland and Pyle (1977)]. Finally, owning shares provides control benefits for managers [Morck, Shleifer, and Vishny (1988), Stulz (1988)].

Since control cannot be directly measured, prior empirical research has used associations among various measurable constructs to illustrate the

Table 16**Director/officer insider trading: The effect of antitakeover laws on changes in insider sales as a function of poison pills**

Dependent variable	ln [change in director/officer net sales (%)]			
	Firms without poison pills before the passage of the incorporation state's antitakeover law		Firms with poison pills before the passage of the incorporation state's antitakeover law	
Independent variables	β	p	β	p
Intercept (+)	0.117	.093	0.148	.258
Ln(change in market value) (+)	-0.002	.771	-0.020	.228
Change in annual stock return (-)	-0.101	.322	-0.367	.243
Change in market-to-book (-)	-0.062	.113	0.106	.363
Change in firm risk (?)	-0.091	.411	0.006	.982
Change in leverage (+)	0.050	.777	-1.338	.216
ln(Change in block) (-)	0.018	.354	-0.018	.734
Change in target (?)	0.063	.336	-1.492	.314
Change in taken (?)	0.069	.639	1.882	.322
ln(net sales trend) (+)	-10.178	.118	2.670	.868
Sample number of firms	302		69	
Adjusted R^2	1.41%		4.90%	

Data are for 587 *Forbes* 500 firms over 1984–1991. Director/officer trading data are from the CDA/Spectrum database. Only transactions reported in Form 4 are included in the analyses. For each firm in each year, *Director/officer net sales* is the shares sold by all directors or officers minus shares purchased by all directors or officers, as a percentage of common stock outstanding. For each firm, *Change in average director/officer net sales* is: the average director/officer net sales in the years *after* the passage of the first second-generation antitakeover law in the firm's incorporation state minus the average director/officer net sales in the years *before* the passage of the antitakeover law. The year of the passage of the antitakeover law is excluded in these computations. *Market value* is the market value of equity. *Market-to-book* is the ratio of the market value of equity plus book value of debt to the book value of assets. *Firm risk* is the sample variance of daily logarithmic stock returns for the last 120 trading days of the fiscal year. *Leverage* is the total debt divided by total assets. *Block* is the percentage of common stock of the largest block not directly owned by a director of the board; if the block is less than 5% we code it as zero. *Target* is a dummy equal to 1 if the firm receives a bid offer within a year or has an open bid offer, and zero otherwise. *Taken* is a dummy equal to 1 if the firm is taken over within two years, and zero otherwise. *Change* for the control variables is the average value of the variable for each firm in the years *after* the passage of the first second-generation antitakeover law in the firm's incorporation state minus the average value of the variable for the same firms in the years *before* the antitakeover law. *Net sales trend* for each firm is the upto three-year average of the median of director/officer net sales of the control firms (i.e., firms in states without passing any antitakeover laws during 1984–1991) *after* the passage of the first antitakeover law in the incorporation state of the firm under observation minus the upto three-year average of the median of director/officer net sales of the control firms *before* the passage of the first antitakeover law in the incorporation state of the firm under observation. Since industry dummies do not change with time, we exclude them. $\ln(x)$ is defined as $\text{sign}(x) \times \ln\{1 + |x|\}$, where $\text{sign}(x) = 1$ if $x \geq 0$, and $= -1$, if $x < 0$. The results use White's corrected standard errors. The tests are two-tailed.

extent to which the manager's share ownership gives him control. For example, Morck, Shleifer, and Vishny (1988) use the association between ownership and firm performance to infer the extent of managerial control. DeAngelo and DeAngelo (1985) study managerial stockholdings in firms with dual class shares, while Zingales (1994, 1995) gives a control-based explanation for the stock price premium of voting shares in such firms. Barclay and Holderness (1991) and Dyck and Zingales (2004) document that block trades occur at a premium relative to post-announcement

market prices, and use the premium to infer blockholders' private benefits from control.

In this article, we use a revealed preference argument using data from a unique setting, the passage of second-generation antitakeover legislation, to isolate the corporate control value that managers place on stock ownership. We view antitakeover legislation as an exogenous shock that increases the control of the managers over the firm. We conjecture that, after the passage of antitakeover laws, managers can continue to retain their control by owning fewer risky shares than before. The key advantage of such a natural experiment is that we do not have to specify precisely the structural equation of the optimal managerial ownership levels. Rather, we conjecture that the reduced-form equilibrium levels drop after the passage of the laws. As comparative statics, we also propose and test hypotheses about the differential effects of these laws across firms.

Consistent with our predictions, we find significant reductions in the proportion of blockholders on the board of directors, as well as the ownership percentage of the management team. These effects are much stronger for management teams with higher levels of shareholding and in firms not already protected by poison pills. Our results are robust; they hold for both a panel-regression specification that uses one observation per firm-year with firm and industry controls, as well as a multivariate changes or differences specification that uses each firm as its own control. We also examine data on insider sales and find that net sales by management increased substantially after the passage of antitakeover laws. Collectively, our findings highlight the extent to which control considerations underlie managers' stockholding and stock sales decisions.³⁰

Although our sample period is the mid-to-late 1980s, our inquiry continues to be relevant today. Holmstrom and Kaplan (2001) indicate that, after a brief decline in the early 1990s, there has been a resurgence in merger and takeover activities, with control changes increasingly being initiated by existing shareholders and boards rather than by external raiders [Kaplan (1997)]. Given the concomitant rise in managerial stock-based compensation, corporate control considerations are likely to interact with incentive and risk considerations in interesting ways, providing a fertile ground for future research.

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³⁰ Following prior control studies [e.g. Dyck and Zingales (2004)], we do not examine the social welfare implications of our predictions and findings.

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