Poison Pills, Optimal Contracting and the Market for Corporate Control: Evidence from Fortune 500 Firms

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Abstract

The rationale for issuing poison pill securities remains unclear, despite the findings of a large body of prior research that these defenses adversely affect shareholder wealth. This paper investigates the hypothesis that the adoption of such defenses may reflect shareholders' desire to contract efficiently with their managers in an environment characterized by hostile takeovers and uncertainty about the managers' true performance. Unlike previous research, we focus on financial characteristics of firms as they relate to the motives for adopting such defenses. Our empirical research does not support the optimal contacting hypothesis. We interpret our results as supportive of the managerial entrenchment hypothesis.

Introduction

In recent years corporate board rooms have witnessed a spate of shareholder activism. Institutional investors today are more concerned about corporate governance than ever before. They have consistently used their influence to press for arrangements that render managerial compensation more sensitive to firm performance as well as those that serve to curb managers' discretionary power.[1]

This paper investigates the use of such managerial power in the context of the market for corporate control. We examine the incidence and motives underlying the use and creation of one of the most effective takeover defenses: "Poison Pill" securities. Although such securities may take several forms they all share two features: they make hostile takeovers prohibitively expensive and they are very inexpensive to create.[2]

Unlike previous work which have primarily focused on the wealth effects of adopting these measures, we focus on the relationship between poison pill defenses and the financial characteristics of the firms that adopt these defenses.[3] We provide the first evidence on this relationship by testing two competing hypotheses: first, that poison pill securities allow for better contracting between managers and shareholders in an environment where hostile bids are likely, and second, that inefficient managers adopt poison pills to insulate themselves from the market for corporate control.

Our findings indicate that the adoption of such defenses is not consistent with optimal contracting motives. We interpret our empirical evidence to support the hypothesis that it is the interests of managers–and not those of their shareholders–that are reflected in the adoption of poison pill securities by the firms in our sample.[4]

Our results are also consistent with and complements previous research on the adoption of poison pills. While there is no unanimity regarding the magnitude of wealth effects, studies investigating the effects of poison pill adoption on shareholder wealth for our sample period have consistently reported negative wealth effects (e.g. Malatesta and Walkling [1988], Ryngaert [1988], Lee [1988]). These findings are consistent with our hypothesis that the adoption of poison pill securities does not reflect shareholders' interests.

The remainder of this paper is organized as follows. In the next section we provide the rationale for the adoption of takeover defenses in terms of a firm's financial characteristics. Although our theoretical framework is applicable to a broad range of takeover defenses, our empirical work focuses on the incidence of poison pill securities. The following section describes the two data sets which are juxtaposed to provide appropriate measures of takeover defenses and firm characteristics. The fourth section presents our methodology and empirical findings, and the last section contains concluding remarks.

Issues and Hypotheses

In this section we first identify financial characteristics that are associated with the view that anti-takeover defenses are value-maximizing for the shareholders. We then set up competing hypotheses to distinguish shareholders' welfare from managers' interests in adopting such defenses.

Optimal contracting and the role of anti-takeover defenses

Holmstrom [1980] argues that managerial remuneration should not depend on contemporaneous measures of firm performance, since the noise in

such measures of firm performance would introduce a great deal of volatility in managerial compensation. Such volatility in turn would increase salary costs, since risk-averse managers would have to be compensated for bearing this additional risk. Better contracting therefore requires that managerial remuneration be tied to the long-term performance of the firm. Managers cannot be asked to wait for the true performance measure to reveal itself before they are paid. However, one can design a scheme where the managers are given smaller payments initially but compensated in the long run according to the ex post performance of their projects. Knoeber [1986] argues that an optimal contract for a risk-averse manager whose performance can be determined accurately only over a longer horizon should include some form of deferred compensation.[5] Deferred compensation here refers to both pecuniary and non-pecuniary payments to managers: some of which are explicitly contracted, while others involve implicit consent.[6]

The weakness of such ex post settling up schemes arises from the possibility of shareholders shortchanging the manager in the event of a hostile takeover. The target shareholders can absolve themselves of any obligation to the incumbent managers by tendering their shares to the raider, while the raider has no incentive nor obligation to make good on these implicit contracts.[7]

Thus, the poorer is current information about managerial performance, the greater is the need for deferred compensation; but given the possibility of a hostile raid, the less willing is the manager to accept such arrangements. The shareholders, however, can make such value-maximizing contracts credible by incorporating certain anti-takeover defenses in the corporate charter.[8] These defenses essentially force the raiders to negotiate with the incumbent managers, increasing the likelihood that managers' deferred compensation will be forthcoming.

In the next subsection we identify firm characteristics that relate to the asymmetry of information and the probability of a hostile raid. Asymmetry of information in this context relates to shareholders' inability to evaluate managerial effort by observing contemporaneous measures of the firm's performance.

Anti-takeover defenses and asymmetric information

Following Knoeber's [1986] methodology, we construct the following variables to proxy for the noise in contemporaneous performance measures: advertising expenditures (relative to sales) and expenditures on research and development (relative to sales). The larger is each of the above ratios, the less informative would be contemporaneous returns in signaling true managerial performance. Hence it is important that in such cases shareholders are able to wait for better measures of managerial effort to become available, implying that deferred compensation would be an important element of managerial remuneration.

As a third proxy for noise encountered in evaluating managerial performance, we make use of market sensitivity statistics generated by Merrill Lynch [1984]. They estimate a CAPM regression for each firm's returns against a composite index of market returns of all S&P 500 firms for 60 months. We interpret the residual variance from such a model, denoted SSE83, as a measure of firm-specific risks. The larger the variance, the lower the degree to which market factors can satisfactorily explain the value of the firm, and the less precise would be shareholders' estimates of managerial performance (and consequently, the greater would be the gains of offering deferred compensation). Thus, the magnitude of the residual variance from a market model should be positively

related to the probability of observing anti-takeover defenses.[9]

While optimal contracting in a noisy environment requires deferred compensation, it is the potential of a hostile tender offer that motivates the incorporation of anti-takeover defenses. The decision to incorporate anti-takeover defenses from the optimal contracting perspective thus depends on both the imperfect measurement of managerial performance and the probability of hostile takeovers.

Managerial efficiency, hostile raids and Tobin's Q

Since the incidence of anti-takeover defenses in our model is closely related to the likelihood of hostile takeover bids, it is important to control for the rationale for takeovers.[10] Further, since our goal is to highlight the actions of inefficient management, it is only appropriate that variables that proxy for the probability of a hostile raid can also be related to managerial performance. Tobin's Q adequately satisfies these two criteria.

In the capital investment literature, Tobin's Q signals whether a firm should be adding to its capital stock, maintaining this stock it at its current level, or divesting its capital.[11] A firm with a Q below the break-even value[12] would provide a higher return for its stockholders by selling capital (at the margin) and distributing the proceeds of the sale, as the financial markets value its assets more highly than its prospects. Conversely, a higher-than-break-even Q value is a signal that a firm's expected returns exceed the liquidation value of its capital stock. This corresponds naturally to a classification of firms as "undervalued" or "overvalued," respectively. In the takeover literature, we expect that "undervalued" firms would often be targets of takeover bids; their shares are cheap, relative to intrinsic value, and their low price may well be a signal that

current management is unable to produce adequate returns.[13]

Further, research on sources of the gains from takeover (Servaes, [1991]; Lang et al., [1989]; Hasbrouck [1985]) also points to the relationship between performance and Tobin's Q. There is a consensus that target, bidder, and total returns are larger when targets have low Q ratios and bidders have high Q ratios. Servaes ([1991], p.409) notes that "The best takeovers, in terms of value creation, are those where a high Q firm takes over a low Q firm. The opposite scenario holds for the worst case takeovers–low Q firms taking over high Q firms." He concludes that interpreting Q as a measure of managerial performance supports the view that better-performing firms create value by taking over poorly-performing companies. Finally, Morck et al. [1988], investigating the characteristics of takeover targets in a sample of Fortune 500 firms between 1981 and 1985, note that the probability of a hostile takeover (but not that of a friendly takeover) was strongly (negatively) related to Tobin's Q.

We use industry dummy variables (constructed from two-digit SIC codes) to control for any industry effects. This enables us to focus on managerial inefficiencies in declining industries where the values of Q may be low because of the difficulties associated in transferring assets to more productive uses in the short run (Lindenberg and Ross [1981]).

The other variables used to control for the probability of a hostile raid are firm size (measured by log of total assets) and the percent of stock held by insiders (managers and the board of directors). Firm size and its relation to the threat of raid are in part based on the presence of imperfections in the capital markets. Very large corporations, even with significant gains from restructuring, may be difficult to acquire because of lack of available credit. This is especially important when the managers of the target firm are non-cooperative. Empirical evidence on the negative effect of size on the probability of hostile (non-friendly)

takeover is also very strong in Morck et al.'s work [1988].

The relation between ownership structure and the probability of raid arises from the fact that a management team with a sizable ownership share may have effective veto power over the outcome of any bid. To this end, Morck et al. note that "the only acquisitions with high management ownership we observe are friendly" ([1988], p. 110). Thus we expect the probability of a hostile raid to be negatively related to the stock ownership of the manager and the board.

Competing hypotheses on the adoption of Poison Pill Securities

Our hypotheses on a firm's adoption of poison pill securities rely upon alternative perspectives of the firm's control mechanism. In the traditional 'alignment' view of management acting in shareholders' interests, adoption of poison pills must reflect those interests. Under the alternative 'entrenchment' hypothesis, the firm's behavior only reflects the "entrenched" managers' interests, and may be detrimental to shareholders' welfare. Empirical tests of these competing hypotheses must take into account those factors which affect the probability of a raid. Hostile raids are more probable when target firms are smaller, when target firms' insider holdings of equity are lower, and when target firms' Tobin's Q values are low (relative to their industry's benchmark). Thus, we can express

Pr[Raid] = f [*SIZE*, *INSIDER*, *Q*]

where higher values of all three factors are expected to have negative effects on the probability of raid. We now consider how a heightened probability of raid will affect the firm's decision to adopt antitakeover defenses such as poison pill securities, using a framework that nests the alternative perspectives described above in a single equation:

Pr[Adopt PPS] = g [*CONTRACT, Pr[Raid]*]

where the *CONTRACT* term contains measures of asymmetric information which will affect the firm's contracting behavior. As described above, if contemporaneous measures of firm performance are not very informative in terms of gauging managerial effort, firms will have an incentive to adopt deferred compensation schemes. Those schemes will require takeover defenses in an environment where takeovers pose a credible threat. Thus, if decisions are being made purely in shareholders' interests, the *CONTRACT* variables will have unambiguously positive effects on the probability of adopting poison pills, as this adoption reflects shareholders' interests in achieving more efficient contracting with their managers. However, a higher probability of raid has ambiguous effects on shareholders' willingness to adopt antitakeover defenses. If that probability is heightened by some firm-specific factors such as the firm's market niche or unique portfolio of products and patents, shareholders may be willing to play 'hard to get' in the market. On the other hand, if the firm's target status is due to poor performance–e.g. a low Tobin's Q–that could well reflect what shareholders would view as inadequate managerial talent or effort, and they might welcome the firm being put 'in play' in order to reap the benefits of a bidding contest and in all likelihood dispose of inefficient managers. In summary, from the contracting perspective, where the adoption of poison pill securities reflects shareholders' interests, we would expect

Pr[Adopt PPS] = g [+ , ?]

where the *CONTRACT* measures of asymmetric information have unambiguously positive effects, while variables affecting the probability of raid such as *SIZE, INSIDER, Q* have ambiguous effects.

Alternatively, if decisions to adopt poison pill securities are under the control of entrenched managers, we would expect that contracting issues would

have no importance, while a higher probability of raid would unambiguously increase the likelihood that such a defense is erected. In particular, we would expect that managers in control of low-Q firms would be very likely to exhibit such behavior. Thus, if the adoption of poison pill securities reflects entrenched managers' actions, we would expect

Pr[Adopt PPS] = g [0 , +]

We now may consider the power of this framework to discriminate between these competing hypotheses. If shareholders' interests are driving firms' adoption of poison pill securities, then we would expect to find strong positive effects from the *CONTRACT* variables which reflect the degree of asymmetric information, and we would have no clear prediction on the signs of *SIZE, INSIDER, Q* in this relationship. On the other hand, if entrenched managers are able to instigate poison pill adoption, we would expect the *CONTRACT* variables to have no effect upon the probability of adoption, and each of the variables affecting the probability of raid (*SIZE, INSIDER, Q*) should have a strong negative effect upon the probability of adoption poison pill securities as well. Although it is possible that the data may not discriminate between these hypotheses, there is clear potential for such discrimination to be successful.

Data

The sample for this study is primarily based on the survey conducted by Rosenbaum [1986] regarding the adoption of anti-takeover defenses among Fortune 500 firms. Information from Jarrell and Poulsen [1987] was used to identify some of the dates missing from the Rosenbaum survey. The Rosenbaum survey also reports the percentage of stock held by insiders (managers and board of directors).

Data for estimating Tobin's Q and expenditures on advertising, research and development were obtained from the Manufacturing Sector Master File documented in Hall [1990]. This data set contains most balance sheet and income statement items, as well as estimates of the replacement cost of firms' assets, for many manufacturing firms from 1959 to 1987. Tobin's Q was calculated as the ratio of the market value of common stock, preferred stock and debt to the estimated replacement cost of the firm's assets. Firm size was calculated as the logarithm of total assets. The SSE83 measure of firm specific risk was calculated from the Merrill Lynch market sensitivity statistics.

Juxtaposing the above data sets left us with a sample of 367 Fortune 500 firms, of which 138 had adopted poison pill securities as of May 1986. These adoptions were largely a phenomenon of 1986, in which 109 were recorded; 20 adoptions took place in 1985, and six in 1984.[14]

Descriptive statistics, based on the time-series average values of the explanatory variables used in our analysis, are presented in Table 1. The average values of Size, R&D/Sales, Advt/Sales and Tobin's Q are given for the five-year periods 1979-83, while the SSE83 measure of firm-specific risk pertains to the latter time period. The figures for ownership by officers and directors (insider holdings) reflects the latest proxy statement in the sampling period. Table 1 presents financial characteristics of firms that adopted poison pill securities in the 1984-1986 period. The differences between adopters' and non-adopters' values of the regressors are given in these tables, as well as t-tests for the significance of their differences.

Methodology and Empirical Results

The competing hypotheses that decisions to adopt poison pill securities reflect shareholders' desire for better contracting or, alternatively, that they are consistent with the interests of entrenched managers are tested for firms that adopted such defenses in 1984-1986. Since the majority of adopting firms took action in 1986, we conduct our empirical tests to cover two time periods. We first look at the evidence from firms that adopted such a defense in 1986 and then expand our sample to include all adoptions between 1984-1986. In both cases, we use the average values of firms' characteristics for the 1979-1983 period as explanatory variables.

The binomial probit estimation technique is used to test the alternative motives for adopting poison pill securities. Table 2 presents our probit estimates of the probability of adopting poison pill securities in 1986, conditioned on firm characteristics over the five year period 1979-83. We present three models: in column [1], a full model which includes all the explanatory variables posed in our competing hypotheses.[15] Column [2] presents a restricted model where we drop the proxies for asymmetric information where their joint exclusion is validated by the likelihood ratio test ($\chi^2[\ ]$ for $\dagger = 0$). Finally, in column [3], we consider the model further restricted by the exclusion of firm size and industry effects (where exclusion of industry effects is validated by a likelihood ratio test, $\chi^2[\ ]$ for Industry Effects = 0).

Table 3 expands our sample to include the firms that adopted poison pill defenses in 1984, 1985 and 1986, conditioned on firm characteristics over 1979-1983. The three alternative models are presented here, and our findings from this table are qualitatively similar to those resulting from the consideration of 1986

adopters only. In both cases. our findings reject the 'alignment' hypothesis, in that asymmetry of information plays no role in predicting the adoption of poison pill securities. The inability of the asymmetric information variables to exhibit any systematic relationship to the adoption of anti-takeover defenses indicates that shareholders' interests in better contracting with managers does not affect the likelihood of firms adopting poison pill defenses. It should be made clear that the weaknesses of the asymmetric information proxies in our results do not flow from their intercorrelation–that is, there is no severe collinearity in the regressor matrix. The intercorrelations of these three variables are minuscule, and there are no pairwise correlations exceeding 0.5 in any of the models. As high pairwise correlations are sufficient but hardly necessary for severe collinearity, we have presented the maximal condition indices (Belsley [1991]) for each model's right-hand variables. Belsley states that "...moderate to strong relations are associated with condition indexes of 30 or more" (p. 56). None of our models' maximal indices exceed 30.

Tobin's Q and the level of insider holding, on the other hand, both have statistically significant negative effects on the probability of poison pill adoption, as the 'entrenchment' hypothesis predicts.[16] Firms with (relatively) low Q are not only more vulnerable to hostile raids, but the gains to target shareholders from such raids are on the average larger (Servaes [1991]). Hence the result that, ceteris paribus, a reduction in a firm's Q leads to an increase in the probability of adoption of poison pill securities does not reflect shareholders' interest. Firm size was omitted from model 3, reflecting its weak explanatory power; although we might expect that larger firms would have a lesser need for anti-takeover defenses, the results do not mandate a role for size when the other explanatory factors are taken into account.

The variations presented in Tables 2 and 3 illustrate that our results are

quite robust with respect to the timing of adoptions and the measurement of firms' characteristics. The results are qualitatively almost identical across the tables, suggesting that the specter of simultaneity between adoption and regressors should not be a concern.[17]

The powerful effects of Tobin's Q on the likelihood of adoption are particularly important if we take the perspective that hostile takeovers are characterized as disciplinary actions in which the primary gains from takeover follow from the displacement of the incumbent managers. In that context, the adoption of poison pill defenses is consistent with the actions of managers who are unwilling to expose themselves to the discipline of the market.

To further illustrate the implications of our estimates, we calculate the probability of adopting poison pill securities at various levels of the explanatory variables. Tables 4 and 5 illustrate how 10, 20, and 30 per cent perturbations of the explanatory variables alter the conditional probability of adoption for the 1981-1985 and 1987-1983 samples, respectively. Our results indicate a consistent increase (decrease) in the probability of adopting poison pill defenses with the decrease (increase) in Tobin's Q and insider holdings. As Table 5 illustrates, a firm with the sample average Tobin's Q has a 31.6 per cent probability of adoption; this rises to 38.2 per cent if the firm's Q is 30 per cent below the sample mean (which falls well within the range of experience). These conditional probabilities are calculated holding the other explanatory variable at its mean.

Conclusions

The adoption of poison pill defenses is shown to be clearly related to firm-specific factors, in particular the firm's Tobin's Q. Informational asymmetries play no role in explaining the presence of such defenses. The redundancy of informational proxies is inconsistent with the deferred compensation/optimal contracting hypothesis advanced by Knoeber as a motive for adopting such defenses. If optimal contracting required deferred compensation, and if the primary role of anti-takeover amendments was in fact to facilitate such contracting, then one would expect a positive and significant relationship between the adoption of such defenses and informational proxies.[18]

Contrary to the value-maximizing rationale for anti-takeover defenses, we find a strong negative relationship between the presence of takeover defenses, Tobin's Q, and managers' and directors' level of ownership. Given that event studies of the adoption of poison pill defenses consistently report negative wealth effects, our results point toward managerial entrenchment as the primary motive for adoption.

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[1] Such concerns have led to substantial changes in the way information is presented to shareholders in a proxy statement (Gottschalk [1993]).

[2] While the Delaware Supreme Court ruled in 1985 that Poison Pill issuance does not require majority approval of voting shareholders, Harris [1990] argues that since shareholders are notified of such defenses through the proxy statement, they approve these measures by acquiescence.

[3] McWilliams (1993), while investigating the relationship between q and antitakeover charter amendments, finds no evidence to support managerial entrenchment. Our study concentrates on poison pills (the only category of defenses not considered in McWilliams' study) and finds clear evidence of managerial entrenchment.

[4] In the U.S., where explicit shareholder consent is not required to issue poison pill securities, such securities have consistently eroded shareholders' wealth. The Australian experience is quite different. Woo et al. [1993] report significantly positive wealth effects on the adoption of antitakeover defenses in Australia, where adoption of such defenses require the explicit consent of the shareholders.

[5] Although in theory granting of stock options may mitigate the problem of deferred compensation, in reality such arrangements do not offer long-term incentives. "Towers Perrin, a consulting firm specializing in pay issues, estimates that American managers turn more than half of all options into cash within the first year they are granted, and most of the rest a few years later." (*The Economist*, January 23rd 1993, p.20). Golden parachutes could also be designed to overcome the deferred compensation problem. Golden parachutes, however, create a perverse incentive for incumbent managers who may engineer a takeover to get their take-over contingent payments.

[6] Since it is not possible to write explicit deferred compensation contingent on all possible states of nature, one should expect a large part of such contracts to be implicit

by nature. In fact, Shleifer and Summers [1988] argue that some of the gains from takeover can be attributed to the new management's ability to re-negotiate such implicit deferred compensation.

[7] It is important to note that the probability that managers will be shortchanged is very low in friendly mergers, because such mergers involve the consent of the incumbent managers.

[8] Although the adoption of Poison Pill securities does not require explicit amendments to the corporate charter, shareholders must be notified of such preferred stock rights plans in a proxy statement. Hence it can be argued (Harris [1990]) that shareholders approve of such actions by acquiescence.

[9] In fact, Knoeber (1986) demonstrated that the probability of a firm adopting a Golden Parachute–another optimal contracting arrangement–is clearly related to the above measures of asymmetry of information.

[10] The problem of managers forfeiting their deferred compensation does not arise in the case of a friendly takeover.

[11] This relation depends on (unobservable) marginal Q, rather than the measurable average Q. Hayashi [1982] has demonstrated conditions under which marginal Q is reasonably proxied by average Q.

[12] It is well known that in the presence of taxes the break-even or threshold Q differs from unity.

[13] In order to reduce the possibility that Tobin's Q might merely capture a transitory move in the valuation of firm equity, we used a five-year average to generate an estimate of firms' Tobin's Q.

[14] We could not confirm the poison pill adoption date for three firms which were listed in the Rosenbaum survey as adopters; those firms were consequently omitted from the subsequent analysis.

[15] This includes nine dummy variables constructed from two-digit SIC codes to control for industry effects.

[16] Both Malatesta and Walkling [1988] and Lee [1988] report that managers of poison pill-adopting firms hold statistically significantly smaller fractions of their own firms' stock.

[17] We also estimated Table 3 using explanatory variables formed from firms' average values over the 1981-1985 period to reduce the timing difference between firm performance and poison pill adoption. The results were qualitatively similar to those of Table 3, and thus are not reported here.

[18] Knoeber [1986], working with a similar set of proxies to characterize informational asymmetry, finds support for the hypothesis that the adoption of golden parachutes represents value maximizing decisions. Since anti-takeover defenses, like golden parachutes, insulate the manager from the market for corporate control, he conjectures that such amendments should also represent wealth-maximizing decisions. Our results fail to support his conjecture.

Table 1
Means of Explanatory Variables

Explanatory Variable	Sample Means	Mean for 1984-1986 Adopters	Mean for Non-Adopters	Difference of Means [2] and [3]
	[1]	[2]	[3]	[4]
Size	6.983	7.164	6.870	0.294 (2.2)
Insider Holding	7.770	4.832	9.607	-4.775 (-4.2)
Tobin's Q	0.753	0.643	0.822	-0.178 (-3.9)
R&D / Sales	0.020	0.016	0.022	-0.005 (-1.9)
Advt / Sales	0.015	0.016	0.015	0.001 (0.3)
SSE83	8.030	7.528	8.343	-0.816 (-2.9)
N of firms	351	135	216	

Notes: Size, Tobin's Q, R&D / Sales, and Advt / Sales are average firm values over 1979-1983, while SSE83 is calculated from a market model estimated from those five years' data. T-statistics for the difference of sub-sample means are given in parentheses.

Table 2
Dependent Variable: Poison Pill adopted in 1986

	[1]	[2]	[3]
Size	-0.0437 (-0.6)		
Insider Holding	-0.0319 (-3.4)	-0.0326 (-3.8)	-0.0285 (-3.6)
Tobin's Q	-0.7700 (-2.9)	-0.7276 (-3.0)	-0.7405 (-3.4)
R&D / Sales †	-0.787 (-0.2)		
Advert / Sales †	0.7149 (0.2)		
SSE83 †	-0.0440 (-1.2)		
Industry Fixed Effects	Included	Included	Excluded
$\chi^2[3]$ for † = 0	1.64 (0.65)		
$\chi^2[8]$ for Industry Effects = 0	6.66 (0.57)	8.30 (0.40)	
Log-likelihood	-189.55	-190.415	-194.624
Max. cond. index	26.1	4.8	4.3
N of firms	326	326	326

Notes:
All models include a constant term. The sample includes firms which adopted poison pills in 1986. The explanatory variables' values are averages over the 1979-1983 period. Nine industry groups are included as fixed effects where indicated. Asymptotic t-statistics are given in parentheses. The χ^2 marginal significance levels are given in parentheses.

Table 3
Dependent Variable: Poison Pill adopted in 1984-86

	[1]	[2]	[3]
Size	-0.0216 (-0.3)		
Insider Holding	-0.0344 (-3.8)	-0.0368 (-4.4)	-0.0320 (-4.1)
Tobin's Q	-0.8027 (-3.1)	-0.7718 (-3.3)	-0.8058 (-3.8)
R&D / Sales †	-2.003 (-0.5)		
Advert / Sales †	1.559 (0.57)		
SSE83 †	-0.0586 (-1.7)		
Industry Fixed Effects	Included	Included	Excluded
χ^2[3] for † = 0	3.36 (0.33)		
χ^2[8] for Industry Effects = 0	6.93 (0.54)	8.93 (0.35)	
Log-likelihood	-209.37	-211.151	-215.675
Max. cond. index	26.4	4.8	4.3
N of firms	351	351	351

Notes:
All models include a constant term. The explanatory variables' values are averages over the 1979-1983 period. Nine industry groups are included as fixed effects where indicated. Asymptotic t-statistics are given in parentheses. The χ^2 marginal significance levels are given in parentheses.

Table 4
Probability of Poison Pill Adoption
for Varying Levels of Explanatory Variables

Level of Explanatory Variable	Insider Holding	Tobin's Q
μ – 30 %	0.339	0.382
μ – 20 %	0.331	0.360
μ – 10 %	0.324	0.338
μ	0.316	0.316
μ + 10 %	0.309	0.296
μ + 20 %	0.302	0.275
μ + 30 %	0.295	0.256
μ for sample	8.125%	0.810

Notes: Based on 331-firm sample, model [3] of Table 2. μ denotes the sample mean of the explanatory variable.

Table 5
Probability of Poison Pill Adoption
for Varying Levels of Explanatory Variables

Level of Explanatory Variable	Insider Holding	Tobin's Q
μ – 30 %	0.393	0.436
μ – 20 %	0.384	0.412
μ – 10 %	0.374	0.388
μ	0.365	0.365
μ + 10 %	0.356	0.342
μ + 20 %	0.347	0.320
μ + 30 %	0.337	0.299
Sample mean	7.770 %	0.753

Notes: Based on 351-firm sample, model [3] of Table 3. μ denotes the sample mean of the explanatory variable.