

WHICH ANTI-TAKEOVER DEVICES AFFECT FIRM VALUE?

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Abstract

This research is a two-stage, cross sectional analysis that finds evidence that nine antitakeover defenses (ATDs) are associated with lower firm value in terms of Tobin's Q . Of the nine, six are limits on shareholder rights such as staggered boards. The other four have the potential of increasing the cost of a takeover such as pension parachutes that prohibit successor firms from using pension surpluses to finance the takeover. Six ATDs, such as anti-greenmail provisions, are associated with higher firm values.

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1. Introduction

Financial theory is ambivalent about the effect of many anti-takeover provisions found in corporate charters. While anti-takeover defenses (ATDs) may entrench managers leading to inappropriate levels of compensation, perquisites, and shirking (Jensen and Mecklin, 1976), they may also increase the bargaining position in the event of merger proposals and, in the case of some ATDs provide incentives to managers to make long term commitments to the firm (Knoeber, 1986, Stout, 2002, Danielson and Karpoff, 2002, Brewer and Wall, 2004). Earlier work on the relation between corporate ATDs and return on equity tends to focus on event studies and provides sketchy evidence that ATDs are associated with lower returns. Jensen and Ruback (1980) and Coates (1999) provide surveys of these earlier studies. Because the event window of the adoption of an ATD is not easily identified and the adoption of an ATD could be a signal of a pending merger threat to management, recent research has employed the "long horizon approach" of Gompers, Ishii, and Metrick ("GIM", 2003). GIM construct an index based on 24 ATDs that identifies high ATD and low ATD companies and show that an equity portfolio of companies with a very low score on the index tends to dramatically outperform an equity portfolio of firms with a high score over the course of 1990 through 1999. While the GIM approach produces convincing evidence that under-performance is associated with high rates of ATD adoption, it gives

rise to the issue of whether financial analysts systematically underrate the importance of ATDs. Core, Guay, and Rusticus (2004) find no direct evidence that financial analysts underestimate the significance of ATDs and suggest that the poor performance observed by GIM may be an anomaly of the 1990's.

Another problem with the GIM index is that it weighs all ATDs equally. Cremers and Nair (2004) are able to largely replicate GIM results with an index based on only three ATDs: blank check preferred stock provisions that work like poison pills, staggered boards that stretch out the time to replace directors, and restrictions on the rights of shareholders calling a meeting or taking action. Cremers and Nair (2004) claim that this more parsimonious proxy reduces noise caused by redundant provisions. But these three provisions are highly correlated to other provisions so it is not clear whether there are more significant ATDs that could be chosen. Several studies focus on one ATD provision at a time. For example, Bebchuck and Cohen (2003) find staggered board provisions have a negative impact on firm value and Danielson and Karpoff (2002), who control for other ATDs, find that poison pills are associated with improved, or at least non-negative, firm performance. Bebchuck, Cohen, and Ferrell ("BCF", 2004) hypothesize that there are only six ATDs that significantly affect firm performance. Four of the six are "constitutional limits on shareholders' voting power" and two of them are "hostile takeover readiness measures."

Their test involves two steps. First they largely replicate GIM's result with an index based on the chosen six. They then go one step further by investigating the effect of the omitted ATDs on firm performance. Finding no evidence of any relationship between the omitted ATDs and firm performance, they conclude that the six that they chose should be the ones that researchers, analysts, and regulators should focus on. The list of six ATDs includes only one that Cremers and Nair (2004) consider: staggered boards. Unlike Cremers and Nair (2004), BCF include both blank check preferred stock and limits on the ability of shareholders to call a meeting, in their insignificant list. They argue that blank check provisions are redundant to the poison pill provisions and that limitations on calling a meeting are not onerous enough to interfere with a takeover attempt.

Larcker, Richardson, and Tuna (2004), in a wide ranging study, avoid the analyst underestimating problem by using a variety of alternative measures of managerial performance including abnormal accruals, Tobin's Q, over investment, shareholder lawsuits, and accounting restatements. To deal with multicollinearity among ATDs, board characteristics, ownership characteristics, capital structure, and executive compensation schemes, they use principal components analysis to identify 14 factors as independent variables in regressions on their various measures of managerial performance. Of the ATDs they consider, three emerge among the factor loadings: staggered boards, supermajority provisions, and poison pills. The other two ATDs they consider, dual class shareholding and unequal voting rights, do not load. A factor that includes staggered boards and poison pills is associated with a slightly higher Tobin's Q at the 10% level of significance. Overall they conclude that structural indicators do not explain the variance of managerial performance.

A problem with all these studies is that there may be some underlying characteristic that causes firms to adopt an ATD. Comment and Schwert (1995) find evidence that firms adopt poison pills when a takeover attempt is likely. In order to measure the deterrence effect of pills, they estimate a probit model that predicts poison pill adoption and then use the predicted values in a second stage regression that measures pill deterrence. Predictors of ATD adoption include abnormal returns, firm size, sales growth, the state of registration, and four accounting ratios. They find that when poison pill adoption is predictable, it has a deterring effect on takeovers.

The present study seeks to identify which among the most common ATDs are associated with firm value. In a sense, there is a hypothesis to be tested for each of the 21 provisions considered: the given ATD has a significant effect on firm value against the alternative that it has no significant effect. This study contributes to the literature in the

following ways. First it uses Tobin's Q and a related thick frontier metric to gauge firm value. This allows a cross sectional approach that avoids the issue of analyst under-rating of ATDs. Second, unlike previous studies, the research design does not impose *a priori* theory on which of the many ATDs affect firm value. Third, it takes into account that different industry characteristics will lead to differences in the adoption of ATDs. It is found that firms in industries with greater potential franchise value tend to adopt fewer ATDs. Fourth, the probability of each ATD adoption based on potential franchise value is used as an instrument in a second stage principal components analysis to determine which of the ATDs are associated with higher or lower firm values.

The basic findings of this research are that nine out of the 21 ATDs studied are associated with lower firm value, six are associated with higher firm value, and the significance of the remaining six must be rejected. The nine significant and negative ATDs include staggered board terms that require several years to elect a completely new board, supermajority requirements to approve a merger, limited shareholder ability to amend bylaws and charters, limited ability of shareholders to take action by written consent, executive severance packages that are not contingent on any reason for departure, the ability of the board to consider non-financial (stakeholder) factors in considering a merger, limits on the personal liability of directors, pension parachutes that prevent successor firms from raiding any surplus in the pension plan to finance a takeover, and retirement ESOPs that can hold large blocks of stock against a takeover. Although the definitions used in this study do not exactly match those of BCF, all four of BCF's hypothesized limits of shareholder voting power are associated with a lower firm value.

The six provisions that are positively associated with firm value are: blank check ability to issue stock that could dilute the holdings of a hostile bidder (similar to poison pills), anti-greenmail provisions that prevent the management from raiding the corporate treasury to "buy off" hostile bidders, cumulative voting rights that protect minority interests, silver and golden parachutes that provide severance payments to employees and CEOs in the event of a termination due to a takeover, and the requirement that advanced notice be given to managers to have items placed on the annual meeting agenda. The six provisions that were not significant at the five percent level were fair price provisions that require a hostile bidder to pay all shareholders the highest price paid in the market, confidential voting, poison pills that allow managers to issue under-priced stock to existing shareholders to dilute the voting power of a hostile bidder, limits on shareholder rights to call a special meeting, director indemnification, and dual classes of stock.

In sum, this study is a two-stage cross sectional analysis that uses the principal components technique to identify the association of individual ATDs with firm value. The second section of this paper describes the data and compares the thick frontier approach to the conventional approach of adjusting Q's by their industry medians. The third section derives a probit model of ATD adoption with firm efficiency as the dependent variable. The fourth section uses principle components to reduce the dimensionality of the set of ATD adoptions to measure the significance of each ATD on firm value. The fifth section concludes.

2. ATD Use and Franchise Value

The conventional way controlling for industry differences in Tobin's Q multiples is to divide each firm's Q by the median Q of its industry (e.g. Bebchuk and Cohen, 2003). In this section we consider normalizing each firm's Q by dividing it by the firm's potential Q. Many industries are characterized by either heavy or light use of ATDs according to their potential to create franchise value over and above their book value. Franchise value is defined here as the maximum market value of the firm's assets that could be obtained given the characteristics of the four-digit SIC industry in which it operates. The use of potential Q and potential franchise value mitigates against any bias caused by using industry medians.

The data used in this analysis is the merger of all the firms in the Investor Responsibility Research Institute's (IRRI) 2000 survey and the Compustat data base. Companies with missing values and conglomerates such as General Electric, 3M, etc. (SIC 9000) whose activities transcend many industries, and firms with negative book value are dropped leaving 1700 firms in the sample. In tests involving hypotheses about industry characteristics, the need for at least five observations in an industry caused a further reduction to 1,692. Three firms with zero sales revenue were dropped to bring the final sample size to 1689.

A profile of the industries represented in the sample classified according to the Fama and French (1997) classification can be found in Table 2. Observations range in number from zero (Real Estate) to 176 (Business Services). The assets size of the 1689 firms ranges from \$30 million to \$901 billion with an average of \$10.8 billion. A list of the 21 charter and by-law provisions and the frequency in which they appear in the sample is given in the first and second columns of Table 1. GIM append a glossary to their paper describing these ATDs. Descriptions are also available in IRRI 2000 survey and can be found using common search engines on the web.

The third column of Table 1 considers the relation between firm median-adjusted asset size and ATD adoption. To form this comparison the asset size of each firm in the sample is divided by the median asset size of the other firms in the sample of the same Fama French (1997) industry category. The average median-adjusted size for non-ATD adopters is subtracted from the average median-adjusted size of adopters and this difference is subjected to a t-test. In Table 1 the differences are re-scaled using the average median for the whole sample to facilitate economic interpretation. For example, the industry-adjusted average asset size of a firm adopting a blank check provision is roughly \$9.67 billion greater than the average size of a firm that does not. Consistent with the findings of GIM and others, adopters of eight of the 21 provisions are significantly larger than non-adopters. Comment and Schwert (1995) suggest that large firms may be more likely to adopt poison pills because there are economies of scale in the cost of adoption. Removing financial institutions (SIC 6000 firms) changes little. Fair price provisions, limiting the ability of shareholders to amend bi-laws, and silver parachutes become statistically significant. In order to examine the effect of ATDs on firm value, the same procedure is applied to each firm's Q multiple as defined as the market value of equity plus the book value of debt divided by assets net of goodwill. Morck, Shleifer, and Vishny (1988), La Porta, Lopez-de-Silanes, and Shliefer, and Vishny (2001), GIM (2003), Gompers Ishii and Metrick (2004), Bebchuk and Cohen (2003), and BCF (2004) use this or very similar techniques to investigate the affect of ATDs on firm value. While some of the studies use two-digit SIC industrial codes, this study uses the Fama-French (1997) industry classifications. To mitigate the effect of outliers, observations that differed from the mean by more than three standard deviations are winsorized at the three standard deviation level. The third column of Table 1 shows that for 15 out of the 21 takeover defenses studied, adoption is associated with significantly lower firm value. Removing financial institutions from the sample affects the significance of only pension parachutes and retirement and ESOP plans. The almost universal negative impact of all these provisions is unexpected. Confidential voting is a provision designed to protect the interests of outside shareholders. Executive severance packages and golden parachutes are designed to mitigate executives' natural conflict of interest in takeover negotiations. The fact that these provisions lower firm value may reflect the fact that all these provisions are highly correlated. In fact, of the 210 potential correlations among the 21 ATDs, 167 are significantly positive (see GIM who find the same relationships). This well known correlation is why identifying which ATDs affect firm value is so difficult.

Table 1. Difference in Means for ATD and NON ATD Adopters

ATD	Freq.	Difference in Means		ATD	Freq.	Difference in Means	
		Assets (\$Bill.)	Q/Q ^{med}			Assets (\$Bill.)	Q/Q ^{med}
Blank Check	1101	9.67 (5.37) ^{***}	-0.39 (4.04) ^{***}	Director Liability	454	12.68 (3.63) ^{***}	-0.32 (4.04) ^{***}
Stag-gered Board	751	-0.95 (0.45) [*]	-0.29 (3.59) ^{***}	Director Indem-nification	318	12.50 (2.94) ^{***}	-0.28 (3.18) ^{***}
Fair price	337	2.76 (1.42)	-0.24 (2.86) ^{***}	Advanced Notice	715	5.42 (2.48) ^{***}	-0.36 (4.62) ^{***}
Super-Majority	209	-1.43 (0.47)	-0.42 (5.48) ^{***}	Confidential Voting	100	43.51 (3.38) ^{***}	-0.28 (2.48) ^{**}
Ltd. Action	435	6.23 (2.43) ^{**}	-0.21 (2.57) ^{***}	Cumul-ative Voting	135	-1.43 (0.66)	-0.12 (0.83)
Anti-Green-mail	56	7.46 (1.33)	-0.36 (2.55) ^{**}	Executive Severance	860	0.15 (0.07)	-0.44 (5.26) ^{***}
Non financial Consideration	93	-2.03 (0.79)	-0.12 (0.88)	Silver Parachute	21	4.58 (1.46)	-0.12 (0.49)
Dual Class	133	5.87 (0.81)	-0.14 (4.23) ^{***}	Golden Parachutes	875	3.34 (1.53)	0.36 (4.24) ^{***}
Ltd. Abil. to Call a Meeting	415	7.52 (2.86) [*]	-0.22 (2.67) ^{***}	Pension Parachute	20	2.86 (0.72)	0.44 (1.87) [*]
Ltd. Abil. to Amend bi-laws	243	-2.17 (0.78)	-0.29 (2.93) ^{***}	Retirement-ESOP	124	18.73 (2.18) ^{**}	0.28 (2.21) ^{**}
Poison Pill	716	-0.68 (0.33)	-0.37 (4.57) ^{***}	Q ^{med} = median Q for 4-digit SIC industry. t ratios in parenthesis, * significant at 0.10, ** at 0.05, *** at 0.01			

Using industry-medians to normalize Q multiples may pose additional problems as well. Some of the industrial categories have only one or two observations so that the median Q may not be reflective of the “normal” firm value. This problem is even more acute in studies that use two-digit SIC codes. Morck, Shleifer, and Vishny (1988), La Porta, Lopez-de-Silanes, and Shliefer, and Vishny (2001), GIM (2003), Gompers Ishii and Metrick (2004), Bebchuk and Cohen (2003) and BCF deal with this problem by using panel data. But as GIM point out, charter provisions and bi-laws change very slowly. Successive observations of the same firm over time may not be independent.

Another problem with median Q adjustment is that ATD adoption is not independent of industry

groups. As can be seen in Table 2, some industries are characterized by heavy usage of ATDs while others tend toward the opposite. For example, the construction materials industry is a statistically significant user of 15 of the 21 provisions studied. The paper industry is a heavy user of 13. In contrast, business services is a statistically significant *under* user of 18 of the provisions and the electronic industry is an under user of 14. Many industries have too few representatives for a valid statistical test. There are several reasonable explanations for the clustering of ATD adoption rates. One has to do with peer pressure. If every firm in an industrial sector adopts ATD provisions except one, that one is more vulnerable to a takeover than it would be otherwise. It has been occasionally observed that when a

takeover of a firm in an industry is announced, the value of the other firms in the industry increases. A second explanation is offered by Davis and Greve (1997) who find that governance provisions spread through personal contact at the board level. The third explanation, and the one that is the concern of this paper, is related to Q, itself. Q measures the achieved

franchise value of the firm. But different firms have different potential franchise values. If these potential franchise values are related directly to both ATD decisions and realized Q then observing only realized Q and ATDs will lead to problems of simultaneity.

Table 2. Significant Deviations from Whole Sample ATD Adoption Rate

Fama Fr Industry	Freq	MVA* MBVA	Rate		Fama Fr Industry	Freq	MVA* MBVA	Rate	
			+	-				+	-
Drugs	59	7.91	1		Shipping	5	3.64		
Computers	65	6.89	2	5	Elc. Eq.	20	3.62	5	
Bus. Srv.	176	6.59		18	Retail	110	3.58	2	
Elect. Eq.	116	5.99	1	14	Chemical	46	3.54	8	
Telcom	36	5.76	1	6	Rubber	6	3.51		
Trading	45	5.20		11	Bus. Sup.	31	3.34	13	
Rl. Est.	0				Con. Mat.	35	3.16	15	
Lab. Eq.	35	5.00		7	Alcohol	5	3.09		
Tobacco	3	4.76			Auto/Truck	32	3.09	11	
Fabr. Prd.	6	4.47			Transpor.	47	3.09	3	
Med. Eq.	30	4.41	3	2	Shp. Cont.	7	3.09		
Recrea.	9	4.30	6		Const	20	3.05	6	1
Misc.	11	4.21	7		Rest/Hotel	34	2.96		3
Guns	4	4.21			Energy	62	2.96	10	
Mach.	61	4.14	6		Food Prd.	31	2.94	9	
Per. Sevc.	13	4.13	4		Apparal	22	2.91	7	1
Health	26	4.12		6	Aircraft	8	2.84	9	
Cons. Gds.	33	3.91	7		Insur.	77	2.70	2	
Steel	37	3.86	4		Utilities	97	2.27	13	1
Soda/Candy	4	3.80			Textiles	10	2.26	3	1
Entertain.	14	3.77	2	3	Agric.	3	2.20		
Books	22	3.74	7		Banks	110	2.02	8	
Wholesale	57	3.71	5	1	Gold	8	1.68	2	2
Mines	8	3.67	11		Coal	1	1.14		

MVA* frontier market value of assets, MBVA Mean Book Value of Assets across Fama French (1997) industry classifications, ordered on descending MVA*/MBVA or descending average growth potential.
 + (-) indicates significantly (= 0.10) greater (fewer) than expected adoption of ATD provisions using sample wide proportions as binomial probabilities.

To examine these problems we measure firm potential franchise value from a thick frontier. The thick frontier metric consists of regressing either the Q multiple of each firm or the market value of its assets (MVA) on a set of variables that are exogenous to the firm, recovering the residual, re-estimating a subset of the 25% of firms with the lowest residuals, recovering the estimated coefficients, and using them as parameters to

calculate the potential Q or Market Value, denoted Q* and MVA* respectively, of each firm in the sample. The idea behind this procedure is that the 25% lowest residual firms are “efficient” and the non-stochastic kernel extracted from the regression of their Q multiples or the market values on the exogenous variables is the frontier against which other firms can be measured. The function used in this study is a translog function.

$$\ln(Q) = \alpha_0 + \sum_{i=1}^7 \alpha_i \ln x_i + \sum_{i=9}^{10} \alpha_i \ln x_i + \frac{1}{2} \sum_{i=1}^7 \sum_{j=1}^7 \beta_{ij} \ln x_i \ln x_j + \text{Findummy} \quad (1)$$

$$\ln(MVA) = \alpha_0 + \sum_{i=1}^{10} \alpha_i \ln x_i + \frac{1}{2} \sum_{i=1}^8 \sum_{j=1}^8 \beta_{ij} \ln x_i \ln x_j + \text{Findummy} \quad (2)$$

Where,

Q	≡	Tobin's Q (Market value of assets divided by book value of assets adjusted for goodwill).
MVA	≡	The Market Value of the Firm's Assets.
x ₁	≡	The Industry Herfindahl Index.
x ₂	≡	The Industry Average Net Profit Margin.
x ₃	≡	The Industry Average Beta.
x ₄	≡	The Industry Average Total Asset Turnover.
x ₅	≡	The Industry Average Return of Equity.
x ₆	≡	The Ten Year Ave Growth in Industry Sales .
x ₇	≡	The Industry Average Operating Earnings.
x ₈	≡	The Book Value of the Firm's Assets.
x ₉	≡	The Percent of Industry Sales Imported.
x ₁₀	≡	The Percent of Industry Sales Exported.
FIN	≡	Financial Dummy for SIC 6000 firms.

In order to exploit available data as efficiently as possible, the term "industry" is defined as a four-digit SIC categorization. Export and import percentages are entered as linear terms only because many industries are purely domestic and multiple zero quadratic terms are destabilizing. Most of the import and export percentages are calculated for a single four-digit SIC level but when Department of Commerce data definitions transcended SIC boundaries, they are computed over multiple four digit categories. With the exception of the Herfindahl index, observations were winsorized at three standard deviations from their mean. With the possible exception of book value of assets (BVA) all regressors can be considered exogenous to the managerial decisions of the firm. BVA is legitimately short-run exogenous to managerial decision making and is considered an exogenous variable in this analysis. Leverage ratios, while potentially related to charter provisions, are not included because they are implicitly reflected in the combined effect of the industry averages of net profit margin, total asset turnover and return on equity. The results of this study are robust with respect to variations that include a reasonable set of financial ratios. The inferences of this study are not very sensitive to the way finance companies are treated. The finance dummy variable is not significant and results are invariant with regard to its inclusion. The effects of eliminating all finance companies from the sample are minor. Eliminating all finance companies except commercial banks and predicting commercial bank Q using a linear alternative profit function (Humphrey and Pauley, 1997), has no effect on the inferences that follow.

The purpose of Equation 1 is to benchmark the point of departure of this paper. Tobin's Q is a common measure of firm performance and we can use it to replicate previous findings. The purpose of Equation 2 is to control for industry effects in the

analysis that follows. The estimated coefficients of these regressions are not reported. Equation (1) yields an $R^2 = 0.22$ and $F = 12.26$ for the entire sample of 1689 and an $R^2 = 0.57$ with $F = 14.02$ for the 25% smallest residual observations that form the frontier. Equation (2) yields, after a generalized least square estimation to adjust for heteroskedasticity, an $R^2 = 0.89$ for the entire sample and $R^2 = 0.94$ for the 25% of the lowest residual observations that form the frontier.

This formulation solves the problem of the paucity of observations in some of the industrial classes because industrial averages are calculated across the universe of firms in the Compustat data base. The second column of Table 3 shows that almost all ATDs are associated with lower Q* values, indicating that firms with the opportunity for generating high market values from their brick and mortar assets tend to adopt fewer ATDs. This fact can also be seen in Table 2 where each of the Fama French industries are sorted in order of decreasing average of frontier market values (MVA*) divided by book value of assets less goodwill (BVA). High potential franchise value industries at the top of the table are low ATD users while low potential franchise value industries at the bottom are high ATD users. There are a number of rationalizations for this relationship. Firms that have a high potential for creating financial value from a small base of brick and mortar assets may be less vulnerable to hostile takeovers. This may be true for two reasons. If the value of a firm is more dependent on the skill of highly mobile employees the firm may not be a good candidate for a take-over. Moreover, firms with low amounts of on-the-ground assets may be more easily replicated than purchased in the financial markets.

The third column of Table 2 shows each firm's achieved Q normalized by its frontier Q (i.e. Q/Q*). This normalization differs from that of Column 3 of

Table 1 where normalization was by industry median Q (i.e. Q/Q^{med}). Under the Q^* normalization five ATDs no longer appear to be significant or become significant only at the 10% level. The five include fair price, antigreenmail, limited shareholder ability to amend bylaws, confidential voting, and retirement ESOP accounts. These are ATDs that characterize firms with low potential franchise value so they will

naturally be associated with firms with low achieved franchise value.

3. The Probability of ATD Adoption

In order to better sort out the effects of potential and realized market value one can exploit the fact that Q^* is exogenous to firm performance. Probit analysis is one way to formally test the effect of potential franchise value on ATD adoption.

$$P_{ri} = \alpha_{0i} + \alpha_{1i} \left(\frac{MVA^*}{BVA} \right) + \sum_{j=1}^{42} \beta_{ji} D_j \quad (3)$$

Where,

- P_{ri} ≡ Probability of adopting ATD_i for $i = 1 - 21$.
- MVA^* ≡ The frontier market value based on the firm's four-digit SIC industry cohort.
- BVA ≡ The book value of the firm's assets less goodwill.
- D_j ≡ A dummy that equals one for the j^{th} Fama-French industries ($j = 3,4,6-26,28,29,31-46, \& 48$ in order of Fama and French, 1997, pp. 179-181).

The $\hat{\alpha}_{li}$ coefficients of these 21 regressions and their t-ratios are reported in Table 3. Intercept terms and the 21×42 β_{ji} estimates are not reported to save space. The latter were largely insignificant.

The reported $\hat{\alpha}_{li}$ coefficients have been scaled so that they can be interpreted to represent the effect of a unit change in potential market to book value on the probability of an ATD adoption. For example, a one-unit increase of potential market to book value will reduce the probability of adopting a blank check provision by 1.5%.

The Craig-Ulmer R-Squares range from a low of 0.03 (limiting the ability of shareholders to act by written consent) to 0.30 (pension parachute) and largely correspond to the t-ratios reported in parentheses.

The probability of adopting 15 out of the 21 ATDs is significantly ($\alpha \leq 5\%$) lower for firms with high potential franchise value than otherwise. High potential franchise value has no positive effect on the probability of the adoption of any ATD.

Table 3. Effect of ATD's on Performance Difference in Means and Regression

1	2	3	4	5
Key Variable	Q^*	Q/Q^*	$\hat{\alpha}_{li}$	$\hat{\delta}_{2i}$
Constant				0.46 (5.15)***
MBH*/BVA				0.060 (8.45)***
Blank Check	-0.334 (3.79)***	-0.246 (3.33)***	-0.015 (3.02)***	+0.23 (2.63)***
Classified Board	-0.471 (5.97)***	-0.140 (2.09)**	-0.017 (2.91)***	-0.66 (6.02)***
Fair price	-0.551 (6.31)***	-0.007 (0.97)	-0.029 (3.95)***	-0.05 (1.05)
Super Majority Merger	-0.59 (5.90)***	-0.231 (2.64)***	-0.020 (3.19)***	-0.25 (3.29)***
Ltd. Action by consent	-0.123 (1.34)	-1.156 (2.18)**	-0.006 (1.27)	-0.15 (3.00)
Anti-greenMail	-0.348 (2.65)***	-0.175 (1.08)	-0.004 (1.24)	+0.07 (3.49)***
Non financial Consideration	-0.629 (4.18)***	-0.90 (0.61)	-0.011 (2.32)**	-0.07 (3.09)***

Table 3. Effect of ATD's on Performance Difference in Means and Regression

1	2	3	4	5
Key Variable	Q*	Q/Q*	$\hat{\alpha}_{1i}$	$\hat{\delta}_{2i}$
Dual Class	-0.274 (2.44)**	-0.232 (2.05)**	-0.011 (2.24)**	+0.20 (1.88)*
Ltd. Ability to Call a Meeting	-0.330 (3.74)***	-0.151 (2.11)**	-0.024 (3.50)***	-0.06 (0.58)
Ltd. Ability to Amend by-laws	-0.499 (4.61)***	-0.144 (1.79)*	-0.011 (1.92)**	-0.31 (4.35)***
Poison Pill	-0.216 (2.68)***	-0.281 (4.26)***	-0.005 (0.92)	-0.14 (0.12)
Director Liability	-0.632 (8.18)***	-0.144 (2.09)**	-0.048 (5.72)***	-0.22 (2.08)**
Director Indemnification	-0.512 (0.03)	-0.157 (2.06)**	-0.037 (4.91)***	-0.13 (1.84)*
Advanced Notice	-0.38 (4.74)***	-0.185 (2.81)**	-0.038 (5.00)***	+0.26 (2.21)**
Confidential Voting	-0.550 (4.94)***	-0.111 (0.89)	-0.024 (4.03)***	-0.01 (0.20)
Cumulative Voting	-0.381 (2.83)***	-0.76 (0.61)	-0.008 (1.63)	+0.17 (2.40)***
Executive Severance	-0.481 (5.98)***	-0.274 (4.07)***	-0.013 (2.37)**	-0.42 (4.19)***
Silver Parachute	-0.430 (1.89)*	0.029 (0.10)	-0.005 (1.75)	+0.05 (5.12)***
Golden Prachute	-0.247 (3.04)***	-0.246 (3.63)**	-0.010 (1.90)*	+0.55 (5.11)***
Pension Parachute	0.612 (3.62)***	-0.444 (1.52)	-0.011 (2.46)**	-0.05 (4.88)***
Retirement-ESOP	-0.577 (5.29)***	-0.224 (1.90)*	-0.016 (2.72)***	-0.24 (4.60)***
R2				0.1831
Column 2: The difference in mean frontier Q of ATD adopters and that of non-adopters. Column 3: The difference in mean achieved Q normalized by frontier Q* of ATD adopters and that of non-adopters. Column 4: Estimated coefficient $\hat{\alpha}_{1i}$ from $P_{ni} = \alpha_0 + \alpha_1(MVA^*/BVA) + \alpha_j D_j$ $i = 1 \dots 21, j = 2 \dots 48$ where P_{ni} is the probability of adopting ATD _i , MVA^* is the frontier market value, and BVA is book value of assets less goodwill, D_j is an industry indicator (Equation 3). Column 5: Estimated coefficient $\hat{\delta}_{2i}$ from $\ln Q = \alpha_0 + \alpha_1(MVA^*/BVA) + \alpha_j EP_{ni}$ $i = 1 \dots 21$, where EP_{ni} is the predicted probability of adopting ATD _i from Equation 3 (see Equation 4). t ratios are in parentheses, *significant at 0.10, **at 0.05, ***at 0.01. t ratios in column 5 are adjusted.				

The results are consistent with the notion that the greater the firm's potential for turning its assets into high market values the lower the probability that it will adopt an ATD.

4. The Probability of ATD Adoption and Firm Value

The fact that ATD adoption is in part a result of the potential franchise value of the firm implies that a simple OLS regression of ATD's on firm performance would generate inconsistent estimates of the coefficients because ATD adoption would likely be correlated to the error term. In this section

the results from the probit analysis of Equation 3 are incorporated into a multivariate analysis of the effect of ATD adoption of firm value in the following regression.

This procedure is related to the investigation by Comment and Schwert (1995) of the effect of poison pill adoption. At the first stage, Comment and Schwert estimate the probability of adoption and at the second stage they measure the take-over deterrence of adoption to find that poison pills do not deter takeovers. Probabilities retain far more information than binary predicted values so it is efficient to use them rather than translate them into binary adopt/no-adopt variables.

$$\ln Q = \delta_0 + \delta_1 \ln \left(\frac{MVA^*}{BVA} \right) + \sum_{i=1}^{21} \delta_{2i} \hat{P}_{ri} \quad (4)$$

Where,

Q	≡	Tobin's Q multiple.
MVA*	≡	The frontier market value for the firm's four-digit SIC industry cohort.
BVA	≡	The book value of the firm's assets less goodwill.
\hat{P}_{ri}	≡	The predicted probability that the firm will adopt ATD _i from Equation 4.

To mitigate against multicollinearity, the dimension of the regressor set is reduced through the means of principal component analysis. The 21 \hat{P}_{ri} are used to construct principal components and the six principal components with eigen values greater or equal to one are selected. These comprise 87% of variation among the 21 \hat{P}_{ri} . The components are used as independent variables in lieu of the \hat{P}_{ri} in Equation 4. Estimates of the original coefficients are then recovered and these are reported in the last column of Table 3 along with their t-ratios which have been adjusted for downward bias.

The coefficients, as reported, do not lend themselves easily to economic interpretation for they give the percentage change in a firm's Q multiple due to a change in the probability that firm might adopt a particular ATD. While there is no way to infer the impact of this jump function from its probability, one can imagine an efficient market where the value of a company adjusts to a change in the probability of its adopting an ATD. In that case, the impact a one percent increase in, say, the probability of adopting a staggered board provision would result in a decrease in the value of the average company of about 0.66%.

Column 5 of Table 3 displays evidence that nine of the ATDs are associated with significantly lower firm value as measured by Tobin's Q. Three of the nine are ATDs that are consistent with those ATDs hypothesized by BCF as "limitations on shareholding voting power", including provisions for a staggered board, a super majority to approve a merger and other business, limits in the ability of shareholders to amend by-laws and charter provisions. Six not included in BCF's list are limiting the ability of shareholders to act through written consent, the director's right to consider non-financial factors when weighing the merits of a takeover, limits on the liability of directors, provisions that protect the pension plan surplus from being deployed to finance a take-over, executive severance agreements that guarantee post employment wealth and/or income regardless of the reason for termination, and retirement ESOP plans that can hold large blocks of stock against takeovers. The first three of these six additional ATDs limit, in some way, the rights of shareholders. Poison Pills, which BCF include while pointing out that poison

pills are redundant to the statutory power of the board are not significant. The insignificance of poison pills is consistent with Danielson and Karpoff (2002) who find evidence that pills have a non-negative influence on firm operating performance.

Six of the provisions appear to be associated with significantly greater firm value. Blank check provisions, which are included in Cremers and Nair (2004) list of three, is one example. As Coates (1999) and BCF point out, blank check provisions that allow the issuance of new stock is also redundant to the statutory power of the board and so one can reason they would not significantly affect firm value. The fact that the blank check provision appears to enhance the value of the firm may be an indication that it is being used in the manner of "shelf registration" of bonds and serves as a signal of potential investment opportunities. The positive influence of cumulative voting is to be expected because cumulative voting helps protect the interests of minority holders. Anti-greenmail provisions prevent management from raiding the corporate treasury to preserve their positions and so one would expect a positive sign. The positive influence of silver parachutes and golden parachutes is consistent with the goal of motivating a long term commitment from the middle and upper management of the firm (Stout, 2002 and Knoeber, 1986). Brewer and Wall (2004) show that golden parachute provisions in employment contracts can be constructed in a way that aligns management interests with shareholders. The fact that dual class stock has a positive influence on firm value may be due to a correlation between control rights and cash flow rights even when they are separated by stock classes. If that were the case, the incentive effect of cash flow rights may dominate the entrenchment effects of control rights on firm value when management possesses the superior stock. Gompers, Ishii, and Metrick (2004) show that the two effects must be isolated before inferences can be drawn. Finally, the only rationalization for the significantly positive sign on the requirement that shareholders notify the board of agenda items in advance of the meeting may be because it can enhance the bargaining position of managers in the event of a takeover.

5. Conclusion

Recent research has been generating increasing evidence that antitakeover defenses (ATDs) are

generally associated with poor management performance. ATDs are highly correlated so it is difficult to determine which among them are statistically significant. While Cremers and Nair (2004) and Bebchuk, Cohen, and Ferrell (BCF, 2004) test subsets of ATDs chosen by theory, this study lets the data determine significance with no a priori theory.

At the first stage of this analysis the probability of ATD adoption is estimated using potential franchise value as an explanatory variable. The potential franchise value is the maximum market value the firm can achieve determined by the thick frontier metric. It is found that for 18 of the 21 ATDs considered, the lower the franchise value the greater probability of adoption. At the second stage of the analysis the probability of adoption is used as an instrument in a principal components analysis of the effect of ATD adoption on firm performance as measured by Tobin's Q. Nine of the 21 ATDs are associated with lower firm value, six are associated with higher firm value, and six are not significant at the 5% level or more.

Of the nine ATDs that are associated with lower firm value, three are what BCF (2004) would define as "limits on shareholder rights." They are staggered boards, limits on the ability to amend bylaws and charters, and supermajority requirements to approve mergers. Additional ATDs that are associated with lower firm value include limits on the ability of shareholders to take action by written consent, the board's right to consider non-financial ("stakeholder") considerations in taking a position on a merger or takeover, commitments to compensate executives in the event of termination regardless of cause, limits to the personal liability of directors, provisions that prevent successor firms from raiding the surplus of employee pension plans to finance a takeover, and retirement ESOPs that can be mobilized to purchase stock to thwart a takeover bid.

The six provisions that are associated with an increase in firm value include blank check provisions that permit the issuance of new shares of stock that dilute the value of take-over holdings, anti-greenmail provisions that prevent management from raiding the corporate treasury to "pay-off" a corporate raider, cumulative voting that protects the rights of minority shareholders, silver and golden parachutes that provide severance to employees and the CEO in the event of a termination due to a takeover. The six ATDs that were not significant at the five percent level or higher include fair price agreements, poison pills, confidential voting, and limits on the ability of shareholders to call a special meeting.

In general, the results of this study are consistent with the theories advanced in the literature. While most antitakeover provisions do not adversely affect the value of the firm, defenses that limit shareholder rights or signal managerial entrenchment appear to be associated with lower shareholder values.

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