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Contesting Corporate Control in the U.S.: The Role of Ownership Structure and Antitakeover Measure

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Abstract

This study investigates the role of ownership structure and antitakeover measure in proxy contests using nested logit model. Findings indicate that dissidents target small firms with high agency costs, poor performance, and a high volume of prior shareholder proposals for Media Threats. Following a Media Threat, dissidents target firms with more independent boards, with the next step being a SEC filing of a proxy fight. After that, management in firms with poison pills and less independent boards are more likely to settle contests with dissidents, while firms with lower insider ownership are more likely to go through a proxy fight.

1. Introduction

It has been argued that the U.S. corporate voting process imposes substantial costs on shareholders seeking to contest board seats. Indeed, Pound (1988) and Bebchuk (2005) contend that due to the costs of mounting an activist campaign, activist investors are largely constrained from running for corporate boards. Furthermore, if a proxy fight does occur, incumbent management is in an advantageous position relative to activist investors since antitakeover measure imposes substantial barriers to obtaining control of the board. Additionally, management can use corporate resources to defend against external threats.

Increased concern about the ability of activists to contest board seats has led to calls for the reform of relevant corporate laws to empower shareholders (e.g., Bebchuk, 2005). On June 10, 2009, the Security and Exchange Commission (SEC) proposed a rule that fundamentally would reform the current proxy process to facilitate director nominations by shareholders. The proposed rules would add a new rule, Rule 14a-11, which would allow shareholders meeting certain requirements to add director nominees in the company's proxy materials. Said proposed changes were adopted in August of 2010. Additionally, activist investors are pressuring firms by submitting shareholder proposals to adopt majority rather than plurality voting rules for corporate boards.

Despite what might be viewed as management entrenchment, the very threat of a proxy contest could lead to changes in the corporate culture. For example, 30 U.S. companies ceded board seats to dissidents who threatened proxy fights in 2008, up from 23 in the same period in 2007 and nine in 2006. Recent academic work on shareholder activism includes Klein and Zur (2009), Brav, Jiang, Partnoy, and Thomas (2008), and Clifford (2008). These authors focus on firm performance following the public disclosure that an activist investor (or hedge fund) has acquired a large block of stock, as filed with the SEC on Schedule 13-d. They note that activist hedge funds typically do not seek control of the firms in which they invest, with ownership stakes typically less than 10% of outstanding shares. Although such shareholdings are not generally sufficient for control purposes *per se*, the authors show that activist hedge funds are quite successful in enhancing shareholder value.

Ownership less than that required for control, when coupled with the threat of proxy contests, suggests that the broader ownership structure of these firms is potentially important. That is, absent sufficient voting power to achieve corporate control, the potential for other shareholders to vote with an dissident poses a credible threat to which management must respond. At the same time, a natural question arises as to the nature of antitakeover measure in place at these firms and the extent to which management is indeed entrenched. Thus, the purpose of this study is to investigate the role of ownership structure and antitakeover measure in the context of proxy fights.

In particular, we examine firms targeted via the proxy process for the three-year period from 2005 through 2007. Each proxy contest starts with a threat by activist investors of a proxy fight via the media (Media Threat). Among those battles, some cases can be finished after the negotiations, but the rest could proceed into a formal filing with the SEC by activist investors for a proxy fight (SEC Filing), and could even become a proxy fight or contested election. The development of the proxy contests can be described as follows:

Media Threat → SEC Filing → Proxy Fight

Because of the interlinked composition of the underlying subjects, we apply a three stage nested logit model. Based on this model and consistent with the literature, the results show that dissidents are more likely to launch a Media Threat (the first stage) against small firms with high agency costs, poor performance, and a high volume of prior shareholder proposals, which

pattern suggests shareholder dissatisfaction with the company. Those findings tend to suggest that the very threat of a proxy fight could act as a disciplining mechanism.

In the stage following a Media Threat, the antitakeover mechanisms become the critical factors in determining the resolution of the contest. We find that firms with more independent boards are more likely to face a SEC Filing and less likely to settle proxy contests with activist investors. Furthermore, the existence of poison pills tends to help the two parties settle the contest without shareholder voting.

In the third/final stage, the ownership structure tends to determine whether the contest is going to evolve into a proxy fight. We find that at this point in time, over the 2005 through 2007 study period, it is the extent of ownership by insiders that really matters. When that insider ownership is low, it is more likely for the dissidents to carry the contest to the very end, the proxy fight. The results show that dissidents tend to take no action against firms when the ownership by investment companies is higher and more concentrated.

The remainder of the study is organized as follows. Section 2 reviews the literature and explains the economic intuition of proxy contest. Section 3 explains the nested logit model. Section 4 describes the experimental design and sample construction. Section 5 explores the effects of ownership structure and antitakeover measure on shareholder activism. Section 6 provides a discussion of conclusions.

2. Economic intuition and literature review

Proxy contest is viewed as an integral component of the control devices disciplining management (Mulherina and Poulsen, 1998; Dodd and Warner, 1983). A board seat embodies fiduciary duties. Activist investors, who generally possess industry, firm specific or takeover related expertise, often use proxy contests to get their representatives elected to the board. They take large positions in the target firm, show a bit of “jawboning” and explain why the firm is targeted by emphasizing on management inefficiency as reflected in poor firm performance, not only to the management but also to the public (Carleton, Nelson, and Weisbach, 1998; DeAngelo and DeAngelo, 1989). It potentially can culminate in a proxy contest. On the other hand, management views the dissidents as disruptive and seeks to fortify their positions against the challenge from the activist investors. Furthermore, management and dissidents also could come to the table to resolve the controversy. Indeed, management can take advice recommended by the activist investors or even invite them to join the board.

In general, the following figure could illustrate the potential development of a proxy contest:

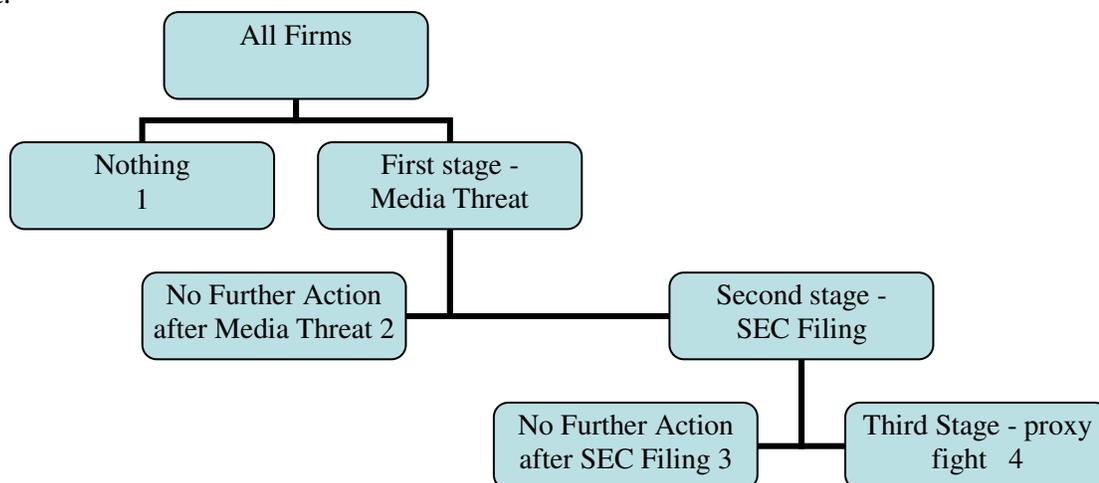


Figure 1 – Development of a proxy contest (Nested Tree Structure)

Figure 1 shows the nested structure of proxy contest. It starts from the announcement of a proxy fight by dissidents, followed by dissidents filing with SEC to make the contest formal. The fight can be finished by shareholder voting at the annual shareholder meetings.

During the first stage of a proxy contest, dissidents launch a Media Threat against those firms with which they are dissatisfied. Clearly, shareholders generally are not satisfied with firms that are underperforming or have high agency costs. Thus, those firms tend to become ideal targets. Additionally, the occurrence of prior shareholder proposals also could indicate shareholder dissatisfaction (Gillan and Starks, 2000; Renneboog and Szilagyi, 2011).

Indeed, the majority of activist investors in the sample notify the public of the forthcoming proxy contests and state supportive rationales, mainly requesting firms to improve performance and take action, such as selling idle assets, repurchasing shares, issuing dividends, and so forth (DeAngelo and DeAngelo, 1989). Thus, poor performance and high agency costs are considered the reason behind a Media Threat. Bratton (2007) discussed such a model in the study of the proxy contest between Mylan Inc. and Carl Icahn. Hence, we hypothesize that firms with high agency costs, poor performance, or prior shareholder proposals are more likely to become the target of a Media Threat.

Meanwhile, on the initiation of a Media Threat, management could address the issues to avoid further confrontation. For example, to address high free cash flow problems, management can purchase company shares or increase dividends. In the case of the proxy contests between Carl Icahn and Mylan, “pre Icahn, Mylan had \$1.8 billion of shareholders’ equity and no debt. Post Icahn, its shareholders’ equity stood at \$787 million and long term debt at \$685 million.” This 87% ratio of debt to equity arguably constrained managers’ freedom of action (Bratton, 2007). The above example suggests that with a positive response from management, the proxy contest could be ended at this stage and activist investors do not need to take further action. However, in our samples, only half of the proxy contests are ended at the first stage. The other half have moved to the second stage where the dissidents file their intentions with the SEC for a proxy fight.

At this stage, the potential targets, such as those firms with fewer antitakeover devices and an independent board, tend to look “breakable.” Fewer antitakeover provisions indicate less of a barrier to a takeover attempt and thus less protection for management. In other words, the presence of antitakeover measure could not only limit the potential for outside monitors to discipline management but also insulate boards from being accountable to shareholders. Gompers, Ishii, and Metrick (2003) construct the G-index, an index composed of 24 antitakeover provisions and shareholders rights. They show that better shareholder rights are associated with greater firm value and better performance. Bebchuk, Cohen, and Ferrell (2009) select a subset of six provisions from the 24 employed by Gompers, Ishii, and Metrick (2003) and use this subset in an entrenchment index (E-index). Similarly, they find that higher entrenchment negatively affects firm value. In addition, among the six components of E-Index, staggered boards and poison pills are the most effective mechanisms. A staggered board is an exceptionally effective antitakeover device for management, since it requires only one third of the seats to be voted annually, and thus a minimum of two proxy fights is required to establish a majority of the seats in the board. A board also can install a poison pill at anytime without shareholder approval, and the combination of a staggered board and poison pills creates a strong barrier to invasion by activist investors (Bebchuk, Coates, and Subramanian, 2002a, 2002b; Bebchuk and Cohen, 2005; Guo, Kruse, and Nohel, 2008; Mulherina and Poulsen, 1998; DeAngelo and DeAngelo, 1989). For example, Bebchuk, Coates, and Subramanian (2002a, 2002b) show that a classified board reduces the returns to hostile takeovers by 8-10%, and not a single hostile bid won a ballot box victory against a classified board over the period

1996-2000. Furthermore, unlike insiders or affiliated directors, independent directors are, arguably, more vigorous monitors because they are less entrenched. A diversified board is thereby less likely to be indebted to management (Carleton, Nelson, and Weisbach, 1998). Thus, a more independent board might suggest higher incentives within the board to enhance shareholder value, increasing the potential for the board to adopt proposed reforms. Hence, we hypothesize that firms with low antitakeover measure or with a more independent board are more likely to become the target of a SEC Filing.

Proxy contests could be terminated at this stage if management follows advice as directed by the dissidents. Otherwise, activist investors either can drop the contest if they anticipate that majority shareholders support management or bring it to a contested election, the final stage of a proxy contest.

Clearly, ownership structure plays an important role in this stage, since the victory of the proxy fight depends on how shareholders vote. Specifically, during the proxy fight, shareholders vote at the annual shareholder meeting, choosing between the two slates of directors, one from the current management and the other from the dissidents. The ideal target firms for a proxy fight should be those whose majority shareholders will vote against the incumbent teams and vote for the dissidents' slates. Thus, the decision regarding whether to proceed after a SEC Filing depends on the projected support among all shareholders, especially large investors, including insiders, institutional shareholders, and blockholders. Insiders generally support the incumbent team and thus we expect the probability of a proxy fight to be negatively related to insider ownership.

However, the role of institutional investors is ambiguous. With greater stakes, institutional shareholders have a greater incentive to become well informed to oversee the management. Nevertheless, it is costly to do so. Because the costs are paid by the institutional investors but the efforts from monitoring are reaped by all shareholders, this free-rider problem can seriously hold the institutions back. Representative studies on the role of institutional ownership include Parrino, Sias, and Starks (2002), who report that institutional ownership declines in the year prior to a forced CEO turnover, suggesting that institutions typically choose to sell their shares rather than intervene with a firm's operations when they are dissatisfied with management. However, Hartzell and Starks (2003) found a strong negative relation between institutional ownership concentration and the level of executive compensation, which suggests that institutional investors are active in monitoring management. Consistent with this view, Chen, Harford, and Li (2007) find that the net benefits to institutions of monitoring increase with the size of the stake, the length of time invested, and the independence of the institution. Several other studies suggest that funds monitor and vote their shares responsibly and pressure corporate management for reforms (Ashraf and Jayaraman, 2007; David and Kim, 2006; Duan, 2008; Ng, Wang, and Zaiats, 2009).

In contrast, some institutional investors, such as pension funds and university endowments and foundations, tend to allocate resources heavily to index. Those funds therefore have lack of motivation for monitoring (Coffee, 2010).

Meanwhile, depending on the level of significance of the business ties with the management, institutional investors could vote unconditionally with management. Pressure sensitive institutional shareholders, such as banks and insurance companies, tend to have existing or potential business relations with management (Brickley, Lease, and Smith, 1988; Pound, 1988; Renneboog and Szilagyi, 2011; Aggarwal, Erel, Ferreira, and Matos, 2011). On the contrary, pressure insensitive institutional investors, such as investment firms, independent investment advisors, and pension funds, are unlikely to have any business ties with management (Renneboog and Szilagyi, 2011).

In summation, the role of institutional investors after a SEC Filing is an empirical question. It depends on the monitoring outcomes as well as funds' business ties with management.

Similarly, when the number of institutional funds increases, institutional ownership is more dispersed, leading to reduced incentives for institutional investors to monitor due to the liquidity and control tradeoff (Coffee, 2010). Therefore, it is expected that the probability of a proxy fight will be positively related to the number of funds. In addition, it is expected that the Herfindahl index, a measure of institutional concentration, would negatively impact the likelihood of a proxy fight.¹

In contrast to typical institutional investors that often own only a small amount of a particular firm's shares, there are investors holding large blocks of stocks. More generally, blockholders – institutional or otherwise – play an important role in corporate governance. During the past decade, blockholders, in the form of activist hedge funds, have become increasingly important. The actions taken by hedge funds include taking large positions in target firms, criticizing firms' business plans and governance practices, confronting management, and demanding corrections to boost stock prices. Their involvement in proxy contests implies investment opportunity and, therefore, strengthens the belief that the targeted firm is underperforming. Thus, it is expected that a greater presence of activist blockholders or hedge funds would negatively impact the likelihood of a proxy fight. Recent work suggests that participation by hedge funds helps reduce agency costs and enhance firm value (Brav, Jiang, Partnoy, and Thomas, 2008; Klein and Zur, 2009; Bethel, Liebeskind, and Opler, 1998). In addition, hedge funds could be able to affect managerial decisions through the perceived threat of a proxy fight (Klein and Zur, 2009).

Regarding the remaining blockholders, higher ownership by pressure insensitive blockholders can result in more voting for dissidents to enhance shareholder value. Meanwhile, pressure sensitive blockholders might support management unconditionally. Thus, it is an empirical question as to the role of blockholders after a SEC Filing. It depends on the blockholder type as well as its business relation with management.

At issue, however, is that institutional investors and blockholders as individuals typically own small stakes in their portfolio firms. Even activist hedge funds typically own less than 10% of the total shares, an amount that falls far short of a reasonable threshold for assuming corporate control. As a result, it appears that aggregate ownership structure also is important in assessing the ability to influence corporate management.

In brief, activist investors identify underperforming firms as potential targets for a Media Threat. A Media Threat occurs when dissidents announce via the media the intention to launch a proxy fight with management. The ideal target is a firm with poor performance and high agency costs. The Media Threat can lead to private negotiations between dissidents and management, potentially ending the protest. Alternatively, activists can proceed to the next stage, formally filing for a proxy fight with the SEC. A firm with fewer antitakeover provisions and a more independent board is an ideal target, as managers are less entrenched and more susceptible to outside pressure. As with the Media Threat, the SEC Filing can lead to private negotiations, ending the contest. Otherwise, the process culminates in a proxy fight. The ideal target firm for a proxy fight is where shareholders tend to be more supportive of the dissidents than the management.

Based on the above analysis, a three-level nested structure best describes the data structure of proxy contests, as shown in Figure 1. In particular, firms at the lower levels share certain firm characteristics similar to those at the upper levels because of the nested structure of data.

¹ A higher Herfindahl index indicates greater concentrated institutional ownership.

For instance, activist investors target underperforming firms for a Media Threat. Hence, firms that face a SEC Filing or a proxy fight are all underperformers because all of them are targeted for a Media Threat. Accordingly, it is not necessary to use firm performance as a factor in the analysis of a SEC Filing or proxy fight. In sum, firm attributes included in the upper levels are shared by firms in the lower levels and thus, different firm features should be considered in different levels.

It is important to recognize that proxy contests can be costly. Although a proxy contest at a small firm can cost as little as \$100,000, the average cost can range between \$200,000 and \$1 million (Bratton, 2007; Clifford, 2008). An example is a proxy contest between Sam Wyly and Computer Associates, Inc. According to the Los Angeles Times, both sides spent approximately \$20 million on the fight, with the Computer Associates, Inc. management team attaining victory.

3. Nested logit model

3.1 Assumptions of the nested logit model

Because of the data structure as described in Figure 1, we apply the nested logit model and evaluate the underlying assumptions.

First, nested logit model is based on the assumption that each alternative can be partitioned into nests. Figure 1 clearly shows the nested structure of the proxy contests. Thus, this assumption is reasonably satisfied in this study.

Second, the nested logit model relaxes assumption of Independent and Identically Distributed (IID) and recognizes the possibility that “each alternative could have information in the unobserved influences of that alternative, which in turn has a role to play in determining an outcome that is different across the alternative branches” (Jones and Hensher, 2007). This difference implies that the variances of error might be different but the information content could be similar among subsets of alternatives generating some amount of correlation among these subsets (Jones and Hensher, 2007). Under the context of the proxy contests, IID indeed does not hold. In fact, the utilities of the third and the fourth outcomes are highly correlated in that the occurrence of both events depends on the contingency of the SEC Filing.

Lastly, the application of a nested logit model relaxes the restriction that the choice between any two pairs of alternatives is simply a binary logit model (Cameron and Trivadi, 2009). In other words, the Independence of Irrelevant Alternatives (IIA) can be too restrictive under the nested logit model. Indeed, if the ‘No further action after a Media Threat’ in Figure 1 is not an option anymore, then more cases of the ‘No further action after SEC Filing’ apply. This will change the ratio of the occurrence of the two mutually exclusive alternatives nested with SEC Filing.

Of note, if IIA does not hold, then it is derivable that IID does not hold since IIA is a consequence of assuming that the errors are IID (Stata10 Manual, 2007). Accordingly, we test the assumption of IIA by applying the Hausman specification test to re-estimate the model on a subset of the alternatives since this test is not sensitive to the tree structure that we specify for a nested logit model (Stata10 Manual, 2007). Therefore, if IIA truly holds, there should not be any significant differences between the parameters obtained on the subset of alternatives and those obtained on the full set of alternatives. If the difference is proven significant, then the assumption of IIA does not hold. The test of the IIA assumption is in Section 5.

3.2 Specifications of the nested logit model

A nested logit model is based on a “choice” modeling concept. It assumes that decision makers are rational and choose from among their choices the option that brings the highest

utility. It means that given the utility function for each choice, respondents are expected to make the optimum choice. Based on the estimated utility from each available choice, as in the logit model, it is possible to obtain the optimum probability for each choice.

$$\pi_{\text{choice}, i} = e^{\text{utility}, i} / \sum_{i=1}^n e^{\text{utility}, i}, \text{ where } i \text{ represents the } i^{\text{th}} \text{ choice among } n \text{ alternatives.}$$

The decision making or choice structure could be complicated, causing the structure to become nested with many layers. In each layer, it is possible to get the probability for each choice from the above equation, except that the calculated probability for choice i is a conditional probability. Choice i 's marginal probability is equal to its conditional probability times the marginal probability of the prior event that is linked to choice i . Thus, it is possible to get marginal probability functions for all alternatives. Given that the choice is known, it is possible to obtain the log likelihood function,

$$\text{LnL} = \ln \sum_{i=1}^n (\pi_{\text{choice}, i} * \text{occurrence choice } i)$$

where i represents the i^{th} choice among n alternatives.

Referring to Figure 1, while nothing represents the independent (degenerate branch) alternative, there is a hierarchy that establishes groupings such as Media Threat with two distinct branches: 'No further action after Media Threat' and SEC Filing. Continuing in the next level, 'No further action after Media Threat' presents an independent alternative, while SEC Filing is connected with two distinct alternatives: 'No further action after SEC Filing' and proxy fight.

Figure 2 shows this three level nested tree structure for states of proxy contests. The four elemental alternatives are Nothing, No further action after Media Threat, No further action after SEC Filing, and proxy fight.

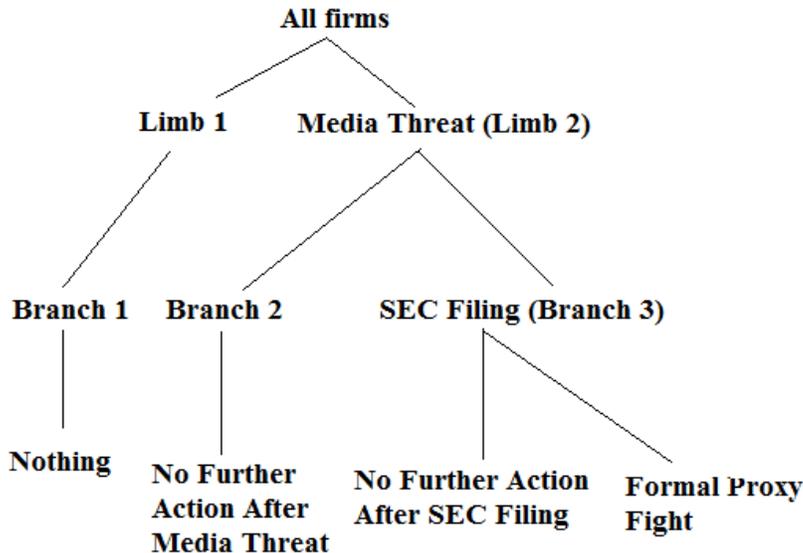


Figure 2 - Nested Tree Structure for States of Proxy Contests

Figure 2 shows the nested structure of proxy contest. It starts from the announcement of a proxy fight by dissidents (limb 2), followed by dissidents filing with SEC to make the contest formal (branch 3). The fight can be finished by shareholder voting at the annual shareholder meetings (formal proxy fight).

In Figure 2, the marginal outcomes are expressed in the limb levels, i.e., the outcome of Nothing and Media Threat state. There are two conditional outcomes. One outcome involves the probability of a SEC Filing state or a ‘No further action after Media Threat’; it is conditional on whether a firm falls under the Media Threat category. Another conditional outcome involves the probability of a ‘No further action after SEC Filing’ or a proxy fight; it is conditional on whether a firm falls under the SEC Filing category. Additionally, there are three nodes, Limb 1, Branch 1 and Branch 2, which are degenerated with only one extension.

In sum, nested logit models start by first calculating the expected utilities of the bottom levels, with utilities at higher levels including the expected utilities from lower level outcomes. Based on the expected utilities at each level, the maximum likelihood (ML) function equals the log of sum of each utility times the corresponding proxy contest outcome (indicator variable). This ML function is concave and has efficient and consistent solutions.

The utility models at each level are as follows.

Utility_{Media Threat}

$$= \gamma_{(1)}[\beta_{1(1)}*\text{Free_Cash_Flow} + \beta_{2(1)}*\text{Leverage} + \beta_{3(1)}*\text{Market_Book} + \beta_{4(1)}*\text{Stock_Returns} + \beta_{5(1)}*\text{Firm_Size} + \beta_{6(1)}*\text{Shareholder_Proposals} + 1/\lambda_{(1,1)}*IV_{(1)}]$$

Where,

$$IV_{(1)} = \ln(e^{\lambda_{(1,1)} \text{ utility of SEC Filing}} + e^{\lambda_{(2,1)} \text{ utility of No further actions after Media Threat}}) \quad (1)$$

$$\text{Utility}_{\text{SEC Filing}} = \lambda_{(1,1)}[\beta_{1(1,1)}*\text{Poison_Pills} + \beta_{2(1,1)}*\text{Staggered_Board} + \beta_{3(1,1)}*\text{Approve_Merger} + \beta_{4(1,1)}*\text{Amend_Bylaw} + \beta_{5(1,1)}*\text{Amend_Charter} + \beta_{6(1,1)}*\text{Board_Independence} + IV_{(1,1)}]$$

Where,

$$IV_{(1,1)} = \ln(e^{\text{utility of proxy fight}} + e^{\text{utility of No further actions after SEC Filing}}) \quad (2)$$

Utility_{proxy fight}

$$= \beta_{1a}*\text{Insider_Ownership} + \beta_{2a}*\text{Blockholder_Ownership} + \beta_{3a}*\text{Institution_Ownership} + \beta_{4a}*\text{No_of_funds} + \beta_{5a}*\text{Active_blockholder} \quad (3)$$

In Appendix A, we report the theoretical analysis of the nested logit model in the context of proxy contests.

4. Sample selection and data

We collected the publicized threats of proxy contests from Lexis-Nexis by using key words: proxy fight, proxy battle, proxy contest, proxy solicitation, consent solicitation, solicit proxies, soliciting proxies, and solicitation of proxies. The search is focused within the 2005 through 2007 period because of data availability in the Corporate Library (TCL). A total of 254 potential proxy contests are identified within the sample period, of which 197 cases have filed DEF 14A forms with the SEC and 52 have ended with a shareholder vote.

We collected the data with respect to antitakeover measure, board composition, and ownership by blockholders and insiders from TCL. In total, there are 8,257 observations from 2005 through 2007 in the sample. We deleted 13 observations due to missing values for “annual meeting date”. We also collected the status of classified boards and poison pills, percentage of outstanding shares required to amend bylaws, percentage of outstanding shares required to amend company charters, and percentage of outstanding shares required to approve a merger or sale from TCL.² Where the percentage of the above three variables is greater than

² From TCL: BDClassified - classified board. TDPoisonPills - position pills in position. TDBylawVotePercent - percentage of outstanding shares required to amend bylaws. TDCharterVotePercent - percentage of outstanding

66.67%, the threshold for super majority, it is recorded as 1. Otherwise, it is recorded as 0. Additionally, board size and number of outside directors from TCL are recorded to help reflect the level of board independence.

Stock market information is taken from CRSP, and stock returns for each firm are calculated on a fiscal year basis. For example, firm A's fiscal year ends in July. Thus, its annual return is calculated from August in the previous year to July this year, adjusted for the value weighted market return in the same time frame.

Data related to operating income before depreciation; capital expenditures (Schedule V) of property, plant and equipment; long term debt; short term debt; total asset; stock price at the end of the fiscal year; outstanding common shares; and total equity are collected from COMPUSTAT, focusing on the period of 2004 to 2007.³ Leverage, market to book ratio, firm size, and free cash flows also are constructed. Free cash flows are calculated by subtracting capital expenditures (Schedule V) of property, plant and equipment from operating income before depreciation and scaled by total assets. Leverage equals the sum of long term debt and short term debt divided by the value of total assets. Market to book ratio equals the sum of total assets, the product of stock price at the end of the fiscal year, and outstanding common shares, minus total equity, and divided by total asset. Firm size equals the value of total assets. Firm size and market to book ratio are transformed by log and leverage by square root to reduce kurtosis and skewness. Additionally, to control for the industry effect, all of the above accounting variables are adjusted by industry means, following Fama and French (1997) who define 49 industries in the market.

Quarterly ownership by institutional investors from the Thompson CDA/Spectrum 13F institutional ownership data were collected for the sample. We also divided the sample into five groups by manager type code as defined in Thompson. We then calculated the aggregate ownership and counted the number of funds by all institutional investors and by each manager type. The Herfindahl Index (H) measures the ownership dispersion of institutional investors and was calculated as follows:

$$H = \sum_{i=1}^N S_i^2 \quad (4)$$

where S_i is defined as the market share of fund i in the market, and N is the number of funds.

We also calculated the normalized Herfindahl index:

$$H^* = \frac{H - 1/N}{1 - 1/N} \quad (5)$$

where N is the number of firms in the market and H is the Herfindahl Index as above. A low index value indicates dispersed ownership by institutional investors with no dominant players, whereas a high index value means that there is concentrated institutional ownership in the firm. The presence of active shareholders was collected from Electronic Data Gathering, Analysis, and Retrieval (EDGAR) by checking each blockholder who has filed SEC Schedule 13-d with the targeted firms.

shares required to amend company charter. TDMergerVotePercent - percentage of outstanding shares required to approve a merger or sale.

³ OIBDP- operating income before depreciation. CAPXV - capital expenditures (schedule V) of property, plant and equipment. DLTT - long term debt. DLC - short term debt. AT - total asset. PRCC_F - stock price at the end of the fiscal year. CSHO - common shares outstanding. CEQ - total equity.

Activist investors are investors who are dissatisfied with management and attempt to bring changes within a firm without any change in control (Gillan and Starks, 2000, 2007). Their approach includes submitting shareholder proposals and launching a proxy fight, with the latter often more time consuming and more expensive than the former. Additionally, unlike proxy fights, shareholder proposals are non-binding in nature. Management is not obligated to adopt any proposals including those with majority shareholder support. Thus, activist investors use proposals as an approach to express their concerns about corporate governance and firm performance. Therefore, prior shareholder proposals are used as a proxy for shareholder dissatisfaction in this study. Shareholder proposal data with a total of 5,222 observations from 2004 to 2008 were collected from IRRC, with 4,345 nonsocial shareholder proposals. We include proposals in 2004 in this study to control for the occurrence of shareholder activism in 2005.

The final data set consists of 6,333 observations out of the total of 8,257 TCL firms from 2005 through 2007. Among them, there are 126 Media Threats, 55 SEC Filings of a proxy fight, and 29 proxy fights. Figure 3 shows the comparison of Media Threat, SEC Filings, and proxy fights with non-target cases (Nothing).

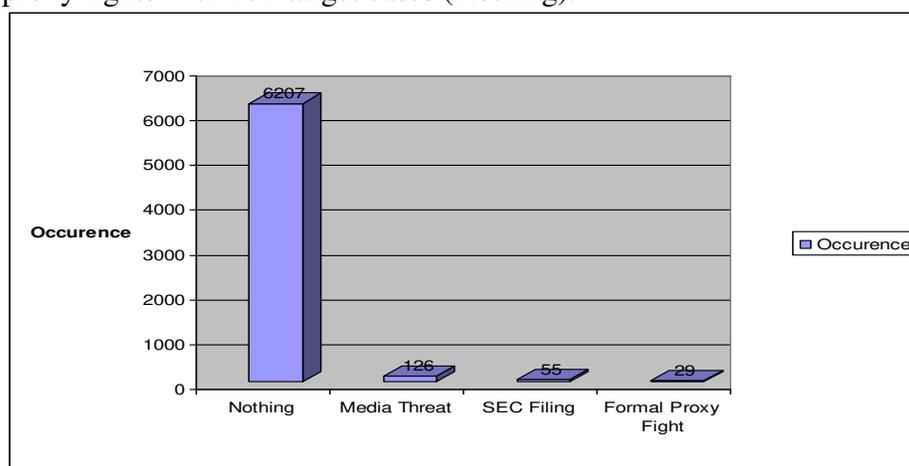


Figure 3 - Comparison of Media Threat, SEC Filing, proxy fight with Nothing

Figure 3 shows the comparison of frequency of Media Threat, SEC Filing, and proxy fight with non-target observations.

There are several concerns about this set of proxy contest data. One concern is that by the end of 2007, some contests might not be over. For example, one company might be threatened for a proxy fight via media in 2007 but the SEC Filing or proxy fight could occur in 2008 instead. In such circumstances, they are recorded as a Media Threat in 2007 only, rather than SEC Filing or proxy fight. Thus, we revisited proxy contest data for 2007. There were five such cases. In three, the fights started in October of 2007 and ended in January of 2008. In the fourth case, CSX Corporation had a Media Threat on October 16, 2007, and it was resolved by shareholder voting on June 25, 2008 at the annual shareholder meeting. The final instance was the Steak n Shake Company, whose fight is from October 1, 2007 to March 12, 2008. The outcomes of the proxy contests are adjusted accordingly.

Second, Media Threat and information regarding proxy fights were collected from Lexis - Nexis and Securities Data Company (SDC). Meanwhile, SEC Filing information was collected from EDGAR. Therefore, there is the possibility that there could be records of SEC Filings without documentation regarding Media Threats, or cases of proxy fights without SEC Filing. To address these concerns, we checked the three data sets individually. All cases of SEC Filings, except for the three records of Alaska Airline Co., have preceding reports of Media

Threats. However, the proxy contests faced by Alaska Airline Co. are special cases. Indeed, a group of individuals, including Richard Foley, Steve Neiman, and members of the Osorne family, have filed an intention of a proxy fight with the SEC every year since 2003. The latest filing by this group was on August 14, 2008. In their definitive proxy statements, they propose almost the same nominees of directors for election every year. However, none of the contests have proceeded to become an actual proxy fight. The possible reason for ending the contest before a proxy fight is due to the dissidents' application of online communication with shareholders and their adoption of the campaign of proxy contest via the internet, which were exceptions to SEC rules at that time.

The last concern about the three data sets focuses on the possibility of multiple fights over the sample periods. Checking the three data sets, there were neither multiple proxy fights nor multiple SEC Filings within each firm. However, instances of two Media Threats in the same year were found in eight firms. For example, MCI was targeted twice in 2005. The dissidents, Qwest and Deephaven Capital Management Fund, launched a Media Threat against MCI in April and June 2005, respectively. In these instances, a single record was kept while the second was discarded to avoid data clustering concerns. Thus, after deleting eight duplications, the final sample has 126 cases of Media Threats.

5. Data analysis

5.1. Univariate analysis

Panels A, B, C and D in Table 1 report summary statistics for four groups, respectively: Nothing, Media Threat, SEC Filing, and proxy fight. The mean of stock returns is positive for the Nothing group, but is negative for the other three groups. However, the median values of stock returns are negative for all groups. For all the other variables, the means have the same sign among the four groups.

Table 2 reports the difference of means testing between Nothing and Media Threat at the first level, between no further actions after Media Threat and SEC Filing at the middle level, and between no further actions after SEC Filing and proxy fight at the bottom level, using the Wilcoxon method. Z values are reported.

When comparing between the two events at the first level, (1) non-target firms and (2) Media Threat firms (the target), the results show that activist investors tend to target large firms. They also tend to target firms with poor performance, as indicated by negative signs for market to book ratio as well as for stock returns. The proxies for agency costs, (1) free cash flows and (2) leverage ratio, are not significantly different between the two groups. Additionally, the results show that target firms have more shareholder proposals than non-target firms.

When comparing the two events at the middle level, (1) no further actions after Media Threat, and (2) SEC Filing for a proxy fight, the two groups nested under Media Threat, we find no evidence of significant differences in the status of poison pills; staggered board; and supermajority requirements of merger, charter, and bylaws between the two groups. Additionally, the results show no compelling evidence that activist investors tend to target firms with a more independent board.

When comparing the two events at the bottom level, (1) no further action after SEC Filing and (2) proxy fight, both nested under SEC Filing, ownership structure comparison indicates no evidence that activist investors target firms with greater institutional ownership. However, the results provide evidence that dissidents tend to target firms with fewer funds and with more concentrated institutional ownership. Activist investors also tend to target firms with more blockholder ownership, but there is no evidence of significant differences of insider ownership

between the two groups. Additionally, the results show no evidence that dissidents are less likely to target firms with the presence of active blockholders.

5.2. Nested logit models – examination of assumptions

The purpose of the multivariate analysis is to investigate the association between the development of a proxy contest and firm characteristics, in four dimensions: antitakeover measure, ownership structure, agency costs, and firm performance. To accomplish this, a three level nested logit model is used. As shown in Figure 2, the first level includes 6,207 observations of Nothing firms (non-target firms) and 126 occurrences of Media Threat. The middle level includes 71 observations of no further action after Media Threat and 55 cases of SEC Filings. The bottom level has 26 cases of no further action after SEC Filing and 29 proxy fights. Additionally, following Hensher, Ross, and Greene (2005), the choices of Nothing and no further action after Media Threat at the top and the middle levels, respectively, are extended to the bottom, serving as two elementary alternatives in the bottom level.

The nested logit model relaxes the restriction of IIA across the alternatives. In particular, the IIA assumption test is used to answer the question: Are the odds ratios ‘No further action after SEC Filing’ and proxy fight really independent from the presence of the alternatives Nothing and ‘No further action after Media Threat’? Following the literature, we use the Hausman specification to test the IIA assumption. This method estimates the conditional logit model on full sample (β_a as estimated coefficients and Ω_a as estimated covariance matrix) and subsample (β_b as estimated coefficients and Ω_b as estimated covariance matrix) individually. The subsample is created by eliminating choice Nothing from the alternative set and by estimating a three choice model. Thus, 6,207 observations under Nothing are eliminated. The new subsample has 126 observations of Media Threats nested with 71 cases of ‘No further action after Media Threats’ and 55 cases of SEC Filing. The latter alternative has 26 events of ‘No further action after SEC Filing’ and 29 proxy fights. If IIA holds, there should not be any significant differences between the two sets of estimates. Additionally, the quadratic form of $(\beta_a - \beta_b)'(\Omega_a - \Omega_b)^{-1}(\beta_a - \beta_b)$ has a chi-square distribution. Figure 4 shows the new tree structure after eliminating Nothing from the sample.

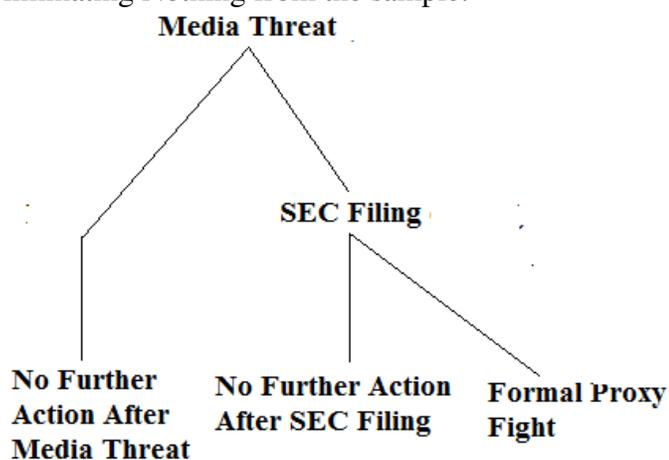


Figure 4: New Nested Tree Structure

Figure 4 shows the nested tree structure of proxy contest, starting from Media Threat. It is for testing IIA assumption of nested logit model.

Next, we run the Hausman test with total assets, free cash flow, market to book ratio, leverage, prior shareholder proposals, poison pills, board independence, institutional ownership, and blockholder ownership. This strategy is appropriate due to the small sample

size of the subgroup. The purpose of the Hausman test is to demonstrate IIA assumption for some variables; hence, using certain variables while excluding the rest should not distort the conclusions.

The results are reported in Table 3. Panels A and B of Table 3 report the estimates from the full sample and subsample respectively, applying the conditional logit model. Panel C in Table 3 reports the results from the Hausman test. The chi-square value is 121.76, suggesting that the hypothesis that IIA holds can be rejected at the 1% significance level.

Another approach to test IIA assumption is to apply the likelihood ratio test (LRT), which tests the goodness of fit between the nested logit model and the conditional nested model. The two models differ only in the dissimilarity parameters, which are set to equal to 1 in the conditional logit model while they are unconstrained for estimation purposes in the nested logit model. The LRT uses the following equation to compare the likelihood scores of the two models:

$$LR = 2 * (\ln L_{\text{conditional logit model}} - \ln L_{\text{nested logit model}})$$

This LRT statistic follows a chi-square distribution. The degree of freedom is equal to the number of additional parameters in the more complete model, which is 2, coming from the dissimilarity parameters for Media Threat and SEC Filing. The dissimilarity parameters for the two degenerate branches are set to 1 in the nested logit model, the same as in the conditional logit model. The result of LRT is reported in Table 4 as part of the procedures of a nested logit model. The chi-square is 87.24, with 2 degrees of freedom. Thus, the IIA assumption is rejected at the 1% statistical significance level once again.

In summary, the IIA assumption does not hold by applying both the Hausman test and the likelihood ratio test. Thus, the nested logit model is more appropriate.⁴ The detailed utility and probability functions derived from the nested logit model are reported in Appendix B.

5.3. Discussion of regression results

Panel A of Table 4 reports the results from running the nested logit model. Among the variables for Media Threat, the coefficient of stock return is negative, indicating that activist investors tend to target firms with poor performance for a Media Threat. The corresponding average marginal effect (AME) is -0.011, implying that for a 1% increase of stock returns, the estimated probability of a Media Threat rather than Nothing decreases by 0.011%. The similar conclusion can be drawn from market to book ratio. For a 1% decrease of market to book ratio (log), the estimated probability of a Media Threat increases by 0.02%.

Furthermore, the results confirm in a statistically significant fashion that activist investors tend to target firms with high agency costs. Specifically, for a 1% increase of scaled free cash flow, the estimated likelihood of a Media Threat rather than Nothing increases by 0.0015%. However, leverage ratio, which is another proxy for agency costs, is not statistically significant. Additionally, if there is one more prior proposal, the estimated likelihood increases by 0.023%. Lastly, dissidents tend to target small firms. Indeed, when firm size (log) decreases by 1%, the estimated probability of a Media Threat rather than Nothing increases by 0.0032%.

⁴ We use Stata10 to run the nested logit model. Stata10 produces a nested logit model that is consistent with random utility maximization (RUM) [Stata10 Manual, 2007; Heiss, 2002). We use the default settings for nested logit model under Stata10. For the numerical root finding method, the default setting is Newton-Raphson algorithm. For the type of variance – covariance matrix, the default is observed information matrix (OIM), the inverse of the negative Hessian matrix (Gould, Pitblado, and Sribney, 2008). In addition, all models have no constant variables since all independent variables are non-variant among alternatives, which require keeping one alternative as base in each level and using the interaction between the alternative and the independent variables to create variations in independent variables.

The finding confirms that dissidents tend to target small firms because they can more easily acquire a significant stake in those firms to start a contest.

Among the variables for events at the middle level, the results confirm in a statistically significant fashion that activist investors tend to target firms with a more independent board for a SEC Filing, because outside directors are less likely to be beholden to management and arguably strive to enhance shareholder value. Thus, with a 1% increase of board independence, the estimated likelihood of a SEC Filing increases significantly by 0.147%. Additionally, a 1% increase of board independence is associated with a 0.125% decrease in the estimated occurrence of dissidents taking no further actions and ending the contest. In addition, the results show evidence that dissidents tend not to file with SEC for a proxy fight when the firm has poison pills. When a firm establishes a poison pill, its likelihood to settle the contest increases significantly by 0.198%. However, none of the other antitakeover provisions are significant, including staggered board.

Among the variables for events at the bottom level, the results confirm in a statistically significant fashion that activist investors tend to target firms with less insider ownership for a proxy fight. With an increase of 1% insider ownership, the estimated likelihood of a proxy fight decreases by 0.033%. The results suggest that the insiders tend to support management and thus higher insider ownership would prevent the contest from culminating to an actual proxy fight. Furthermore, the results provide no evidence that institutional ownership and blockholder ownership are statistically significant. Additionally, activist investors do not target firms with more dispersed ownership of institutional investors. Since the number of funds is in relation to the dispersion of institutional shareholders, we rerun the test but replace the number of funds and institutional ownership by the normalized Herfindahl index as a robustness test. However, the Herfindahl index is not significant. Thus, the role of the institutional investors in a proxy fight still appears to be inconclusive and needs to be investigated further. The results are reported in Panel B of Table 5. Lastly, we find no evidence that the presence of active shareholders can exert greater pressure over management to force them to settle the contest with dissidents prior to the annual shareholder meeting.

Furthermore, for some variables such as firm size, we identify differences either in the statistical significance level or in the signs when comparing Table 2 and Panel A of Table 4. Table 2 shows the simple pair wise mean comparison based on the Wilcoxon–Mann–Whitney method without considering the nested structure of the data set, while Table 4 is based on the nested logit model. Of note, the dissimilarity parameters, or the parameters for the inclusive values (IV), are set to equal to one for the three degenerate nodes, as shown in Figure 2. For the two branches with nests, Media Threat and SEC Filing, their dissimilarity parameters both are significantly different from one as reported in Panel B in Table 4.

Figure 5 plots the marginal probabilities of Media Threat for stock return while holding all the other variables fixed at sample mean, except for indicator variables whose values equal to 1 for all observations.

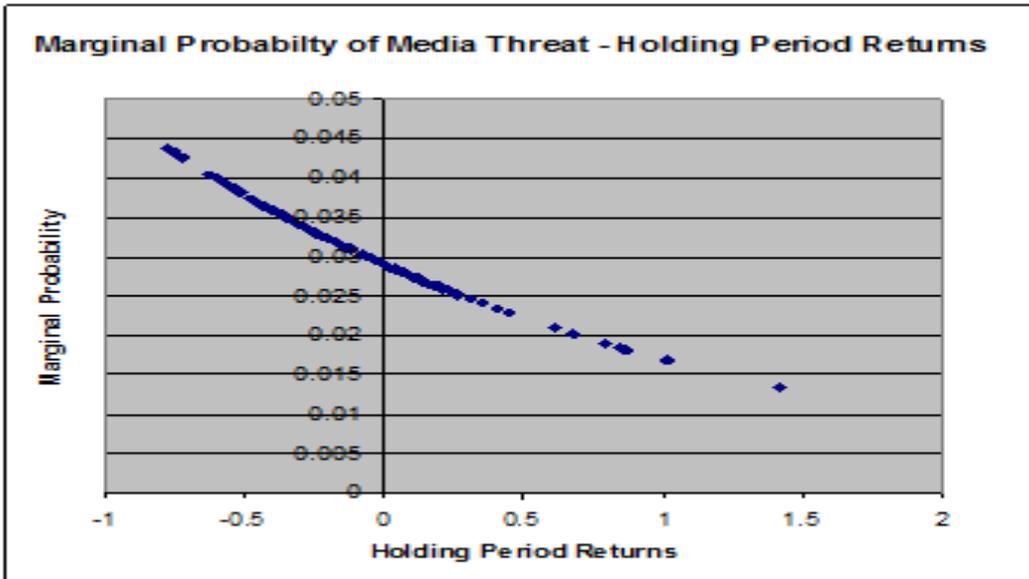


Figure 5 - Marginal probability of Media Threat and Stock Returns

Similarly, Figure 6 and 7 plot the marginal probabilities of SEC Filing for board independence level and the proxy fight for insider ownership, respectively.

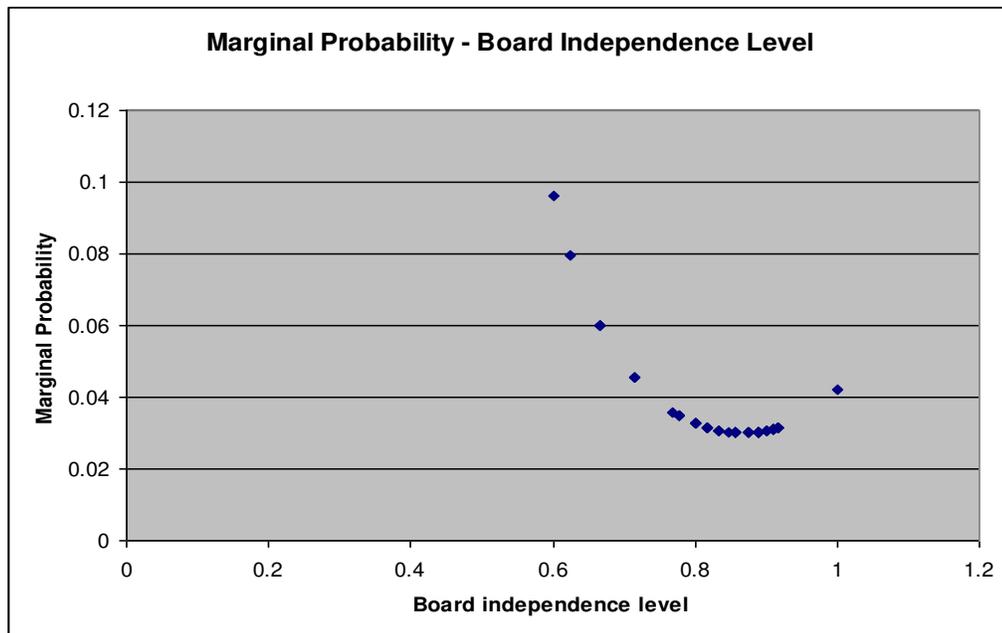


Figure 6 - Marginal probability of SEC Filing and board independence level

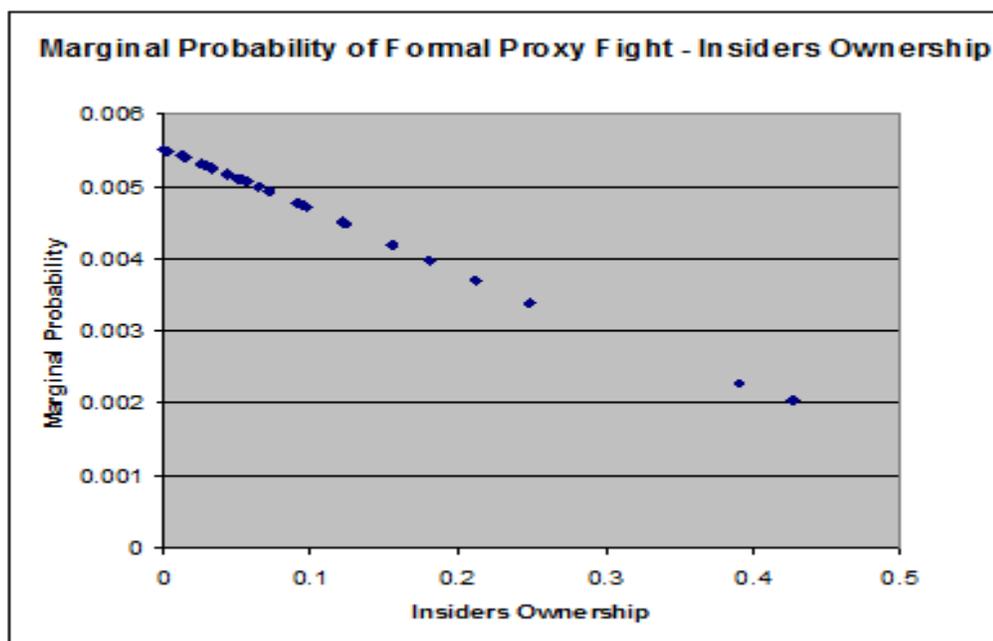


Figure 7 - Marginal probability of proxy fight and insider ownership

5.4. *The role of institutional investors*

The study thus far indicates that the role of the aggregated institutional ownership on proxy fight is ambiguous. However, as discussed in Section 2, well informed institutional investors with a substantial stake can exert influence on management and reduce agency costs. Thus, we revisit this subject with detailed institutional ownership taken into consideration. In particular, following Thompson CDA/Spectrum 13F, we separate institutional investors into five groups: banks, insurance companies, investment companies and their managers, independent investment advisors, and others (pension funds, university endowments, and foundations). Each group has variant monitoring inclination and capabilities. For example, pension funds are pressure insensitive investors and generally hold index funds. Thus, they tend to vote with the dissidents without monitoring. By contrast, banks or insurance companies are pressure sensitive investors. They tend to vote with management unconditionally (Brickley, Lease, and Smith, 1988; Pound, 1988; Renneboog and Szilagyi, 2011).

With detailed ownership by institutional investors and a corresponding number of funds, we rerun the nested logit model using the same nested tree structure. The results are reported in Panel A of Table 5.⁵ IIA also is strongly rejected, indicating that it is suitable to apply the nested logit model.

The focus is on the likelihood of a Media Threat. The results show that for a 1% decrease of firm size, the likelihood of a Media Threat increases by 0.0034%; for a 1% decrease of holding period return (market to book ratio), the likelihood increases by 0.0161% (0.0222%); for a 1% increase of shareholder proposals, it increases by 0.0254%. Regarding the likelihood of a SEC Filing, the results show that after firms adopt poison pills, the likelihood of a SEC filing drops by 0.0156%; for a 1% increase of board independence level, the likelihood increases by 0.1661%. The results basically are consistent with those in Panel A of Table 4.

⁵ Type II for investment companies is not included in the Model. We use Type II as the base of the other four types.

Regarding the role of institutional investors in proxy fights, the results show that when the ownership by investment firms increases by 1%, the likelihood of proxy fights (no further actions after SEC Filing) decreases (increases) by 0.4082% (0.4581%). Additionally, when the number of funds of investment firms (pension funds, etc.) increases by 1%, the likelihood of no further actions after SEC Filing decreases by 0.0044% (0.1234%); when number of funds of banks (independent investment advisors) increases by 1%, the likelihood of proxy fight decreases by 0.0007% (0.0006%), and when the number of pension funds increases by 1%, the likelihood of proxy fight increases by 0.0002%. The results show that dissidents tend to take no action against firms when the ownership by investment companies is higher and more concentrated. Regarding pension funds, when the ownership gets more dispersed, the likelihood of a proxy fight increases. On the contrary, when banks' ownership gets more dispersed, it is less likely for a proxy fight to occur. Thus, the findings suggest that the market expects investment firms and banks to support management whereas pension funds are expected to endorse dissidents. This is generally consistent with the view that banks are pressure sensitive institutions and pension funds are pressure insensitive investors.

Regarding the role of blockholders, the results show that for a 1% increase in the ownership of blockholders, the likelihood of no further action after SEC Filing decreases by 0.0201%, suggesting that blockholders are expected to support the dissidents. However, insider ownership is not significant anymore as shown in Panel A of Table 4.

In summary, the puzzle regarding the role of the institutional investors seems resolved. Panel A of Table 5 also confirms that major findings in Panel A of Table 4 are robust.

6. Conclusion

This study investigates the role of ownership structure and antitakeover measure in proxy contests for corporate control from 2005 through 2007. Each proxy contest can go through from one to three continuous stages, following this chain of action:

Media Threat → SEC Filing → Proxy Fight

This study contributes to the literature by applying the nested logit model to studying the nature of proxy contest. While the nested logit model has been applied in the transportation and consumer behavior fields, its application in the accounting and finance fields still is rare. However, when IIA and IID are violated, this method is preferable to the multinomial logit model and the conditional logit model. Worth noting is that there is not a conventional rule for the designation of the nested tree structure. Thus, it is an *ad hoc* decision that rests with the researcher.

The results from running the nested logit model show that, unlike typical shareholders who are passive investors, activist investors demand management to act to enhance shareholder value. They start by identifying small underperforming firms with high agency costs and more prior shareholder proposals for a Media Threat of a proxy contest. Obviously, rewards from investing in these firms could be high if management adopts the recommendations of the dissidents.

Next, dissidents tend to target firms with more independent boards for a SEC Filing to make the contest more formal and intense. Unlike insiders and affiliated directors, outside directors potentially are vigorous monitors and are less likely to beholden to management. Attaining their endorsement can exert more pressure over management for reforms. If nothing happens after the SEC Filing, dissidents tend to target firms with more insider ownership for a proxy fight. Furthermore, firms with higher and concentrated ownership by investment

companies, with fewer banking funds, and with more pension funds (or university endowments and foundations) also are potential targets for a proxy fight. The presence of investment companies that monitor can exert pressure on management when management does not reward shareholders adequately.

Finally, antitakeover measure can block the takeover attempts and thus reinforce management's position. The study suggests the importance of poison pills in proxy contests and shows that a firm is less likely to have a contested election if it has poison pills.

Overall, this study investigates the association between a three stage proxy contest and firm attributes in agency costs, firm performance, antitakeover measure, and ownership structure. However, each proxy contest is a dynamic process in that both parties continually incorporate new information to find the most optimal "fighting" strategies at each stage. Thus, a more detailed analysis of the development of proxy contests is an interesting topic for future research.

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Table 1 – Panel A

Univariate Analysis of the *Nothing* Firms

This table shows the univariate analysis of the firms in the Nothing group in The Corporate Library (TCL) from 2005 through 2007. Out of the total of 6,333 firms in TCL in the sample period, 6,207 of them are not targets of proxy fights and thereby are classified into Nothing group. 126 firms (Media Threat) are threatened by activists via media, among which 55 firms (SEC Filing) are threatened further when activists file form DEF 14A with the SEC. Only 29 firms end proxy fights via shareholder voting (proxy fight).

Variables	Mean	Median	Min	Max	Skewness	Kurtosis	N
Total asset (log)	1.83	1.68	-3.98	12.27	0.54	1.14	6207
Market adjusted return	0.03	-0.01	-1.06	4.17	1.71	8.58	6207
Free cash flow	0.97	0.45	-5.06	20.98	6.19	48.15	6207
Leverage ratio (square root)	-0.08	-0.05	-1.38	1.82	0.07	0.86	6207
Market to book ratio (log)	-0.10	-0.15	-1.70	3.11	0.84	1.82	6207
Shareholder proposal (square root)	0.13	0.00	0.00	13.00	9.57	131.9	6207
Institutional investors ownership	0.73	0.77	0.00	4.07	-0.09	5.67	6207
Herfindahl index – log	-17.50	-17.41	-22.49	-4.70	0.40	4.00	6207
Number of institutional funds	194.01	140.00	1.00	1,539.00	2.97	11.94	6207
Insider ownership	0.14	0.06	0.00	1.00	2.12	4.23	6207
Blockholder ownership	0.23	0.21	0.00	1.26	1.09	1.89	6207
Board independence	0.82	0.86	0.33	1.00	-1.19	1.34	6207

Table 1 – Panel B

Univariate Analysis of the *Media Threat* Firms

This table shows the univariate analysis of the Media Threat firms in The Corporate Library (TCL) from 2005 through 2007. Out of the total of 6,333 firms in TCL in the sample period, 6,207 of them are not targets of proxy fights and thereby are classified into Nothing group. 126 firms (Media Threat) are threatened by activists via media, among which 55 firms (SEC Filing) are threatened further when activists file form DEF 14A with the SEC. Only 29 firms end proxy fights via shareholder voting (proxy fight).

Variables	Mean	Median	Min	Max	Skewness	Kurtosis	N
Total asset (log)	2.06	1.92	-1.43	7.90	0.53	0.88	126
Market adjusted return	-0.09	-0.13	-0.77	1.42	1.10	2.23	126
Free cash flow	1.32	0.53	-0.24	20.42	4.64	27.18	126
Leverage ratio (square root)	-0.05	-0.04	-1.38	0.63	-0.86	3.93	126
Market to book ratio (log)	-0.30	-0.35	-1.70	0.82	-0.10	0.83	126
Shareholder proposal (square root)	0.21	0.00	0.00	3.32	3.29	12.85	126
Institutional investors ownership	0.76	0.78	0.00	1.21	-0.51	0.67	126
Number of institutional funds	214.29	138.50	5.00	1,431.00	2.83	9.23	126
Herfindahl index – log	-17.74	-17.56	-22.27	-12.96	-0.40	1.19	126
Insider ownership	0.08	0.05	0.00	0.88	3.80	21.77	126
Blockholder ownership	0.26	0.26	0.00	0.64	0.23	-0.89	126
Board independence	0.85	0.88	0.54	1.00	-1.47	3.18	126

Table 1– Panel C

Univariate Analysis of the SEC Filing Firms

This table shows the univariate analysis of the SEC Filing firms in The Corporate Library (TCL) from 2005 through 2007. Out of the total of 6,333 firms in TCL in the sample period, 6,207 of them are not targets of proxy fights and thereby are classified into Nothing group. 126 firms (Media Threat) are threatened by activists via media, among which 55 firms (SEC Filing) are threatened further when activists file form DEF 14A with the SEC. Only 29 firms end proxy fights via shareholder voting (proxy fight).

Variables	Mean	Median	Min	Max	Skewness	Kurtosis	N
Total asset (log)	2.15	1.99	-1.08	5.77	-0.12	-0.10	55
Market adjusted return	-0.06	-0.08	-0.77	1.02	0.80	0.65	55
Free cash flow	2.04	0.84	-0.24	20.42	3.24	12.25	55
Leverage ratio (square root)	-0.06	-0.05	-1.38	0.63	-1.03	4.27	55
Market to book ratio (log)	-0.30	-0.30	-1.70	0.82	-0.33	1.21	55
Shareholder proposal (square root)	0.17	0.00	0.00	1.73	2.34	4.17	55
Institutional investors ownership	0.76	0.77	0.00	1.21	-0.58	0.61	55
Number of institutional funds	191.11	130.00	5.00	849.00	2.04	4.27	55
Herfindahl index – log	-17.52	-17.35	-21.30	-12.96	0.23	0.97	55
Insider ownership	0.09	0.05	0.00	0.43	1.83	3.15	55
Blockholder ownership	0.28	0.26	0.00	0.64	0.30	-0.95	55
Board independence	0.84	0.88	0.60	1.00	-1.26	1.23	55

Table 1 – Panel D

Univariate Analysis of the Proxy Fight Firms

This table shows the univariate analysis of the proxy fight in The Corporate Library (TCL) from 2005 through 2007. Out of the total of 6,333 firms in TCL in the sample period, 6,207 of them are not targets of proxy fights and thereby are classified into Nothing group. 126 firms (Media Threat) are threatened by activists via media, among which 55 firms (SEC Filing) are threatened further when activists file form DEF 14A with the SEC. Only 29 firms end proxy fights via shareholder voting (proxy fight).

Variables	Mean	Median	Min	Max	Skewness	Kurtosis	N
Total asset (log)	2.41	2.13	-1.08	5.77	0.05	0.19	29
Market adjusted return	-0.03	-0.12	-0.59	1.02	1.13	0.83	29
Free cash flow	2.08	0.78	-0.01	10.22	1.95	2.33	29
Leverage ratio (square root)	-0.06	-0.05	-0.41	0.53	0.36	-0.26	29
Market to book ratio (log)	-0.23	-0.23	-1.23	0.83	0.23	0.34	29
Shareholder proposal (square root)	0.24	0.00	0.00	1.41	1.68	1.15	29
Institutional investors ownership	0.75	0.77	0.00	1.17	-0.75	1.05	29
Number of institutional funds	214.38	150.00	5.00	849.00	1.90	3.98	29
Herfindahl index – log	-17.71	-17.72	-21.30	-12.96	0.48	1.26	29
Insider ownership	0.09	0.06	0.00	0.43	1.88	3.44	29
Blockholder ownership	0.23	0.18	0.00	0.59	0.43	-0.67	29
Board independence	0.83	0.86	0.63	0.92	-1.00	-0.27	29

Table 2

Wilcoxon–Mann–Whitney Test

This table shows the mean comparison between Nothing group and Media Threat group, between No further actions after Media Threat group and SEC Filing group, and between No further actions after SEC Filing group and proxy fight group, using Wilcoxon-Mann-Whitney Test. Z values are reported. Out of the total of 6,333 firms in TCL in the sample period, 6,207 of them are not targets of proxy fights and thereby are classified into Nothing group. 126 firms (Media Threat) are threatened by activists via media, among which 55 firms (SEC Filing) are threatened further when activists file form DEF 14A with the SEC. Only 29 firms end proxy fights via shareholder voting (proxy fight).

Variables	All Firms	Media Threat	SEC Filing
	Nothing vs. Media Threat	No further actions after Media Threat vs. SEC Filing	No further actions after SEC Filing vs. Voted
	Wilcoxon Test - z Value	Wilcoxon Test - z Value	Wilcoxon Test - z Value
Total asset (log)	1.6032 *	1.1019	-1.2897 *
Market adjusted return	-3.8296 ***	0.4673	-0.2276
Free cash flow	1.0261	1.8299 **	0.2613
Leverage ratio (square root)	1.2701	-0.364	0.0253
Market to book ratio (log)	-4.7772 ***	0.3788	-0.7333
Shareholder proposal (square root)	2.8248 **	-0.3523	-1.2796
Institutional investors ownership	0.9428	0.1771	0.1264
Number of institutional funds	0.2404	-0.7182	-1.5089*
Herfindahl index (log)	-1.5621 *	1.0035	1.3234 *
Insider ownership	-2.8669 ***	0.8831	0.2023
Blockholder ownership	2.2293 **	0.7997	1.8125 **
Filing of 13d –active blockholders	-0.0006	-0.7752	-1.1859
Staggered board	-0.2820	-0.0854	-0.3703
Poison pills	3.6143 ***	-1.1969	-0.3703
Requirement to approve a merger	-0.3051	-0.4342	-0.2336
Requirement to amend bylaws	1.1896	0.4639	-0.3214
Requirement to amend company charter	-0.1137	0.0441	1.1242
Board independence	4.1877 ***	-0.5985	0.7023

***, ** and * represent significance at 1%, 5% and 10% level, respectively.

Table 3 – Panel A

Hausman Test on IIA Assumption Step One

This is the first step in testing IIA assumption with Hausman specification. This step applies conditional logit model based on the full sample with no nesting which includes 6,207 cases of non-target observations, 126 cases of Media Threat, among which 71 are without further actions after a Media Threat and 55 cases have run into SEC Filing of a proxy fight, after which 26 cases are settled without shareholder voting but 29 cases are voted eventually.

Variables	Alternatives	Coefficient	z
Market adjusted return	SEC Filing	-0.3958**	-2.46
Poison pills	SEC Filing	-2.1961***	-11.21
Blockholder ownership	SEC Filing	-20.6261***	-25.51
Shareholder proposal (square root)	SEC Filing	-1.9537***	-5.98
Total asset (log)	Voted	0.0097	0.10
Board independence	Voted	-4.5999***	-7.32
Institutional ownership	Voted	1.6977***	2.71
Free cash flow	Voted	0.1305**	2.32
Leverage ratio (square root)	Voted	1.0523*	1.67
Total asset (log)	No actions after Media Threat	0.0496	0.69
Board independence	No actions after Media Threat	-4.7647***	-11.43
Institutional ownership	No actions after Media Threat	-0.6419	-1.45
Free cash flow	No actions after Media Threat	-0.1336	-1.17
Leverage ratio (square root)	No actions after Media Threat	0.5805	1.29

***, ** and * represent significance at 1%, 5% and 10% level, respectively.

Table 3 – Panel B

Hausman Test on IIA Assumption Step Two

This is the second step in testing IIA assumption with Hausman specification. The second step applies conditional logit model based on the sub sample with no nesting which considers 126 cases of Media Threat, among which 71 are ended without further actions and 55 cases have run into SEC Filing of a proxy fight, after which 26 are ended without shareholder voting and 29 are voted eventually. Additionally, 6,207 cases of non-target cases are excluded.

Variables	Alternatives	Coefficient	z
Market adjusted return	SEC Filing	0.5738	1.06
Poison pills	SEC Filing	-0.4999	-1.26
Blockholder ownership	SEC Filing	1.0979	0.84
Shareholder proposal (square root)	SEC Filing	-0.1126	-0.28
Total asset (log)	Voted	0.2616	1.39
Board independence	Voted	-0.4052	-0.34
Institutional ownership	Voted	-0.1116	-0.09
Free cash flow	Voted	-0.0249	-0.27
Leverage ratio (square root)	Voted	0.0052	0.01
Total asset (log)	No actions after Media Threat	0.1370	0.75
Board independence	No actions after Media Threat	1.8810*	1.67
Institutional ownership	No actions after Media Threat	-0.7339	-0.61
Free cash flow	No actions after Media Threat	-0.3579**	-2.10
Leverage ratio (square root)	No actions after Media Threat	-0.4258	-0.43

***, ** and * represent significance at 1%, 5% and 10% level, respectively.

Table 3 – Panel C

Hausman Test on IIA Assumption Step Three

This is the last step in testing IIA assumption. This last step is to calculate $(\beta_a - \beta_b)'(\Omega_a - \Omega_b)^{-1}(\beta_a - \beta_b)$. β_a and β_b are from step one and step two, respectively, and Ω_a and Ω_b are covariance matrix. $(\beta_a - \beta_b)'(\Omega_a - \Omega_b)^{-1}(\beta_a - \beta_b)$ has a chi-square distribution when IIA holds, with two degrees of freedom.

Variables	Alternatives	Coefficients fullest (a)	Subset (b)	Difference (a-b)
Market adjusted return	SEC Filing	-0.3958	0.5738	-0.9697
Poison pills	SEC Filing	-2.1961	-0.4999	-1.6962
Blockholder ownership	SEC Filing	-20.6261	1.0979	-21.7239
Shareholder proposal (square root)	SEC Filing	-1.9537	-0.1126	-1.8412
Total asset (log)	Voted	0.0097	0.2616	-0.2519
Board independence	Voted	-4.5999	-0.4052	-4.1947
Institutional ownership	Voted	1.6977	-0.1116	1.8092
Free cash flow	Voted	0.1305	-0.0249	0.1553
Leverage ratio (square root)	Voted	1.0523	0.0052	1.0471
Total asset (log)	No actions after Media Threat	0.0496	0.1370	-0.0875
Board independence	No actions after Media Threat	-4.7647	1.8810	-6.6457
Institutional ownership	No actions after Media Threat	-0.6419	-0.7339	0.0920
Free cash flow	No actions after Media Threat	-0.1336	-0.3579	0.2244
Leverage ratio (square root)	No actions after Media Threat	0.5805	-0.4258	1.0064

Chi-square = $(\beta_a - \beta_b)'(\Omega_a - \Omega_b)^{-1}(\beta_a - \beta_b) = 121.76$. Prob > chi2 = 0.0000.

Notes:

1. a = consistent under H_0 and H_a obtained from conditional logit model in step 1.
2. b = inconsistent under H_a , efficient under H_0 obtained from conditional logit model in step 2.
3. Null hypothesis is as follows.
 H_0 : difference in coefficients is not systematic
- 4 $\Omega_a - \Omega_b$ is not positive definite.

Table 4 – Panel A

Nested Logistic Regression

This table shows the direct regression outcome of the nested logit models under Stata10 that are consistent with Random Utility Maximization (RUM). The alternatives are as defined in Figure 2. Nothing and No further actions after Media Threat are with degenerate nodes and are therefore extended to the bottom level as elementary alternatives. Out of the total of 6,333 firms in TCL in the sample period, 6,207 of them are not targets of proxy fights and thereby are classified into Nothing group. 126 firms (Media Threat) are threatened by activists via media, among which 55 firms (SEC Filing) are threatened further when activists file form DEF 14A with the SEC. Only 29 firms end proxy fights via shareholder voting (proxy fight).

Variables	Alternative	Coefficient	Average Marginal Effects
Total asset (log)	Media Threat	-0.1643*	-0.0032
Market adjusted return	Media Threat	-0.5509*	-0.0106
Free cash flow	Media Threat	0.0785**	0.0015
Leverage ratio (square root)	Media Threat	0.3080	0.0059
Market to book ratio (log)	Media Threat	-1.0484***	-0.0202
Shareholder proposals (square root)	Media Threat	0.5966***	0.0115
Staggered board	No actions after Media Threat	0.1817	0.0012
Poison pills	No actions after Media Threat	2.6244**	0.0198
Requirement to approve a merger	No actions after Media Threat	0.5419	0.0040
Requirement to amend bylaws	No actions after Media Threat	-0.4679	-0.0029
Requirement to amend company charter	No actions after Media Threat	2.2630	0.0280
Board independence	No actions after Media Threat	-28.9569***	-0.1254
Staggered board	SEC Filing	-0.8908	-0.0037
Poison pills	SEC Filing	-2.1897	-0.0100
Requirement to approve a merger	SEC Filing	-0.9289	-0.0032
Requirement to amend bylaws	SEC Filing	1.3447	0.0065
Requirement to amend company charter	SEC Filing	-3.8977	-0.0083
Board independence	SEC Filing	36.7119***	0.1468
Institutional ownership	No actions after SEC Filing	0.5389	0.0005
Number of funds	No actions after SEC Filing	-0.0011	0.0000
Insider ownership	No actions after SEC Filing	30.3590	0.0306
Blockholder ownership	No actions after SEC Filing	-19.9147	-0.0201
Filing of 13d –active blockholders	No actions after SEC Filing	11.8989	0.0766
Institutional ownership	Proxy Fight	0.2603	0.0002
Number of funds	Proxy Fight	0.0041	0.0000
Insider ownership	Proxy Fight	-34.8581*	-0.0329
Blockholder ownership	Proxy Fight	22.4023	0.0212
Filing of 13d –active blockholders	Proxy Fight	-11.3002	-0.0292

***, ** and * represent significance at 1%, 5% and 10% level, respectively.

Table 4 – Panel B

Nested Logistic Regression – Dissimilarity Parameters

This table shows the dissimilarity parameters for the top level and middle level. The table also reports the likelihood ratio test result for IIA assumption. The alternatives are defined in Figure 2. Nothing and No further actions after Media Threat are with degenerate nodes and are extended to the bottom level as elementary alternatives. Their corresponding dissimilarity parameters are defined as 1 (Stata10 manual , 2007).

Level and Alternatives	Dissimilarity Parameters	Standard Error
Top level		
Nothing (limb1)	1	
Media threat	18.4435	8.9097
Middle level		
Nothing (branch1)	1	
No further actions after Media Threat (branch2)	1	
SEC filing	-71.1981	23.6095

Likelihood ratio test (LR) for IIA (tau = 1): chi2(2) = 87.24 Prob > chi2 = 0.0000

Table 5 – Panel A

Nested Logistic Regression - Robustness Test

This table shows the direct regression outcome of the nested logit models under Stata10 that are consistent with Random Utility Maximization (RUM). The alternatives are defined as shown in Figure 2. Nothing and No further actions after Media Threat are with degenerate nodes and are therefore extended to the bottom level as elementary alternatives. There are 5,915 firms in TCL in the sample period, 5,798 of them are not targets for Proxy fights. 117 firms (Media Threat) are threatened by activists via media, among which 48 firms (SEC Filing) are threatened further when activists file form DEF 14A with the SEC. Only 26 firms end proxy fights via shareholder voting (proxy fight). Following Thompson, we defined type one, two, three, four and five of institutional investors as banks, insurance companies, investment companies, independent investment advisors and others (pension funds, etc.). Here, type two is used as the base.

Variables	Alternative	Coefficient	Average Marginal Effect
Total asset (log)	Media Threat	-0.1781*	-0.0034
Market adjusted return	Media Threat	-0.8574***	-0.0161
Free cash flow	Media Threat	0.0673	0.0013
Leverage ratio (square root)	Media Threat	0.1653	0.0031
Market to book ratio (log)	Media Threat	-1.1779***	-0.0222
Shareholder proposals (square root)	Media Threat	0.5885**	0.0254
Staggered board	No actions after Media Threat	0.0847	0.0006
Poison pills	No actions after Media Threat	3.3847**	0.0306
Requirement to approve a merger	No actions after Media Threat	0.7505	0.0060
Requirement to amend bylaws	No actions after Media Threat	-0.3604	-0.0024
Requirement to amend company charter	No actions after Media Threat	1.9174	0.0222
Board independence	No actions after Media Threat	-24.0797***	-0.1649
Staggered board	SEC Filing	-0.6192	-0.0021
Poison pills	SEC Filing	-3.5286*	-0.0156
Requirement to approve a merger	SEC Filing	-1.2083	-0.0035
Requirement to amend bylaws	SEC Filing	1.0548	0.0041
Requirement to amend company charter	SEC Filing	-3.5920	-0.0071
Board independence	SEC Filing	48.7247***	0.1661
Bank ownership - type 1	No actions after SEC Filing	132.0656	0.0989
Investment firm ownership - type 3	No actions after SEC Filing	605.2737**	0.4581
Investment advisor ownership - Type 4	No actions after SEC Filing	-49.7794	-0.0371
Pension ownership - Type 5	No actions after SEC Filing	20.2523	0.0151
Number of institutional funds - type 1	No actions after SEC Filing	0.5644	0.0004
Number of institutional funds - type 3	No actions after SEC Filing	-5.9345*	-0.0044
Number of institutional funds - type4	No actions after SEC Filing	0.5700	0.0004
Number of institutional funds - type 5	No actions after SEC Filing	-0.1234*	-0.0001
Insider ownership	No actions after SEC Filing	9.5577	0.0071
Blockholder ownership	No actions after SEC Filing	-26.9762*	-0.0201
Filing of 13d –active blockholders	No actions after SEC Filing	0.1847	0.0004
Bank ownership - type 1	Proxy Fight	-114.9183	-0.1077
Investment firm ownership - type 3	Proxy Fight	-439.094**	-0.4082
Investment advisor ownership - Type 4	Proxy Fight	46.3332	0.0436
Pension ownership - Type 5	Proxy Fight	-18.3565	-0.0173
Number of institutional funds - type 1	Proxy Fight	-0.7754**	-0.0007
Number of institutional funds - type 3	Proxy Fight	4.2441	0.0040
Number of institutional funds - type4	Proxy Fight	-0.6214*	-0.0006
Number of institutional funds - type 5	Proxy Fight	0.1684	0.0002
Insider ownership	Proxy Fight	-16.1097	-0.0151
Blockholder ownership	Proxy Fight	25.7239	0.0242
Filing of 13d –active blockholders	Proxy Fight	0.0180	0.0000

***, ** and * represent significance at 1%, 5% and 10% level, respectively.

Table 5 – Panel B

Nested Logistic Regression Results – Robustness Test II

This table shows the direct regression outcome of the nested logit models under Stata10 that are consistent with Random Utility Maximization (RUM). Herfindahl index is in place of institutional ownership and number of funds as in Table IV. The alternatives are as defined in Figure 2. Nothing and No further actions after Media Threat are with degenerate nodes and are therefore extended to the bottom level as elementary alternatives. Out of the total of 6,333 firms in TCL in the sample period, 6,207 of them are not targets of proxy fights and thereby are classified into Nothing group. 126 firms (Media Threat) are threatened by activists via media, among which 55 firms (SEC Filing) are threatened further when activists file form DEF 14A with the SEC. Only 29 firms end proxy fights via shareholder voting (proxy fight).

Variable	Alternative	Coefficient	Z value
Total asset (log)	Media Threat	-0.1971**	-2.26
Market adjusted return	Media Threat	-0.5422*	-1.91
Free cash flow	Media Threat	0.0797**	2.17
Leverage ratio (square root)	Media Threat	0.2604	0.66
Market to book ratio (log)	Media Threat	-1.1146***	-4.08
Shareholder proposals (square root)	Media Threat	0.6136***	3.01
Staggered board	No actions after Media Threat	0.0621	0.05
Poison pills	No actions after Media Threat	-3.3072*	-1.82
Requirement to approve a merger	No actions after Media Threat	-0.8057	-0.49
Requirement to amend bylaws	No actions after Media Threat	0.2170	0.21
Requirement to amend company charter	No actions after Media Threat	4.9107	1.07
Board independence	No actions after Media Threat	6.2036**	2.13
Staggered board	SEC Filing	-0.7088	-0.44
Poison pills	SEC Filing	5.3192**	2.28
Requirement to approve a merger	SEC Filing	1.0202	0.45
Requirement to amend bylaws	SEC Filing	0.4001	0.30
Requirement to amend company charter	SEC Filing	-5.4753	-1.29
Board independence	SEC Filing	0.3331	0.09
Herfindahl Index (log)	No actions after SEC Filing	-0.3589	-1.38
Filing of 13d –active block-holders	No actions after SEC Filing	0.8451	0.33
Insider ownership	No actions after SEC Filing	-2.6622	-0.59
Block-holder ownership	No actions after SEC Filing	-2.0121	-0.38
Herfindahl Index (log)	Proxy Fight	-0.2979	-1.16
Filing of 13d –active block-holders	Proxy Fight	-0.8308	-0.51
Insider ownership	Proxy Fight	-4.1878	-1.60
Block-holder ownership	Proxy Fight	2.7930	0.56

Appendix A

Theoretical Analysis of the Nested Logit Model in the context of Proxy Contests

In this study, the choice behavior is described by using a random utility (RU) model. Additionally, the alternative that is chosen is the one that gives the greatest utility.

Following Hensheer, Rose and Greene (2005), the scale parameters for each limb, branch and elemental alternative in the above nested tree structure are defined as follows.

Limb: $\gamma(i)$

Branch: $\lambda(j,i)$

Elemental Alternative: $\mu(j,i)$

Where:

$\gamma(i)$ is the scale parameter for the i^{th} limb, $\lambda(j,i)$ is the scale parameter for the j^{th} branch of limb i . Then, $\mu(j,i)$ represents the scale parameter for the elemental alternatives of branch j and limb i . It is identical for each alternative present within any given branch, because the variance of each elemental alternative present within branch j is equal.

The utility functions in the higher levels also include IV (inclusive value) which is calculated as the natural logarithm of the sum of the exponentials of the utility expressions for the level directly below which the IV is calculated.

For simplicity of model presentation, we normalize on $\mu(j,i)$ following random utility model 1 (RU1).

Level 1 (elemental alternatives):

As discussed in Section 2, we focus on variables describing shareholder composition for the bottom level:

1. Aggregated ownership by insiders.
2. Aggregated ownership by blockholders.
3. Aggregated ownership by institutional investors.
4. Number of institutional funds.
5. The indicator variable for filing of schedule 13-d.

For the elemental alternatives at Level 1, the utility functions can be expressed as follows.

$$V_{\text{proxy fight}} = V_a = \mu_1 \beta_{1a} f(X_{1a}) + \mu_1 \beta_{2a} f(X_{2a}) + \mu_1 \beta_{3a} f(X_{3a}) + \mu_1 \beta_{4a} f(X_{4a}) + \mu_1 \beta_{5a} f(X_{5a})$$

$$V_{\text{No further actions after SEC filing}} = V_b$$

$$= \beta_{0b} + \mu_2 \beta_{1b} f(X_{1a}) + \mu_2 \beta_{2b} f(X_{2b}) + \mu_2 \beta_{3b} f(X_{3b}) + \mu_2 \beta_{4b} f(X_{4b}) + \mu_2 \beta_{5b} f(X_{5b})$$

For No further actions after Media Threat and Nothing, utilities are defined at the higher level, not at the bottom level. As such, no attributes are included in the utility function at this level. Hence,

$$V_{\text{No further actions after Media Threat}} = V_c = 0.$$

$$V_{\text{nothing}} = V_d = 0.$$

Using RU1⁶ as suggested by Hensher, Ross and Greene (2005), we normalize $\mu_1 = \mu_2 = 1$, hence,

$$V_a = \beta_{1a} f(X_{1a}) + \beta_{2a} f(X_{2a}) + \beta_{3a} f(X_{3a}) + \beta_{4a} f(X_{4a}) + \beta_{5a} f(X_{5a})$$

$$V_b = \beta_{1b} f(X_{1a}) + \beta_{2b} f(X_{2b}) + \beta_{3b} f(X_{3b}) + \beta_{4b} f(X_{4b}) + \beta_{5b} f(X_{5b})$$

$$V_c = 0$$

$$V_d = 0$$

Since No further actions after SEC Filing and proxy fight are nested under the branch of SEC Filing, the probabilities of the two alternatives are defined as follows.

⁶ In the RU 1 model the scale parameters are normalized at the bottom of the tree, in contrast to the RU 2 model where the scale parameters are normalized at the branch level.

$$\begin{aligned} \pi(a, \text{proxy fight}) &= e^{V_a} / (e^{V_a} + e^{V_b}) \\ &= (e^{\beta_{0a} + \beta_{1a} f(X_{1a}) + \beta_{2a} f(X_{2a}) + \beta_{3a} f(X_{3a}) + \beta_{4a} f(X_{4a}) + \beta_{5a} f(X_{5a})}) / \\ & (e^{\beta_{1b} f(X_{1b}) + \beta_{2b} f(X_{2b}) + \beta_{3b} f(X_{3b}) + \beta_{4b} f(X_{4b}) + \beta_{5b} f(X_{5b})} + e^{\beta_{0a} + \beta_{1a} f(X_{1a}) + \beta_{2a} f(X_{2a}) + \beta_{3a} f(X_{3a}) + \beta_{4a} f(X_{4a}) + \beta_{5a} f(X_{5a})}) \\ \pi(b, \text{No further actions after SEC Filing}) &= e^{V_b} / (e^{V_a} + e^{V_b}) \\ &= (e^{\beta_{0b} + \beta_{1b} f(X_{1b}) + \beta_{2b} f(X_{2b}) + \beta_{3b} f(X_{3b}) + \beta_{4b} f(X_{4b}) + \beta_{5b} f(X_{5b})}) / \\ & (e^{\beta_{1b} f(X_{1b}) + \beta_{2b} f(X_{2b}) + \beta_{3b} f(X_{3b}) + \beta_{4b} f(X_{4b}) + \beta_{5b} f(X_{5b})} + e^{\beta_{0a} + \beta_{1a} f(X_{1a}) + \beta_{2a} f(X_{2a}) + \beta_{3a} f(X_{3a}) + \beta_{4a} f(X_{4a}) + \beta_{5a} f(X_{5a})}) \end{aligned}$$

Nothing and No further actions after Media Threat are obviously degenerative alternatives. Nothing is not partitioned within a branch or a limb. Hence, $\text{Prob}(d, \text{nothing}) = e^{V_d} / e^{V_d} = 1$. It implies that the probability that Nothing will be chosen is not calculated at Level 1, but rather at Level 3, the highest level of the tree structure being explored. In comparison, No further actions after Media Threat is partitioned within the branch of Media Threat. Still, $\text{Prob}(c, \text{No further actions after Media Threat}) = e^{V_c} / e^{V_c} = 1$. However, the probability is calculated at Level 2 rather than Level 1.

Level 2 (Branch):

We focus on antitakeover measure and board composition for the branch level.

1. Poison pills position.
2. Staggered board position.
3. Super majority requirement on merger.
4. Super majority requirement on charter.
5. Super majority requirement on bylaw.
6. Board independent measure.

Level 2 consists of three branches. Branch 2, No further actions after Media Threat and Branch 3, SEC Filing, stem from Limb 2, Media Threat. Branch 1 is degenerate with only one choice at Level 2.

The utility of Branch 3 can be expressed as follows.

$$\begin{aligned} V_{\text{SEC filing}} &= V_{(1,1)} \\ &= \lambda_{(1,1)} [\beta_{1(1,1)} f(X_{1(1,1)}) + \beta_{2(1,1)} f(X_{2(1,1)}) + \dots + \beta_{6(1,1)} f(X_{6(1,1)}) + (1/\mu_{(1,1)}) * IV_{(1,1)}] \end{aligned}$$

Where

$$IV_{(1,1)} = \ln(e^{\mu_{(1,1)} V_a} + e^{\mu_{(1,1)} V_b})$$

Under RU1 which normalize $\mu_{(1,1)} = \mu_{(2,1)} = \mu_{(3,2)} = 1$, we got the following.

$$V_{(1,1)} = \lambda_{(1,1)} [\beta_{1(1,1)} f(X_{1(1,1)}) + \beta_{2(1,1)} f(X_{2(1,1)}) + \dots + \beta_{6(1,1)} f(X_{6(1,1)}) + IV_{(1,1)}]$$

Where

$$IV_{(1,1)} = \ln(e^{\mu_{(1,1)} V_a} + e^{\mu_{(1,1)} V_b}) = \ln(e^{V_a} + e^{V_b})$$

V_a and V_b are known from Level 1.

For Branch 2, it is assumed that the utility for No further actions after Media Threat is defined at this level. Hence, the expected utilities, the IV, from Level 1 is zero.

$$\begin{aligned} V_{\text{branch 2}} &= V_{(2,1)} = \lambda_{(2,1)} [\beta_{1(2,1)} f(X_{1(2,1)}) + \beta_{2(2,1)} f(X_{2(2,1)}) + \dots + \beta_{6(2,1)} f(X_{6(2,1)}) + (1/\mu_{(2,1)}) * IV_{(2,1)}] \\ &= \lambda_{(2,1)} [\beta_{1(2,1)} f(X_{1(2,1)}) + \beta_{2(2,1)} f(X_{2(2,1)}) + \dots + \beta_{6(2,1)} f(X_{6(2,1)})] \end{aligned}$$

In comparison, Branch 1 linked with Nothing at Level 1 is not defined at this level, but at Level 3. Hence, $V_{\text{branch 1}}$ or $V_{(3,2)}$ is still zero.

Next, similar to the conditional logit model, the probability that a branch is chosen is calculated only by considering other branches partitioned within the same limb.

Hence,

$$\pi_{(1,1)} = e^{V_{(1,1)}} / (e^{V_{(1,1)}} + e^{V_{(2,1)}})$$

$$\pi_{(2,1)} = e^{V_{(2,1)}} / (e^{V_{(1,1)}} + e^{V_{(2,1)}})$$

$$\pi_{(3,2)} = 1, \text{ since this branch is degenerate.}$$

Level 3 (limb):

Stock performance, prior shareholder proposals and agency costs are the focus of Limb Level. We also control for firm size.

1. Number of shareholder proposals in the prior year.
2. Market adjusted stock returns.
3. Industry adjusted log market to book ratio.
4. Industry adjusted free cash flow.
5. Industry adjusted square root leverage ratio.
6. Industry adjusted log firm size.

There are two limbs stemming from the same trunk. The utility function of Limb 2 regarding Media Threat with two branches can be written as follows.

$$V_{\text{Media Threat}} = V_{(1)} = \gamma_{(1)} [\beta_{1(1)} f(X_{1(1)}) + \beta_{2(1)} f(X_{2(1)}) + \dots + \beta_{6(1)} f(X_{6(1)}) + 1/\lambda_{(1)} \times IV_{(1)}],$$

where $IV_{(1)} = \ln(e^{\lambda_{(1,1)}V_{(1,1)}} + e^{\lambda_{(2,1)}V_{(2,1)}})$

Under RU1, the scale parameters at Level 1 are normalized but they are free to vary at Level 2. Further, the scale parameters for each connected branch are equal since the IID assumption is maintained within each nest.

So,

$$\lambda_{(1,1)} = \lambda_{(2,1)} = \lambda_{(1)}; \lambda_{(3,2)} = \lambda_{(2)}$$

Hence,

$$V_{(1)} = \gamma_{(1)} [\beta_{1(1)} f(X_{1(1)}) + \beta_{2(1)} f(X_{2(1)}) + \dots + \beta_{6(1)} f(X_{6(1)}) + 1/\lambda_{(1)} \times IV_{(1)}],$$

where $IV_{(1)} = \ln(e^{\lambda_{(1)}V_{(1,1)}} + e^{\lambda_{(1)}V_{(2,1)}})$.

Limb 1 is degenerate and it is assumed that the utility for Nothing is defined at this level. Hence, the expected utility, the IV, from Level 2 is zero.

$$V_{(2)} = \gamma_{(2)} [\beta_{1(2)} f(X_{1(2)}) + \beta_{2(2)} f(X_{2(2)}) + \dots + \beta_{8(1)} f(X_{6(2)}) + 1/\lambda_{(2)} \times IV_{(2)}].$$

Since, $IV_{(2)} = 0$, we get $V_{(2)} = \gamma_{(2)} [\beta_{1(2)} f(X_{1(2)}) + \beta_{2(2)} f(X_{2(2)}) + \dots + \beta_{6(1)} f(X_{8(2)})]$.

The probability of the first limb being selected under RU1 is as follows.

$$\pi(1) = e^{V_{(1)}} / (e^{V_{(1)}} + e^{V_{(2)}})$$

$$= (\gamma_{(1)} [\beta_{1(1)} f(X_{1(1)}) + \dots + \beta_{6(1)} f(X_{6(1)}) + 1/\lambda_{(1)} * \ln(e^{\lambda_{(1)}V_{(1,1)}} + e^{\lambda_{(2)}V_{(2,1)}})]) /$$

$$(\gamma_{(1)} [\beta_{1(1)} f(X_{1(1)}) + \dots + \beta_{6(1)} f(X_{6(1)}) + 1/\lambda_{(1)} * \ln(e^{\lambda_{(1)}V_{(1,1)}} + e^{\lambda_{(2)}V_{(2,1)}})] + \gamma_{(2)} [\beta_{1(2)} f(X_{1(2)}) + \beta_{2(1)} f(X_{2(2)}) + \dots + \beta_{6(1)} f(X_{8(2)})])$$

Similarly, for Limb 1, its probability is as follows.

$$\pi(2) = e^{V_{(2)}} / (e^{V_{(1)}} + e^{V_{(2)}})$$

Probability summary:

The above probabilities calculated in each level are conditional probabilities.

The following summarizes the conditional probabilities.

First, conditional on activists' choices at branch level:

$$\pi(a, \text{proxy fight}) = e^{v_a} / (e^{v_a} + e^{v_b}).$$

$$\pi(b, \text{No further actions after SEC Filing}) = e^{v_b} / (e^{v_a} + e^{v_b}).$$

$$\pi(c, \text{No further actions after Media Threat}) = 1.$$

$$\pi(d, \text{Nothing}) = 1.$$

Second, conditional on activists' choices at limb level:

$$\pi_{(1,1)} = e^{V_{(1,1)}} / (e^{V_{(1,1)}} + e^{V_{(2,1)}}).$$

$$\pi_{(2,1)} = e^{V_{(2,1)}} / (e^{V_{(1,1)}} + e^{V_{(2,1)}}).$$

$$\pi_{(3,2)} = 1.$$

Third, conditional on activists' choices at top level:

$$\pi(1) = e^{V_{(1)}} / (e^{V_{(1)}} + e^{V_{(2)}})$$

$$\pi(2) = e^{V_{(2)}} / (e^{V_{(1)}} + e^{V_{(2)}})$$

Next, the direct probabilities for each elemental alternative, each branch and each limb, can be calculated as follows.

$$\begin{aligned}
\pi(a, \text{proxy fight}) &= (e^{va} / (e^{va} + e^{vb})) * (e^{V(1,1)} / (e^{V(1,1)} + e^{V(2,1)})) * (e^{V(1)} / (e^{V(1)} + e^{V(2)})) \\
\pi(b, \text{No further actions after SEC Filing}) &= (e^{vb} / (e^{va} + e^{vb})) * e^{V(2,1)} / ((e^{V(1,1)} + e^{V(2,1)})) * (e^{V(1)} / (e^{V(1)} + e^{V(2)})) \\
\pi(c, \text{No further actions after Media Threat}) &= (1 * e^{V(2,1)} / (e^{V(1,1)} + e^{V(2,1)})) * (e^{V(1)} / (e^{V(1)} + e^{V(2)})) \\
\pi(d, \text{Nothing}) &= 1 * (1 * e^{V(2)} / (e^{V(1)} + e^{V(2)})) \\
\pi(\text{Branch 3, SEC filing}) &= (e^{V(1,1)} / (e^{V(1,1)} + e^{V(2,1)})) * (e^{V(1)} / (e^{V(1)} + e^{V(2)})) \\
\pi(\text{Limb 2, Media Threat}) &= e^{V(1)} / (e^{V(1)} + e^{V(2)})
\end{aligned}$$

To interpret the regression results, we follow Cameron and Trivedi (2005, 2009) to obtain Marginal effects (ME), which is the first derivative of the probability functions over an independent variable.

$$\text{Theoretically, } ME_n = \text{Marginal effects}_n = \frac{\partial p_{n,j}}{\partial X_i}(X, \gamma, \lambda),$$

where, n represents the nth observation, i represents the ith variable of interest and j represents the jth elemental alternative in relation to the nth observation.

Consistent with Cameron and Trivedi (2005, 2009), we use finite difference methods by considering an increase of one standard deviation from the sample mean of the variable of interest, excluding indicator variables.

Let x = (z, d), where z is defined as all independent variables other than d. Thus, the marginal effects for variable d is as follows.

$$ME_d = E(y|z=z^*, d=\bar{D} + \sigma) - E(y|z=z^*, d=\bar{D}).$$

For the indicator variables, we use the following method to get the ME.

$$ME_d = E(y|z=z^*, d=1) - E(y|z=z^*, d=0).$$

Following Cameron and Trivedi (2005, 2009), for each variable of interest, d, we calculate average marginal effects (AME), \overline{ME}_d to explain the regression results of a nested logit model.

$$\overline{ME}_d = \sum_{i=1}^N ME_{d,i} / N.$$

N is the number of observations and i represents each observation.

The interpretation of the estimated average marginal effects is that one unit increase in x is related to ME% increase in y, while holding all other variables fixed.

Using AME to explain a nested logit model is straightforward. Worth noting, however, the standard errors are not able to be estimated for AME. Cameron and Trivedi (2009) mentioned this issue without any suggestion or solution. Similarly, Jones and Hensher (2007) who aim at introducing the nested logit models into accounting research, also fail to offer suggestions on this issue. Most important, they use the p values obtained directly from the nested logit models in the discussion of the elasticity. In other words, the elasticity (similarly, the marginal effects) and the coefficient estimation have the same p values. Thus, we follow Jones and Hensher (2007) and Bethel, Liebeskind and Opler (1998) and use the p values obtained directly from the nested logit models in the discussions of marginal effects in Section 5.

Appendix B

The Functions of the Nested Logit Model

The coefficients and average marginal effects estimated from the nested logit model are reported in Panel A of Table 4. Based on the coefficients, we obtain the estimated utility functions and derive the estimated probability functions. They are as follows.

Utility Functions:

In general, $U_{nj} = V_{nj} + \varepsilon_{nj}$, where V_{nj} is observed by the researcher and ε_{nj} is a random variable whose value is not observable. Additionally, n represents the n^{th} observations and j represents the j^{th} alternatives.

$$\begin{aligned} V_{\text{Media Threat}} &= 18.44 * (-0.16 * \text{TA} - 0.55 * \text{HPR} + 0.08 * \text{FCF} + 0.31 * \text{Leverage} - 1.05 * \text{MTB} + 0.60 * \\ &\text{Proposal} - 1/71.20 * \ln(\exp(0.18 * \text{Stagger} + 2.62 * \text{Poison} + 0.54 * \text{Merger} - 28.96 * \text{Boardindep} \\ &- 0.47 * \text{Bylaw} + 2.26 * \text{Charter}) + \exp(-0.89 * \text{Stagger} - 2.19 * \text{Poison} - 0.93 * \text{Merger} + 36.72 \\ &* \text{Boardindep} + 1.34 * \text{Bylaw} - 3.90 * \text{Charter} \\ &+ \ln(e^{0.54 * \text{institutional} - 19.91 * \text{Blockholder} + 30.36 * \text{Insiders} - 0.0011 * \text{fund_no} + 11.899 * \text{filing_13d}} + e^{0.26 * \text{institutional} + \\ &22.40 * \text{Blockholder} - 34.86 * \text{Insiders} + 0.004 * \text{fund_no} - 11.30 * \text{filing_13d}})) \end{aligned}$$

$$\begin{aligned} V_{\text{No further actions after Media Threat} | \text{Media Threat}} &= -71.20 * (0.18 * \text{Stagger} + 2.62 * \text{Poison} + 0.54 * \text{Merger} - 28.96 * \text{Boardindep} - 0.47 * \text{Bylaw} \\ &+ 2.26 * \text{Charter}) \end{aligned}$$

$$\begin{aligned} V_{\text{SEC Filing} | \text{Media Threat}} &= -71.20 * (-0.89 * \text{Stagger} - 2.19 * \text{Poison} - 0.93 * \text{Merger} + 36.72 * \text{Boardindep} + 1.34 * \\ &\text{Bylaw} - 3.90 * \text{Charter} \\ &+ \ln(e^{0.54 * \text{institutional} - 19.91 * \text{Blockholder} + 30.06 * \text{Insiders} - 0.0011 * \text{fund_no} + 11.899 * \text{filing_13d}} + e^{0.26 * \text{institutional} + \\ &22.40 * \text{Blockholder} - 34.86 * \text{Insiders} + 0.004 * \text{fund_no} - 11.30 * \text{filing_13d}})) \end{aligned}$$

$$\begin{aligned} V_{\text{No further actions after SEC Filing} | \text{SEC Filing}} &= 0.54 * \text{institutional} - 19.91 * \text{Blockholder} + 30.36 * \text{Insiders} - 0.0011 * \text{fund_no} + \\ &11.899 * \text{filing_13d} \end{aligned}$$

$$V_{\text{proxy fight} | \text{SEC Filing}} = 0.26 * \text{institutional} + 22.40 * \text{Blockholder} - 34.86 * \text{Insiders} + 0.004 * \text{fund_no} - 11.30 * \text{filing_13d}$$

Probability Functions:

$$\begin{aligned} \pi_{\text{Nothing}} &= 1 / (1 + \exp(18.44 * (-0.16 * \text{TA} - 0.55 * \text{HPR} + 0.08 * \text{FCF} + 0.31 * \text{Leverage} - 1.05 * \\ &\text{MTB} + 0.60 * \text{Proposal} - 1/71.20 * \ln(\exp(0.18 * \text{Stagger} + 2.62 * \text{Poison} + 0.54 * \text{Merger} - 28.96 * \text{Boardindep} \\ &* \text{Boardindep} - 0.47 * \text{Bylaw} + 2.26 * \text{Charter}) + \exp(-0.89 * \text{Stagger} - 2.19 * \text{Poison} - 0.93 * \\ &\text{Merger} + 36.72 * \text{Boardindep} + 1.34 * \text{Bylaw} - 3.90 * \text{Charter} \\ &+ \ln(e^{0.54 * \text{institutional} - 19.91 * \text{Blockholder} + 30.36 * \text{Insiders} - 0.0011 * \text{fund_no} + 11.899 * \text{filing_13d}} + e^{0.26 * \text{institutional} + \\ &22.40 * \text{Blockholder} - 34.86 * \text{Insiders} + 0.004 * \text{fund_no} - 11.30 * \text{filing_13d}})))) \end{aligned}$$

$$\begin{aligned} \pi_{\text{Media Threat}} &= \exp(18.44 * (-0.16 * \text{TA} - 0.55 * \text{HPR} + 0.08 * \text{FCF} + 0.31 * \text{Leverage} - 1.05 * \text{MTB} + 0.60 * \\ &\text{Proposal} - 1/71.20 * \ln(\exp(0.18 * \text{Stagger} + 2.62 * \text{Poison} + 0.54 * \text{Merger} - 28.96 * \text{Boardindep} \\ &- 0.47 * \text{Bylaw} + 2.26 * \text{Charter}) + \exp(-0.89 * \text{Stagger} - 2.19 * \text{Poison} - 0.93 * \text{Merger} + 36.72 \\ &* \text{Boardindep} + 1.34 * \text{Bylaw} - 3.90 * \text{Charter} \end{aligned}$$

$$\begin{aligned}
& + \ln(e^{0.54 * institutional - 19.91 * Blockholder + 30.36 * Insiders - 0.0011 * fund_no + 11.899 * filing_13d} + e^{0.26 * institutional + 22.40 * Blockholder - 34.86 * Insiders + 0.004 * fund_no - 11.30 * filing_13d})) \\
& / (1 + \exp(18.44 * (-0.16 * TA - 0.55 * HPR + 0.08 * FCF + 0.31 * Leverage - 1.05 * MTB + 0.60 * Proposal - 1/71.20 * \ln(\exp(0.18 * Stagger + 2.62 * Poison + 0.54 * Merger - 28.96 * Boardindep - 0.47 * Bylaw + 2.26 * Charter) + \exp(-0.89 * Stagger - 2.19 * Poison - 0.93 * Merger + 36.72 * Boardindep + 1.34 * Bylaw - 3.90 * Charter) \\
& + \ln(e^{0.54 * institutional - 19.91 * Blockholder + 30.36 * Insiders - 0.0011 * fund_no + 11.899 * filing_13d} + e^{0.26 * institutional + 22.40 * Blockholder - 34.86 * Insiders + 0.004 * fund_no - 11.30 * filing_13d}))))))
\end{aligned}$$

π closed after Media Threat | Media Threat

$$\begin{aligned}
& = \exp(-71.20 * (0.18 * Stagger + 2.62 * Poison + 0.54 * Merger - 28.96 * Boardindep - 0.47 * Bylaw + 2.26 * Charter) \\
& / \exp(-71.20 * (0.18 * Stagger + 2.62 * Poison + 0.54 * Merger - 28.96 * Boardindep - 0.47 * Bylaw + 2.26 * Charter)) + \exp(-71.20 * (-0.89 * Stagger - 2.19 * Poison - 0.93 * Merger + 36.72 * Boardindep + 1.34 * Bylaw - 3.90 * Charter) \\
& + \ln(e^{0.54 * institutional - 19.91 * Blockholder + 30.06 * Insiders - 0.0011 * fund_no + 11.899 * filing_13d} + e^{0.26 * institutional + 22.40 * Blockholder - 34.86 * Insiders + 0.004 * fund_no - 11.30 * filing_13d}))))))
\end{aligned}$$

π SEC Filing | Media Threat

$$\begin{aligned}
& = \exp(-71.20 * (-0.89 * Stagger - 2.19 * Poison - 0.93 * Merger + 36.72 * Boardindep + 1.34 * Bylaw - 3.90 * Charter) + \ln(e^{0.54 * institutional - 19.91 * Blockholder + 30.06 * Insiders - 0.0011 * fund_no + 11.899 * filing_13d} + e^{0.26 * institutional + 22.40 * Blockholder - 34.86 * Insiders + 0.004 * fund_no - 11.30 * filing_13d}))) \\
& / \exp(-71.20 * (0.18 * Stagger + 2.62 * Poison + 0.54 * Merger - 28.96 * Boardindep - 0.47 * Bylaw + 2.26 * Charter)) + \exp(-71.20 * (-0.89 * Stagger - 2.19 * Poison - 0.93 * Merger + 36.72 * Boardindep + 1.34 * Bylaw - 3.90 * Charter) \\
& + \ln(e^{0.54 * institutional - 19.91 * Blockholder + 30.06 * Insiders - 0.0011 * fund_no + 11.899 * filing_13d} + e^{0.26 * institutional + 22.40 * Blockholder - 34.86 * Insiders + 0.004 * fund_no - 11.30 * filing_13d}))))))
\end{aligned}$$

π SEC Filing = π Media Threat * π SEC Filing | Media Threat

$$\begin{aligned}
& = \exp(18.44 * (-0.16 * TA - 0.55 * HPR + 0.08 * FCF + 0.31 * Leverage - 1.05 * MTB + 0.60 * Proposal - 1/71.20 * \ln(\exp(0.18 * Stagger + 2.62 * Poison + 0.54 * Merger - 28.96 * Boardindep - 0.47 * Bylaw + 2.26 * Charter) + \exp(-0.89 * Stagger - 2.19 * Poison - 0.93 * Merger + 36.72 * Boardindep + 1.34 * Bylaw - 3.90 * Charter) \\
& + \ln(e^{0.54 * institutional - 19.91 * Blockholder + 30.36 * Insiders - 0.0011 * fund_no + 11.899 * filing_13d} + e^{0.26 * institutional + 22.40 * Blockholder - 34.86 * Insiders + 0.004 * fund_no - 11.30 * filing_13d}))) \\
& / (1 + \exp(18.44 * (-0.16 * TA - 0.55 * HPR + 0.08 * FCF + 0.31 * Leverage - 1.05 * MTB + 0.60 * Proposal - 1/71.20 * \ln(\exp(0.18 * Stagger + 2.62 * Poison + 0.54 * Merger - 28.96 * Boardindep - 0.47 * Bylaw + 2.26 * Charter) + \exp(-0.89 * Stagger - 2.19 * Poison - 0.93 * Merger + 36.72 * Boardindep + 1.34 * Bylaw - 3.90 * Charter) \\
& + \ln(e^{0.54 * institutional - 19.91 * Blockholder + 30.36 * Insiders - 0.0011 * fund_no + 11.899 * filing_13d} + e^{0.26 * institutional + 22.40 * Blockholder - 34.86 * Insiders + 0.004 * fund_no - 11.30 * filing_13d})))))) \\
& * \exp(-71.20 * (-0.89 * Stagger - 2.19 * Poison - 0.93 * Merger + 36.72 * Boardindep + 1.34 * Bylaw - 3.90 * Charter) + \ln(e^{0.54 * institutional - 19.91 * Blockholder + 30.06 * Insiders - 0.0011 * fund_no + 11.899 * filing_13d} + e^{0.26 * institutional + 22.40 * Blockholder - 34.86 * Insiders + 0.004 * fund_no - 11.30 * filing_13d}))) \\
& / \exp(-71.20 * (0.18 * Stagger + 2.62 * Poison + 0.54 * Merger - 28.96 * Boardindep - 0.47 * Bylaw + 2.26 * Charter)) + \exp(-71.20 * (-0.89 * Stagger - 2.19 * Poison - 0.93 * Merger + 36.72 * Boardindep + 1.34 * Bylaw - 3.90 * Charter)
\end{aligned}$$

$$+ \ln(e^{0.54 * institutional - 19.91 * Blockholder + 30.06 * Insiders - 0.0011 * fund_no + 11.899 * filing_13d} + e^{0.26 * institutional + 22.40 * Blockholder - 34.86 * Insiders + 0.004 * fund_no - 11.30 * filing_13d}))))$$

$$\pi_{\text{proxy fight | SEC Filing}} = (e^{0.26 * institutional + 22.40 * Blockholder - 34.86 * Insiders + 0.004 * fund_no - 11.30 * filing_13d}) / (e^{0.54 * institutional - 19.91 * Blockholder + 30.36 * Insiders - 0.0011 * fund_no + 11.899 * filing_13d} + e^{0.26 * institutional + 22.40 * Blockholder - 34.86 * Insiders + 0.004 * fund_no - 11.30 * filing_13d})$$

$$\begin{aligned} \pi_{\text{proxy fight}} &= \pi_{\text{Media Threat}} * \pi_{\text{SEC Filing | Media Threat}} * \pi_{\text{proxy fight | SEC Filing}} \\ &= \exp(18.44 * (-0.16 * TA - 0.55 * HPR + 0.08 * FCF + 0.31 * Leverage - 1.05 * MTB + 0.60 * Proposal - 1/71.20 * \ln(\exp(0.18 * Stagger + 2.62 * Poison + 0.54 * Merger - 28.96 * Boardindep - 0.47 * Bylaw + 2.26 * Charter) + \exp(-0.89 * Stagger - 2.19 * Poison - 0.93 * Merger + 36.72 * Boardindep + 1.34 * Bylaw - 3.90 * Charter) + \ln(e^{0.54 * institutional - 19.91 * Blockholder + 30.36 * Insiders - 0.0011 * fund_no + 11.899 * filing_13d} + e^{0.26 * institutional + 22.40 * Blockholder - 34.86 * Insiders + 0.004 * fund_no - 11.30 * filing_13d}))) \\ &/ (1 + \exp(18.44 * (-0.16 * TA - 0.55 * HPR + 0.08 * FCF + 0.31 * Leverage - 1.05 * MTB + 0.60 * Proposal - 1/71.20 * \ln(\exp(0.18 * Stagger + 2.62 * Poison + 0.54 * Merger - 28.96 * Boardindep - 0.47 * Bylaw + 2.26 * Charter) + \exp(-0.89 * Stagger - 2.19 * Poison - 0.93 * Merger + 36.72 * Boardindep + 1.34 * Bylaw - 3.90 * Charter) + \ln(e^{0.54 * institutional - 19.91 * Blockholder + 30.36 * Insiders - 0.0011 * fund_no + 11.899 * filing_13d} + e^{0.26 * institutional + 22.40 * Blockholder - 34.86 * Insiders + 0.004 * fund_no - 11.30 * filing_13d})))) \\ &* \exp(-71.20 * (-0.89 * Stagger - 2.19 * Poison - 0.93 * Merger + 36.72 * Boardindep + 1.34 * Bylaw - 3.90 * Charter) + \ln(e^{0.54 * institutional - 19.91 * Blockholder + 30.06 * Insiders - 0.0011 * fund_no + 11.899 * filing_13d} + e^{0.26 * institutional + 22.40 * Blockholder - 34.86 * Insiders + 0.004 * fund_no - 11.30 * filing_13d}))) \\ &/ \exp(-71.20 * (0.18 * Stagger + 2.62 * Poison + 0.54 * Merger - 28.96 * Boardindep - 0.47 * Bylaw + 2.26 * Charter)) + \exp(-71.20 * (-0.89 * Stagger - 2.19 * Poison - 0.93 * Merger + 36.72 * Boardindep + 1.34 * Bylaw - 3.90 * Charter) + \ln(e^{0.54 * institutional - 19.91 * Blockholder + 30.06 * Insiders - 0.0011 * fund_no + 11.899 * filing_13d} + e^{0.26 * institutional + 22.40 * Blockholder - 34.86 * Insiders + 0.004 * fund_no - 11.30 * filing_13d})))) \\ &* (e^{0.26 * institutional + 22.40 * Blockholder - 34.86 * Insiders + 0.004 * fund_no - 11.30 * filing_13d}) / (e^{0.54 * institutional - 19.91 * Blockholder + 30.36 * Insiders - 0.0011 * fund_no + 11.899 * filing_13d} + e^{0.26 * institutional + 22.40 * Blockholder - 34.86 * Insiders + 0.004 * fund_no - 11.30 * filing_13d}) \end{aligned}$$

Definition of Variables

TA: industry adjusted total asset (log).

HPR: market adjusted holding period returns.

FCF: industry adjusted free cash flow scaled by total asset.

Leverage: industry adjusted leverage ratio (square root).

MTB: industry adjusted market to book ratio (log).

Proposal: shareholder proposal submittal in prior year (square root).

Stagger: Indicator variable, staggered board.

Poison: Indicator variable, poison pills.

Merger: Indicator variable, super majority requirements to approve a merger.

Boardindep: board independence level.

Bylaw: Indicator variable, super majority requirements to amend bylaws.

Charter: Indicator variable, super majority requirements to amend company charter.

Institutional: Institutional ownership.

Blockholder: blockholder ownership.

Insiders: insider ownership.

Fund_no: number of funds

Filing_13d: indicator variable of active blockholders who file Shedule13-d with the SEC.