# Takeover protection as a driver of innovation and value creation

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**Abstract**

This paper shows that managerial entrenchment due to anti-takeover provisions (ATPs) can reduce agency conflicts of managerial risk aversion in 'hard-to-value' (HTV) companies. HTV companies might have depressed prices due to valuation difficulties, rather than managerial under-performance. This might expose HTV companies to an opportunistic takeover, and create agency conflicts of managerial risk aversion. I show that ATPs can ameliorate this. Specifically, I show that that ATPs encourage HTV acquirers to make value-creating acquisitions and encourage value-creating innovation.

*Keywords:* Valuation; Takeovers; Acquisitions; Governance; Managerial Risk Aversion; Innovation

*JEL Classification:* G34, G38, K22, O31, O32

# 1 Introduction

This article examines the role of managerial entrenchment due to anti-takeover provisions (ATPs) in reducing agency conflicts of managerial risk aversion, particularly in high-tech and hard-to-value (HTV) companies. Legislatures have allowed ATPs. One reason might be that there is a 'race to the bottom' to provide the most manager-friendly laws (Bebchuk, 1992; Bebchuk and Ferrell, 1999). Another reason could be that the legislature is public-minded, and aims to allow hard to value and innovative targets to resist opportunistic takeovers and focus on long-term strategic objectives (following Hamermesh, 2006; Henry, 1999; Mahoney and Mahoney, 1993; Ribstein, 1989). This article tests whether ATPs achieve this public-minded policy. Specifically, I show that if an acquirer is hard-to-value or high-tech, then acquirer-level entrenchment (as proxied by a preponderance of ATPs) encourages managers to make takeovers that create more shareholder wealth and that increase post-acquisition innovation.

Motivations for takeovers include managerial self-interest and strategic repositioning. Self-interest-driven takeovers tend to destroy shareholder wealth and are often designed to increase managerial power or prestige (Haleblian et al., 2009). Strategic takeovers should ordinarily create shareholder wealth. Reasons for value-creation include synergies, market power, and increases in innovation. Shareholders might want to encourage managers to make strategic acquisitions while discouraging self-interested decision-making. However, managers are risk averse, and might wish to avoid long-term strategic acquisitions for fear of a myopic market reaction, which might reduce stock prices and expose managers to opportunistic takeovers. Managerial entrenchment might be one solution.

Managerial entrenchment in the acquirer is typically seen as a driver of self-interested takeovers; however, the results are not clear-cut. Managerial entrenchment arguably protects managers from an important disciplinary mechanism, the 'disciplinary takeover', thereby reducing the risk of job loss and worsening corporate governance. Some literature indicates that firms with more ATPs may make worse investments in general (Bebchuk et al., 2009; Gompers et al., 2003). Importantly, Masulis et al. (2007) and Harford et al. (2012) show that if an acquirer is entrenched, then the acquirer makes worse takeover decisions. The stated rationale being that managerial entrenchment worsens corporate governance and enables self-interested managers to pursue value destroying acquisitions. However, some literature suggests that part of this may merely reflect industry effects (Johnson et al., 2009), or that ATPs might benefit firms who would otherwise have difficulties resisting a takeover attempt (Straska and Waller, 2010). Further, Frakes (2007) indicates that ATPs can actually increase value for low-value firms, hypothesizing (but not showing) that this may be because ATPs enable managers to take a long-term approach to investment-decisions.

One reason for the mixed results may be that ATPs may actually increase value in some firms by ameliorating agency conflicts of managerial risk aversion, thereby encouraging managers to undertake value-creating strategic investments. The rationale proceeds in five steps. First, if cash flows are risky, then assets are harder to value, implying that stock prices may be lower (Park and Park, 2004) and more volatile (Campbell et al., 2010; Irvine and Pontiff, 2009).[1] Second, if prices are lower, then the firm is exposed to 'opportunistic' takeovers, which occur when a bidder believes that the target is 'low-priced' (see for example Hasbrouk, 1985; Palepu, 1986; Powell, 1997). Third, managers typically lose their jobs after such hostile takeovers (Franks and Mayer, 1996; Martin and McConnell, 1991). Thus, fourth, managers could take steps to reduce risky cash flows by focusing on short-term, 'safe', projects, which might not maximize firm value or innovation (Cazier, 2011; Dechow and Sloan, 1991; Stein, 1988). Therefore, fifth, ATPs, which managers believe will insulate

[1] I note that this *is* consistent with market efficiency. If the market has difficulties valuing cash flows, then it will value them less. These valuation difficulties can arise due to problems valuing high-tech investments, which have uncertain and long-dated pay-offs. This means that the stock price can be depressed even in an efficient market

them from takeovers (consistent with Casares and Karpoff, 2002; Daines and Klausner, 2001), should reduce managerial risk aversion. Fortunately for the firm's shareholders, this only requires managers to be insulated from opportunistic takeovers, not from disciplinary takeovers following agency-motivated investments.

The prior literature has not fully examined whether ATPs can be used to create value and stimulate innovation. First, I provide a theoretical model and empirical analysis to show that managerial entrenchment can create value in HTV companies. Second, I use an event-study set-up, similar in ethos that in Masulis et al. (2007) and Harford et al. (2012), to test whether acquirer-level entrenchment can stimulate value-creating innovation. Here, I examine the impact of acquirer level characteristics on acquisition outcomes, focusing on whether the firm is HTV and/or entrenched.[2] I examine five definitions of being 'hard-to-value'.[3] This creates four types of acquirer: entrenched HTV; non-entrenched HTV, entrenched non-HTV and non-entrenched non-HTV. The use of an event-study is important because it addresses one causality concern by focusing on a situation in which there is new news about which ATPs might convey information.[4]

I hypothesize and show that entrenched HTV acquirers (compared with non-entrenched HTV acquires or entrenched non-HTV acquirers) feature the following characteristics: (1) the market reacts more positively to entrenched HTV firms' acquisitions. (2) These acquisitions lead to higher long-term post-takeover valuations. (3) The acquisitions are more likely to

[2]I do not focus on entrenchment in the target because: (1) I am interested in the impact of entrenchment on investment decisions; and thus, acquirer-level entrenchment is appropriate as the acquirer makes the investment decision; and, (2) requiring target-level ATPs would automatically exclude any unlisted targets from the sample, thereby imposing a sample selection bias.

[3]These are: (1) high-tech software firms, which are typically difficult to value (Park and Park, 2004); (2) medical companies, which typically rely on hard to value research and development; (3) firms with a high average per-period analyst forecast dispersion, (4) firms with a high yearly standard deviation of analyst earnings forecasts, and (5) firms that have a high analyst forecast error.

[4]This contrasts with studies that just focus on the relation between firm value and entrenchment using a mode of the form $\text{Value} = f(\text{Entrenchment}, \text{Controls})$. Such models run into the problem that in even a moderately efficient market investors should have largely priced the impact of entrenchment (Core et al., 2006). This makes it difficult to draw causal conclusions from such a model.

induce value-creating innovation. (4) While ATPs insulate managers from opportunistic takeovers they do not prevent genuinely disciplinary ones (following a value-destroying bid). (5) ATPs do not induce HTV firms to overpay for acquisitions. These results are robust econometric issues and to endogeneity.

I note that there is some evidence that ATPs may spur innovation and increase value. Sapra et al. (2009) find a U-shaped relation between external and internal governance measures, and the level of innovation. However, these papers do not indicate if patents increase value. Becker-Blease (2011) indicate that ATPs can encourage patent creation. However, it is not entirely clear if these patents create value (as there is the potential for over-investment when managers are shielded from ATPs).[5] Straska and Waller (2010) indicate that ATPs may benefit some firms that are likely to have low bargaining power in takeovers, some of whom may be HTV or high-tech firms.Chemmanur and Tian (2010) show that ATPs may increase the use of patents and that this may increase a firm's Tobin's Q. However, there may be endogeneity between Tobin's Q and ATPs (see Core et al., 2006, 1999); Tobin's Q can deviate for long-periods from accounting-measures of firm-value (see Curtis and Fargher, 2003; Lee, Myers, and Swaminathan, 1999); and, many firms have had ATPs since inception (Daines and Klausner, 2001); and thus, the presence of ATPs conveys no 'new' news to the market without a new event. Further, while focusing on patents provides valuable insight into innovation, not all hard-to-value firms have many patents, and not all patent-intensive firms are hard-to-value. Thus, I build upon this prior literature to connect ATPs, innovation, and value-creation within an event-study setting.

The paper contributes to the literature in several ways. First, it contributes to the literature on managerial incentives and innovation. Prior literature shows that risk-aversion is a source of agency conflicts between shareholders and managers and this might induce value-destroying decisions (Amihud and Lev, 1981; Carpenter, 2000; May, 1995; Wiseman

[5]The present study address this by focusing on both value creation and innovation in HTV companies.

and Gomez-Mejia, 1998). This paper suggests that firms might use ATPs to resolve this conflict.

Second, it contributes to the literature on anti-takeover provisions. I show that ATPs and managerial entrenchment can be beneficial in some firms. This suggests that a more nuanced analysis of the relation between firm value and ATPs is necessary, and indicates that calls to forbid ATPs might not benefit all firms. The finding that ATPs may benefit some types of firm suggests that future literature could examine the types of firm for which ATPs destroy value.

Third, the paper contributes to the literature on valuation difficulties and managerial decision-making. The literature suggests that the fear of a depressed stock price could induce managerial myopia. I show that one way to avoid this problem is to protect managers from the opportunistic takeovers that might arise due to depressed valuations.

The balance of the paper proceeds as follows. Section 2 contains a literature review and formalizes the literature review into a set of predictions. Section 3 produces a theoretical model to further justify the predictions. Section 4 describes the data. Section 5 contains the empirical results, and Section 6 concludes that ATPs do create value in HTV firms.

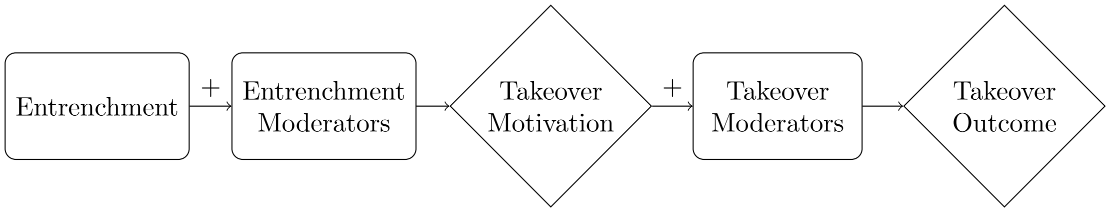
# 2 Prior literature, hypotheses, and relevance to management

This section discusses the prior literature and formulates hypotheses.

## 2.1 Background Literature

Motivations for takeovers broadly include (a) value-creation, and (b) managerial self-interest. A sub-type of value-creating takeovers are innovation-generating takeovers. Managerial entrenchment is typically associated with managers pursuing self-interested takeovers. I argue that it could also enable managers to pursue innovation in takeovers. To position this paper within the framework of Haleblian et al. (2009, Figure 2), I argue that managerial entrenchment is a contingency condition that can enable differently motivated takeovers depending on the nature of the acquiring firm. I argue that managerial entrenchment plus 'entrenchment moderators' can drive a takeover motivation (such as managerial self-interest or innovation). Next, takeover moderators (such as deal factors and other firm-level factors) can influence the takeover outcome. Figure 1 represents this in the form of a modified version of the flowchart in Haleblian et al. (2009, Figure 2).

Figure 1: Flowchart




Innovation is one potential motive for acquisitions. The literature shows that acquisitions sometimes enable managers to increase corporate innovation. Hitt et al. (1991) indicate that R&D can fall after a takeover. However, other studies indicate that the innovation/takeover relationship depends on corporate characteristics. Ahuja and Katila (2001) examine the largest 100 chemical companies and find that the acquisition/innovation relation depends on the firm's size and acquirer-target relatedness. Kapoor and Lim (2007) reach similar conclusions in the semi-conductor field, and Makri et al. (2010) make similar findings using a sample of 96 acquisitions. However, Desyllas and Hughes (2010) find that acquisitions reduce innovation in the pharmaceutical industry. Overall, this suggests that acquisitions can drive innovation; however, it depends on the nature of the acquirer/target.

Managerial self-interest is another motive for acquisitions (Haleblian et al., 2009). This could be because of the possibility of post-acquisition increases in equity-based pay grants (Harford and Li, 2007), and bonuses (Grinstein and Hribar, 2004). Alternatively, managers might aim to increase corporate size. This could increase CEO power and managerial entrenchment; and thus, reduce employment risk (Gomez-Mejia et al., 1990; Haleblian and Finkelstein, 1993).[6]

Managerial entrenchment is typically associated with self-interested takeovers. Masulis et al. (2007, 2009) indicate that entrenched managers make worse takeover decisions. Similarly, Humphery-Jenner (2012a) suggests that the increased managerial entrenchment after the EU takeover directive enabled managers to engage in self-interested takeovers and empire building. Harford et al. (2012) support this and find that entrenched managers are more likely to make acquisitions that strengthen existing managerial entrenchment.

Managerial entrenchment could also be a driver of innovation-through-acquisitions in some firms, particularly 'high-tech' firms and 'hard-to-value' (or 'HTV') firms. High-tech/HTV firms have investments that are difficult to value and strategies that can be difficult to quantify. This is because their investments can be long-dated, rely on intellectual capital, and/or depend on key personnel. However, the market is often 'myopic' and penalizes firms with these traits (Wooldridge, 1988). The risk of an 'artificially' depressed stock price might deter managers of tech/HTV companies from undertaking risky and innovative strategic investments for fear that the stock price might decrease. While properly structured incentive contracts would insulate managerial compensation from this (see e.g. Makri et al., 2006), they cannot protect managers from 'predatory' or 'opportunistic' takeovers, which aim to purchase relatively under-priced targets. Absent some form of takeover protection, this could deter managers from undertaking innovative investments. Takeover protection removes this

[6] Note that the evidence on the size/entrenchment relationship is not clear-cut; Offenberg (2009) finds that larger size does not per se entrench managers.

risk. Thus, I predict that in high-tech/HTV companies, takeover protection (i.e. managerial entrenchment) might actually encourage a company to make investments that induce value-creating innovation. In an acquisition context, this means that if an acquirer is HTV, then entrenchment might encourage-value-creating innovation. This implies that (compared with non-entrenched HTV acquirers' acquisitions) entrenched HTV acquirers' acquisitions should receive a more positive market reaction, increase acquirer value by more, and be more likely to increase innovation.

**Prediction 2.1** (Reaction Prediction)**.** The market reacts positively to entrenched HTV acquirers' acquisitions.

**Prediction 2.2** (Value Prediction)**.** Entrenched HTV acquirers' acquisitions improve long-term value.

**Prediction 2.3** (Innovation Prediction)**.** Entrenched HTV acquirers' acquisitions are more likely to increase innovation in a way that creates value.

Underlying these predictions is the premise that if an entrenched HTV acquirer makes an acquisition, then it is less likely to become the target of a subsequent 'opportunistic' takeover bid. Put differently: I envisage two (potential) takeovers. The (potentially) entrenched and/or HTV acquirer (A1) makes acquisition 1 at time 1. A1 may then be subject to a bid at time 2. I examine the likelihood that A1 is the subject of a subsequent bid at time 2. I hypothesize that if A1 is HTV, then the likelihood is lower if A1 is entrenched than if it is non-entrenched. An explanation is as follows:

An 'opportunistic' takeover is one that is related to the firm's valuation situation rather than whether the manages are performing well. This contrasts with a 'disciplinary' takeover, which responds to a managerial failure (i.e. by making a takeover to which the market responds negatively).This distinction is important because disciplinary takeovers are a key mechanism to remove managers who make value-destroying investments (Humphery-Jenner, 2012b; Kini, Kracaw, and Mian, 2004; Mitchell and Lehn, 1990; Offenberg, 2009; Scharfstein, 1988).

Entrenchment might inhibit opportunistic takeovers by making an acquisition more expensive. If a firm has more ATPs then it can resist a hostile takeover. This can enable it to bargain for a higher takeover premium and/or seek competing bidders, thereby driving-up acquisition premiums. Thus, the firm's price has to be even lower for it to be a similarly attractive target. This reduces the likelihood of an opportunistic bid.

In the current context, the initial acquirer could be subject to subsequent 'opportunistic' bid if the market reacts sufficiently negatively so as to reduce the initial acquirer's share price enough to make it an attractive takeover target. For HTV/tech acquirers, this reaction could reflect (in part) market myopia. Thus, I expect that entrenched HTV acquirers are less likely to be subject to a subsequent opportunistic bid than are non-entrenched HTV acquirers. This implies the following prediction:

**Prediction 2.4.** Entrenched HTV acquriers are less likely to receive a subsequent opportunistic takeover bid than are non-entrenched HTV acquirers.

An additional prediction relates to takeover premiums. Managerial hubris can induce high takeover premiums (Haleblian et al., 2009). However, if the target conveys high synergistic or strategic value, then it may warrant, and demand, a high takeover premium (Laamanen, 2007). This quadrates with evidence that target bargaining power increases takeover premiums (Straska and Waller, 2010). Thus, a negative market-reaction to the takeover premium implies overpayment whereas a positive market-reaction to the takeover premium is consistent with synergies. Given that I predict entrenched HTV acquirers' acquisitions to yield higher synergistic value, I predict the market to react positively to their takeover premiums.

**Prediction 2.5** (Premium Prediction)**.** The market reacts positively to the premiums that entrenched HTV acquirers pay.

To summarize: The theory that entrenchment encourages HTV acquirers to make value-creating and innovative takeovers has five main implications: (1) The market reacts more positively to investments (takeovers) made by HTV firms that have more ATPs. (2) These acquisitions generate long term value. (3) The acquisitions induce value-creating innovation. (4) ATPs insulate HTV managers from opportunistic takeovers without shielding them from disciplinary ones. (5) The market reacts positively to the takeover premiums that entrenched HTV acquirers pay. All must hold after controlling for relevant control variables. This remainder of this paper tests and justifies these predictions.

# 3 Theoretical Model

## 3.1 Set Up

There are three relevant players: (a) the manager or CEO, (b) the 'firm', and (c) a 'shark'. The manager wishes to maximize his or her utility by altering the firm's asset mix. The shark wishes to acquire a low priced firm and replace incumbent management. The firm wishes to maximize its risk adjusted profit.

The situation proceeds as follows. First, the firm sets the level of anti-takeover provisions, $A$ and hires a manager. Assume that the level of anti-takeover protection is a continuous variable. That is, it represents the overall 'strength' of protection. Further, the set of ATPs does not include becoming a 'dual class' company since this might create a disconnect between voting rights and cash flow rights, which might encourage managerial rent extraction (Masulis, Wang, and Xie, 2009). This paper is not a contract-theory paper and does not consider the optimal contract between the firm and the manager. The compensation contract contains a fixed component, $k$, and an incentive component that is a monotonically increasing function, $g(\cdot)$, of the end-of-period value.

Second, the manager invests in a set of 'divisions' or 'assets'. The manager sets the amount of money invested. This is not an either-or decision. The intuition is that firms routinely determine the amount of resources to allocate to a division (as opposed to whether to allocate money at all). The manager invests across $n$ assets. The vector of investments is $\mathbf{x} = (x_1, \ldots, x_n)$. Each investment has a random return, contained in the random return vector $\mathbf{r} = (r_1, \ldots, r_n)$. However, the manager knows that there may be some estimation error in the random return vector. Thus, due to the estimation error, the random returns lie between the lower bound $\underline{\mathbf{r}}$ and the upper bound $\bar{\mathbf{r}}$. Thus, $\underline{\mathbf{r}} \leq \mathbf{r} \leq \bar{\mathbf{r}}$. The expected return vector is is $\mathbf{y} = \mathbb{E}(\mathbf{r})$, which similarly lies between $\underline{\mathbf{y}}$ and $\bar{\mathbf{y}}$.

The returns are joint-normally distributed with variance-covariance matrix $\mathbf{\Sigma}$ and probability density function denoted $p(\mathbf{r})$. Thus, the total variance is $\mathbf{x}^T \mathbf{\Sigma} \mathbf{x}$. However, as with the random returns, there is measurement error in the estimation of $\mathbf{\Sigma}$. Thus, $\mathbf{\Sigma}$ lies between the lower bound $\underline{\mathbf{\Sigma}}$ and the upper bound $\bar{\mathbf{\Sigma}}$. This induces the uncertainty sets:

$$
\begin{aligned}
\mathcal{R} &= \{\underline{\mathbf{r}} \leq \mathbf{r} \leq \bar{\mathbf{r}}\} \\
\mathcal{Y} &= \{\underline{\mathbf{y}} \leq \mathbf{y} \leq \bar{\mathbf{y}}\} \\
\mathcal{E} &= \{\underline{\mathbf{\Sigma}} \leq \mathbf{\Sigma} \leq \bar{\mathbf{\Sigma}}\}
\end{aligned}
$$

Third, the market perceives the returns on these investments and interprets the return as a signal of the manager's quality. Note that this is an imperfect signal and returns can be low because either (a) the manager is low quality, or (b) the firm is hard to value or in an innovative industry (such as technology). The market cannot distinguish between these possibilities.

Fourth, the shark decides if it will acquire the firm. It does this only if the final value, $\mathbf{x}^T\mathbf{y}$, is below a threshold level. The threshold level is a decreasing function of the level of ATPs. This reflects the fact that ATPs make an acquisition more expensive. If the acquisition is more expensive, then the firm must be cheaper for the acquisition to be worthwhile. It is denoted $\eta(A)$, with derivative $\eta'(A) < 0$.

The firm's situation is as follows. The firm decides on a level of anti-takeover provisions, $A$. Further, it offers the manager a contract. The fixed compensation is $k$. The incentive compensation increases in the final asset value but does so at a decreasing rate. That is $g'(\mathbf{x}^T\mathbf{r}) > 0$ and $g''(\mathbf{x}^T\mathbf{r}) < 0$, where $\mathbf{x}^T\mathbf{r}$ is the final return, $g'$ is the first-derivative, and $g''$ is the second derivative. Thus, total wage is $w = k + g(\mathbf{x}^T\mathbf{r})$. The firm is risk-neutral. This reflects the fact that shareholders can reduce their risk exposure by dividing their wealth between the risk free asset and the risky firm. Thus, the firm's goal is to chose the level of ATPs in order to maximize the end of period value. Following Tütüncü and Koenig (2004), this induces the objective function over the uncertainty set $\mathcal{R}$:

$$\max_{A} \quad \left\{ \min_{\mathcal{R}} \int \mathbf{x}^T\mathbf{r}p(\mathbf{r})d\mathbf{r} \right\} \tag{1}$$

$$\tag{2}$$

The shark's situation is as follows. The shark wishes to acquire low-priced firms and to replace (supposedly) inefficient managers. This correlates with the idea of acquiring firms that have a low Tobin's Q (see Hasbrouk, 1985; Palepu, 1986; Powell, 1997). The shark acquires the firm if its value, $\mathbf{x}^T\mathbf{r}$, is below the threshold $\eta(A)$. However, ATPs make the takeover expensive. Thus, $\eta$ decreases with the level of ATPs (i.e. if there are more ATPs, then the firm's price must be lower).

The manager's situation is as follows. The manager wishes to maximize his/her utility.

The manager is risk averse with utility function $U_m$ such that $U_m' > 0$ and $U_m'' < 0$. The utility increases monotonically in the wage. The wage is $k + g\left(\mathbf{x}^T\mathbf{y}\right)$ with associated utility $U_m\left[k + g\left(\mathbf{x}^T\mathbf{y}\right)\right]$. Since $k$ is a constant, the manager maximizes his/her utility by altering the firm's asset mix. Thus, the manager optimizes over $U_m\left[g\left(\mathbf{x}^T\mathbf{y}\right)\right]$.

Two points are notable. First, the manager's utility does not explicitly increase with firm size (cf Nikolov and Whited, 2010). Modeling firm size does not qualitatively change the solution since with firm-size, the manager's utility is $U_m\left[k + g\left(\mathbf{x}^T\mathbf{y}\right) + \mathbf{1}^T\mathbf{x}\right]$, and here both $\mathbf{1}^T\mathbf{x}$ and $g\left(\mathbf{x}^T\mathbf{y}\right)$ monotonically increase with $\mathbf{x}$. Second, the model does not explicitly model managerial expropriation since (a) expropriating assets (which increases managerial utility) reduces returns by a commensurate amount (which reduces utility), (b) Nikolov and Whited (2010) find that that the extent of managerial expropriation is relatively small compared with the size of the firm, (c) the wage function captures the use of perquisites for compensation purposes,[7] (as opposed to illegal theft purposes) and (d) the model does not delve into strictly illegal 'theft' type behavior.

The manager also wishes to avoid losing his/her job. Thus, the manager wants to ensure that with probability $1 - \alpha$, the final return, $\mathbf{x}^T\mathbf{y}$, exceeds the shark's takeover threshold $\eta(A)$. That is there is only a $\alpha$% chance that $\mathbf{x}^T\mathbf{y} < \eta$. Assume that the manager must invest all cash available for investment, such that $\mathbf{1}^T\mathbf{x} = \mathbf{x}^T\mathbf{1} = 1$.[8] Thus, the manager's optimization problem, consistent with Tütüncü and Koenig (2004), is:

$$\max_{\mathbf{x}} \quad \left\{ \min_{\mathcal{R},\mathcal{Y},\mathcal{E}} \int U_m\left[g(\mathbf{x}^T\mathbf{r})\right] p(\mathbf{r})d\mathbf{r} \right\} \tag{3}$$

$$s.t. \quad \left\{ \min_{\mathcal{R},\mathcal{Y},\mathcal{E}} \quad \mathbf{x}^T\mathbf{y} - \int_0^{\eta(A)} \mathbf{x}^T\mathbf{r}p(\mathbf{r})d\mathbf{r} \geq \eta(A) \right\} \tag{4}$$

[7]Perquisites are often incorporated into wage contracts as 'fringe benefits' (see for example Cheng, 2004; Mitchell, 1983; Woodbury, 1983).

[8]Nikolov and Whited (2010) show that the manager need not invest all cash. However, relaxing this constraint does not qualitatively change the solution obtained in Proposition 3.1 or in Proposition 3.2.

$$\mathbf{x}^T\mathbf{1} = 1 \tag{5}$$

The goal is then to (a) solve the manager's optimization problem to obtain an optimal portfolio, $\mathbf{x}^*$, as a function of the level of ATPs, $A$, and the standard deviation of returns, $\mathbf{\Sigma}$; and thus, (b) to examine the relation between firm-risk ($\mathbf{\Sigma}$), ATPs ($A$), and the firm's return.

## 3.2 Solution

The solution proceeds as follows. There are two issues (a) what is the manager's optimal portfolio vector, $\mathbf{x}$, and (b) given this optimal portfolio, how does the interaction of variance and ATPs influence the portfolio return. It is convenient to break this into several sub-steps.

**Proposition 3.1** (Optimal Portfolio)**.** If (a) the vector of returns is normally distributed, with mean return $\mathbf{y}$, and variance $\mathbf{\Sigma}$, (b) the takeover threshold is $\eta(A)$, and (c) the $z$-statistic associated with $\eta(A)$ is $z_A$, then the manager chooses the portfolio:

$$\mathbf{x}^* = \left(2\mathbf{y}\mathbf{y}^T - 2z_A^2\mathbf{\Sigma}\right)^{-1}\left(2\eta(A)\mathbf{y} - \mathbf{y}\lambda_1^{-1} - (\lambda_2/\lambda_1)\mathbf{1}\right)$$

Here, $\mathbf{y}$ is the vector of returns, $\eta(A)$ is the takeover threshold at which the shark acquires the firm, $z_A$ is the $z$-statistic associated with $\eta(A)$, $\Sigma$ is the variance-covariance matrix, and $\lambda_1, \lambda_2$ are Lagrange multipliers.

*Proof.* The Proof is in the Appendix □

The Second key issue is how the firm's returns change based upon interaction of (a) return variance, and (b) ATPs. Proposition 3.2 summarizes the result.

**Proposition 3.2.** The firm's total returns increase with the interaction of ATPs and return-variance. That is, if the asset returns are more risky, then returns increase with ATPs.

*Proof.* The Proof is in the appendix □

To summarize findings thus far, risky firms (interchangeably called difficult-to-value or hard to value firms) benefit by giving managers more ATPs. Conversely, stable firms, as proxied by low cash flow volatility, do not benefit by giving managers more ATPs. The issue is then whether the empirical evidence supports this prediction.

# 4 Sample and Variables

I analyze a set-up that is similar in nature to that in Masulis et al. (2007) and Harford et al. (2012). I aim to analyze the acquisition decisions by acquirers who are hard-to-value. The goal is to assess the impact of [acquirer] managerial entrenchment in HTV firms. That is, the sample-of-interest is the set of acquirers who are hard-to-value (i.e. HTV acquirers). The 'control' sample is the set of non-HTV acquirers. The 'treatment' is whether a acquirer is entrenched (i.e. has a preponderance of ATPs). I am not per se interested in whether the target is entrenched. This is because (a) I want to assess the impact of entrenchment on investment decisions, and (b) there is limited data available on target ATPs.[9]

It is important that the sample comprise HTV and non-HTV firms and entrenched firms and non-entrenched firms. This is for similar reasons to why it is important to have a control sample in a difference-in-difference model. That is, having a sample of non-HTV allows me to compare the impact of entrenchment on HTV and non-HTV firms; and thus, to draw conclusions about the impact of entrenchment on different types of firms.

[9]Some targets are in the relevant IRRC database; however, IRRC does not cover all listed firms and covers no unlisted firms. Thus, requiring target-level IRRC data would impose a clear sample selection bias by excluding any non-public firm.

This sample comprises 3935 acquisitions by companies listed in the US and made between 1990-2005. The takeover must be announced before 2005 so that it is possible to examine whether an acquirer is targeted for a takeover within four years of the initial acquisition. Acquisition data comes from SDC platinum. Stock price data is from CRSP. Firm-level data is from Compustat. IBES analyst forecasts are from the IBES database on WRDS. Governance data is from RiskMetrics (formerly, IRRC).[10] Consistent with Masulis, Wang, and Xie (2007), the sample only comprises completed acquisitions where the acquirer controls 100% of the target after the acquisition, and for which the bidder and target have the necessary data. The sample excludes companies with dual class shares (consistent with Gompers, Ishii, and Metrick, 2003; Masulis, Wang, and Xie, 2007). The sample yields the following variables, which Table 1 defines.

[Insert Table 1 about here]

## 4.1 Proxies for Hard to Value Companies

I use five proxies for HTV firms. These are (a) I(Software), a dummy that equals one if the firm is in the software industry,[11] (b) I(Medical), a dummy that equals one if the firm is in the medical industry,[12] (c) I(High Dispersion), a dummy that equals one if the firm's yearly average analyst forecast dispersion is in the top 25% of the IBES population, (d) I(HighVariability), a dummy that equals one if the standard deviation of analyst forecast errors is in the top 25% of the IBES population for that year, and (e) I(High Forecast Error),

[10] IRRC only reports data for every second or third year during the sample-period. For years with missing data, the article backfills data from the previously available year. The results are robust to forward filling with data from the next available year.

[11] Following Loughran and Ritter (2002), these have the 4-digit SIC codes: 7371, 7372, 7373, 7374, 7375, 7378, 7379.

[12] Loughran and Ritter (2004) define these as firms with 4-digit SIC code of 3841 or 3845. The paper extends this to include firms as being classified as as optical (SIC code 3827), surgical (SIC code 3841), orthopedic (SIC code 3842), dental (SIC code 3843), electromedical (SIC code 3845), opthalmic (SIC code 3851), or pharmaceutical (SIC code 2834).

a dummy that equals one if the firm's analyst forecast error is in the top 25% of the IBES population for that year, implying some difficulty valuing the company. I genericlaly denote the HTV indicators as I(HTV).

The rationale for the proxies is as follows. For the two industry-based proxies: Software companies and medical companies are typically seen as 'high-innovation' companies in general (see Danzon et al., 2007; Desyllas and Hughes, 2010; Makri et al., 2010). These firms typically rely more on complex technologies, patents and R&D; and thus, might be more difficult to value (as indicated in DiMasi and Grabowski, 2007; Giaccotto et al., 2011). For the analyst forecast based proxies, the rationale is that high levels of forecast error, or of dispersion in forecasts, might suggest some difficulty predicting earnings; and thus, in valuing the firm. Allen and Gale (1999) indicate that such diversity of opinion can influence whether, and how, firms finance investment activities.

## 4.2 The Entrenchment variables

The goal is to examine the impact of entrenchment in HTV companies. The main measure, and the one that features in the reported multivariate tests, is 'I(GIM$\geq$ 10)', a dummy variable that equals 1 if the firm has a Gompers et al. (2003) index above 10 (following Harford et al., 2012).[13] The rationale for using a dummy variable is twofold: (1) it is easier to interpret double and triple interactions that feature dummy variables; and (2) Harford et al. (2012) suggest that managers are sufficiently entrenched if there is a 'critical mass' of ATPs.

[13]The results hold using other measures of anti-takeover provisions, including the Gompers et al. (2003) index, the Bebchuk et al. (2009) six-provision entrenchment index, and a dummy that equals one if the firm has a classified board.

## 4.3 Takeover Premiums

The takeover premium is the transaction value divided by the target's share price 3, 11, or 21 days before the acquisition. However, the premium paid for a transaction is endogenous with the market's reaction to that transaction. Thus, following Officer (2007) and Harford et al. (2012), I examine a 'Proxy Premium', defined as the average takeover premium paid for companies in the target's industry in the year of the acquisition. A collateral advantage is that this allows the sample to retain acquisitions of unlisted targets.

## 4.4 Dependent Variables

### 4.4.1 Reaction Variable

This proxy for the market's reaction is the firm's cumulative average abnormal return ('CAR') surrounding the takeover announcement from day -2 to day +2 (a five-day event window). I base it on an OLS estimation of the market model over the period 11-days to 210-days before the acquisition announcement. Following Masulis, Wang, and Xie (2007).

It is worth noting that using a market-based measure of value is consistent with the examination of HTV companies. The use of market-based measures of value implicitly assumes that the market is efficient. I hypothesize that HTV companies may have depressed stock prices due to valuation-difficulties. Superficially, this appears inconsistent with market efficiency. However, the depressed price is consistent with efficiency: the market will rationally decrease the value of long-dated and uncertain cash flows (as could occur in tech companies, or companies that are difficult to value). This would induce lower stock prices in an efficient market.

### 4.4.2 Long Term Value Variable

The long-term value variable is the industry-adjusted Tobin's Q ('Ind Adj Tobin's Q'). This is the firm's Tobin's Q less the average Tobin's Q for all firms in its 3-digit SIC industry.[14] Industry adjusting controls for systemically higher or lower levels of Tobin's Q in different industries (following Gilchrist, Himmelberg, and Huberman, 2005).

### 4.4.3 Value Creating Innovation

It is difficult to assess whether a takeover increases innovation. There is no perfect measure of this. 'Value-creating innovation' contains two components: (1) value-creation, and (2) innovation. I deem a takeover to be value-creating if the market reacts positively to it (i.e. if the CAR $> 0$). I uses several measures of innovation.

First, 'I(Target Tech)' equals one if the target is in a high-tech industry, as defined in Loughran and Ritter (2002). I note that there can be many reasons for acquiring a high-tech target. For example, the acquisition could be to reduce product market competition (say by acquiring a competitor in the same industry), or could be to gain access to the firm's internal R&D processes. Thus, I use another proxy.

Second, I examine the post-takeover increase in R&D.[15] I deem an acquisition to increase innovation if $\text{R\&D}_{t+i} > \text{R\&D}_{t-1}$, where $i \in \{1, 2\}$. I also note that R&D can be a messy measure of innovation. However, R&D is a key pre-requisite for innovation, and it would be unrealistic to expect a takeover to immediately sound in innovation outputs (such as patents).

I capture whether the innovation creates value by interacting the innovation variable with

[14]The results are robust to subtracting the industry median Tobin's Q and examining SIC 2-digit, 3-digit and 4-digit industry classifications.

[15]R&D expenditures have received substantial use as a proxy for innovation, see: Cloodt, Hagedoorn, and Van Kranenburg (2006); Desyllas and Hughes (2010); Hagedoorn (2002); Hagedoorn and Cloodt (2003); Roijakkers and Hagedoorn (2006).

an indicator that equals one if the market reacts positively to the acquisition announcement. Thus, the two 'value creating innovation' variables are I(R&D$_{t+i}$ > R&D$_{t-1}$) × I(CAR>0) and I(Target Tech) × I(CAR>0).

#### 4.4.4 Post-takeover Disciplinary takeovers

I examine entrenchment by examining whether ATPs protect managers from disciplinary takeovers. Following Offenberg (2009), I examine the likelihood of receiving a takeover bid within 4 years of the initial acquisition. Thus, the variable I(Bid For) equals one if the firm receives a takeover bid within 4 years of the initial acquisition that it makes.

### 4.5 Control Variables

The control variables are standard in the literature.[16] The variables are in two sub-categories: bidder-based variables and deal-based variables. Table 1 describes the calculation of the variables in detail.

**Bidder Variables:** Large acquirers tend to earn lower announcement returns (Humphery-Jenner and Powell, 2011; Moeller et al., 2004). Overvaluation might induce agency conflicts and reduce announcement returns (Harford et al., 2012). High free cash flows might create Jensen (1986) type agency conflicts and enable managers to do self-interested acquisitions. Financial leverage might reduce free cash flows and impose additional monitoring, thereby increasing announcement returns (Maloney et al., 1993). Latent growth prospects (i.e. a high Tobin's Q) might encourage the managers to continue pursuing innovative acquisitions. Serial acquirers might earn lower returns if they undertake an acquisition program in order to substitute for poor internal growth prospects (Moeller et al., 2005); however, might earn

[16] See for example: Humphery-Jenner and Powell (2011); Masulis, Wang, and Xie (2007); Moeller and Schlingemann (2005); Moeller, Schlingemann, and Stulz (2004, 2005). For a useful summary of the literature on moderating variables see Haleblian et al. (2009).

higher returns if they learn from their acquisition experience (Barkema and Schijven, 2008; Haleblian and Finkelstein, 1999; Vermeulen and Barkema, 2001).

The bidder variables are thus: (1) ‘ln(Assets)’: the natural log of the bidder’s book assets; (2) ‘P/RIV’: the price-to-residual-income-value; (3) ‘FCF/Assets’: the free cash flow scaled by the market value of assets; (4) ‘Debt/Assets’: the long-term debt divided by the market value of assets; (5) ‘Tobin’s Q’: the Tobin’s Q defined as the market value of assets divided by the book value of assets; and (6) ‘I(Serial Acquirer)’: an indicator that equals one if the acquirer has previously engaged in three or more deals.

**Deal Level Variables:**

The deal-based variables are: (1) ‘Run-up’: the pre-announcement run-up; (2) ‘Volume Run-up’: the pre-announcement abnormal stock turnover; (3) ‘TV/Assets’: the transaction value divided by the bidder’s market value; (4) ‘I(Both Tech)’: an indicator that both the bidder and target are high-tech as defined in Loughran and Ritter (2002).[17]; (6) ‘I(Both Tech)’ × ‘TV/Assets’; (7) ‘I(Diversifying)’: an indicator that the bidder and target are in different Fama-French 48 industries; (8) ‘I(Cross-border)’: an indicator that the bidder and target are based in different countries; (9) ‘I(Multi bidders)’: an indicator that there were multiple bidders; (10) the indicators ‘I(Public Target)’, ‘I(Private Target)’, ‘I(Subsidiary Target)’ represent an acquisition of a listed target, an unlisted target, a subsidiary. The terms ‘I(Cash Payment)’ and ‘I(Stock Payment)’ equal one if the bidder paid with some cash, or with only stock, respectively. The models control for the interactions of the variables.

[17]They define high tech firms as firms in the industries: computer hardware (SIC codes: 3571, 3572, 3575, 3577, 3578); communications equipment (3661, 3663, 3669); electronics (3671, 3672, 3674, 3675, 3677, 3678, 3679); navigation equipment (3812); measuring and controlling devices (3823, 3825, 3826, 3827, 3829); medical instruments (3841, 3845); telephone equipment (4812, 4813); communications services (4899); and software (7371, 7372, 7373, 7374, 7375, 7378, 7379).

# 5 Analysis

## 5.1 Sample Description and Univariate Analysis

The sample contains 3935 acquisitions. Table 2 contains the sample description by year. Software companies make 408 of these acquisitions and Medical companies make 164 acquisitions in the sample. The sample reveals some takeover clustering.

[Insert Table 2 about here]

Table 3 contains summary statistics. Column 1 contains statistics for the full sample of 3935 firms. The statistics are largely in line with those reported in prior literature (see Masulis, Wang, and Xie, 2007; Moeller, Schlingemann, and Stulz, 2004). Columns 2-6 contain summary statistics for sub-samples of HTV firms. There is significant variation in the variables across the HTV sub-samples.

[Insert Table 3 about here]

Table 4 contains univariate statistics for HTV companies sorted by whether they have a GIM index of at least 10. Panel C compares high-ATP HTV companies with low-ATP HTV companies. The key results are: First, HTV companies make acquisitions that have higher CARs. Second, the acquisitions have a less-negative impact on industry-adjusted Tobin's Q. Third, HTV companies are also more likely to make acquisitions that create value and increase R&D expenditure. While ATPs reduce the likelihood that a HighDispersion or HighVariability firm makes a value-creating acquisition of a high-tech target, the difference-result in Panel C is not significant and (in unreported analysis) reflects the lower probability of acquiring a high tech target.[18] Fourth, if the initial acquisition destroyed value (had a

[18]Section 5.4 controls for the possibility that some acquirers are less likely to acquire a high-tech target by examining the probability that a bid creates value conditional on it being for a high-tech target.

CAR< 0), then ATPs increase the likelihood that the HTV will be acquired. Overall, these results are laregly consistent with the predictions in Section 2.

[Insert Table 4 about here]

Table 5 analyzes the CARs in further detail. It examines the relation between CARs and various definitions of being a high-ATP company.[19] Panel A contains the results for all bidders, the results suggest that bidders in general make profitable takeovers (supporting Moeller, Schlingemann, and Stulz, 2004), but that ATPs encourage takeovers that are less profitable (consistent with Masulis, Wang, and Xie, 2007). Panels B to E suggest that ATPs enable managers of hard to value companies to focus on long-term value-creation. Several results are notable: First, if the firm is HTV and has more ATPs, then the market reacts significantly positively to its acquisition announcements. Second, if a HTV firm has GIM< 10 then the market will react insignificantly negatively to its takeovers. Third, if the firm is not HTV, but has more ATPs (GIM≥ 10), then the market reacts significantly negatively to its takeovers.

[Insert Table 5 about here]

## 5.2 Market-Reaction Analysis

The first key issue is whether the market reacts positively to acquisitions by HTV firms who have more ATPs. The multivariate model is in Equation (6).

$$\text{CARs} = f(\text{I(HTV)}, \text{I(GIM}\geq 10), \text{I(HTV)} \times \text{I(GIM}\geq 10), \text{Controls}) \tag{6}$$

[19] Note that for medical companies, all companies that have a Gompers, Ishii, and Metrick (2003) index of at least 10 also have a classified board. Thus, the results in the GIM columns (Columns 2-4) are the same as in the DIC columns (Columns 8-10).

Here, 'CARs' is the 5-day cumulative abnormal return based on an OLS estimation of the market model over the period 11 days to 210 days before the announcement; 'I(HTV)' is one of the five proxies for being a hard-to-value company; 'I(GIM$\geq$ 10)' is an indicator that the firm's GIM index is at least 10; and, 'Controls' denotes the control variables. The model uses standard errors clustered by 3-digit SIC industry and includes year-dummies (consistent with Johnson, Moorman, and Sorescu, 2009; Petersen, 2009).[20] Prediction 2.1 suggests that there should be a positive coefficient on the interaction term 'I(HTV) $\times$ I(GIM$\geq$10)'.

The results confirm that the market reacts positively to takeovers by entrenched HTV firms. Table 6 contains the OLS regression results. The first key result is that the market responds negatively to bidders that that are entrenched (i.e. have more ATPs). This quadrates with findings in prior literature (see for example Harford et al., 2012; Masulis et al., 2007). The second key result is that the market reacts positively to the acquisitions by entrenched HTV acquirers. This supports the hypothesis that ATPs can encourage managers of HTV firms to make value-increasing investments.

The OLS results overall support the hypothesis that takeover protection enables managers of hard to value companies to implement value-creating investments.

[Insert Table 6 about here]

### 5.3 Do these acquisitions increase long-term value?

The second key issue is whether these acquisitions improve long term value. Equation (7) contains the OLS regression model

[20] I ensure the results are robust to various types of clustering and to the inclusion of industry dummies (See Section 5.7) .

$$\text{Ind Adj Tobin's } Q_{t+i} = f\big(\text{Ind Adj Tobin's } Q_{t-1}, \text{I(HTV)}, \text{I(GIM} \geq 10), \text{I(HTV)} \times \text{I(GIM} \geq 10), \text{Controls}) \tag{7}$$

Here, the dependent variable is the industry-adjusted Tobin's Q estimated $i$ years after the announcement. The tables report the results for 1 year after the announcement because the immediate hurdles of acquisition integration and fees impose immediate pressure on corporate values. 'I(HTV)' is one of five hard-to-value proxies, 'I(GIM$\geq$ 10)' equals one if the firm has a GIM index of at least 10, and 'Controls' denotes the controls. The model uses fewer controls than in Section 5.2 because some deal-based variables should not logically influence the acquirer's long-term value.[21] The models use robust standard errors clustered by 3-digit SIC code and include year dummies. Prediction 2.2 suggests that there should be a positive coefficient on the interaction term 'I(HTV) $\times$ I(GIM$\geq$10)'.

Table 7 contains regression results where the dependent variable is the industry-adjusted Tobin's Q one year after the acquisition. Entrenched acquirers perform worse on average. Firms with more ATPs have lower values on average (consistent with Bebchuk et al., 2009; Gompers et al., 2003). However, the interaction 'I(GIM$\geq$ 10) $\times$ I(HTV)' is positive and significant at 1% . Thus, while HTV acquirers tend to make worse acquisitions, on average, entrenchment appears to encourage managers of HTV firms to make acquisitions that create more value.

[Insert Table 7 about here]

[21]The results are qualitatively the same if the model includes all control variables.

## 5.4 Value creating innovation

The third issue is whether entrenchment encourages HTV acquirers to make acquisitions that generate value-creating innovation. Thus the study examines whether ATPs increase the likelihood that HTV firms (1) acquire a high-tech acquisition and the market responds positively to this and (2) the firm's R&D expenditure increases following the acquisition and the market responds positively. To ensure that the propensity to acquire high-tech targets (as opposed to acquiring value-creating high-tech targets) creates value, the study also examines whether ATPs increase the chances of a positive market reaction conditional on the acquisition being for a high-tech firm. The OLS regression specifications are below:

$$\begin{pmatrix} \text{I(Target Tech)} \\ \times\text{I(CAR}\geq 0) \end{pmatrix} = f(\text{I(HTV)}, \text{I(GIM}\geq 10), \text{I(HTV)} \times \text{I(GIM}\geq 10), \text{Controls}) \tag{8}$$

$$\begin{pmatrix} \mathbb{I}\left(\text{R\&D}_{t+i} > \text{R\&D}_{t-1}\right) \\ \times\text{I(CAR}\geq 0) \end{pmatrix} = f(\text{I(HTV)}, \text{I(GIM}\geq 10), \text{I(HTV)} \times \text{I(GIM}\geq 10), \text{Controls}) \tag{9}$$

$$\text{CAR} \geq 0 = f(\text{I(HTV)}, \text{I(GIM}\geq 10), \text{I(HTV)} \times \text{I(GIM}\geq 10), \text{Controls}) \tag{10}$$

Here, R&D is the firm's expenditure on R&D; TargetTech equals one if the target is in a high tech industry as defined in Loughran and Ritter (2002); I(HTV) is one of five hard-to-value proxies; and, I(GIM$\geq$ 10) is an indicator that the firm has a GIM index of at least 10. The control variables are as in Section 5.2 except that they omit 'I(Both Tech)' and 'I(Both Tech)$\times$ TV/Assets' to avoid endogeneity. Equation (10) restricts the sample to the sub-sample of 1016 acquisitions that are for high-tech targets as defined in Loughran and

Ritter (2002). The models are logit models use robust standard errors clustered by 3-digit SIC code. Prediction 2.3 indicates that there should be a positive coefficient on 'I(HTV) × I(GIM≥ 0)'

The results are in Table 8. The control variables are suppressed for brevity. Looking at Panels A - C. The key result is that the coefficient on 'I(HTV) × I(GIM≥ 0)' is positive and significant across all HTV specifications in Panels B and C and across four HTV specifications in Panel A. Unsurprisingly, there is a negative coefficient on 'I(GIM ≥ 10)', confirming that ATPs can reduce value in non-HTV firms. Overall, this implies that ATPs encourage HTV firms to increase innovation and this innovation creates value. Looking at Panel D, the coefficient on 'I(HTV) × I(GIM≥ 0)' is positive and significant for four HTV specifications. Thus, conditional on the acquisition being for a high-tech target, ATPs increase the probability that a HTV firm will make an acquisition that creates value. Overall, these results indicate that ATPs encourage HTV firms to make acquisitions that generate value.

[Insert Table 8 about here]

## 5.5 Post-acquisition takeovers

The hypothesis that entrenchment benefits HTV companies rests on the assumption that (a) ATPs do protect HTV companies from 'opportunistic' takeovers, but (b) ATPs do not prevent appropriate disciplinary takeovers. I analyze this using logit regressions to predict the likelihood of a firm that makes an acquisition in year $t$ being subsequently bid for in year $t + i$. That is, I analyze whether the initial bidder receives a subsequent takeover bid. This is similar in spirit to the approach to analyzing whether 'bad bidders become good targets' in Mitchell and Lehn (1990). Equation (11) contains the regression approach.

$$\begin{aligned} \text{I(Bid For)} = f\,(&\text{I(HTV)}, \text{I(HTV)} \times \text{I(GIM} \geq 10), \text{I(HTV)} \times \text{I(CAR} < 0), \\ &\text{I(HTV)} \times \text{I(GIM} \geq 10) \times \text{I(CAR} < 0), \text{Controls}) \end{aligned} \tag{11}$$

Here, 'I(Bid For)' is an indicator that equals one if the initial bidder recieves a takeover offer within four years of that initial bid; 'I(HTV)' denotes the hard-to-value proxies; 'I(GIM $\geq$ 10)' equals one if the firm has a GIM index of at least 10; and 'Controls' denotes the control variables (including the appropriate two-way interactions of the independent variables). The models use robust standard errors clustered by 3-digit SIC code and include year dummies. [22]

Prediction 2.4 implies the following: If ATPs protect managers from opportunistic takeovers but do not insulate them from disciplinary ones, then (1) there should be a negative coefficient on 'I(HTV) $\times$ I(GIM$\geq$ 10)', suggesting that ATPs make an acquisition of a HTV company less likely; and (2) there should be a positive coefficient on 'I(HTV) $\times$ I(GIM$\geq$ 10) $\times$ I(CAR$<$ 0)', suggesting that HTV companies are still disciplined for value-destroying decisions, even if they have more ATPs.

The bidder and deal variables are largely as in Section 5.2. However, there are two key changes. First, following Offenberg (2009), the models include the Herfindahl-Hishman Index ('HHI') of the initial-bidder's industry since a high HHI indicates a crowded industry, which might reduce the probability of receiving a takeover-bid (Brar et al., 2009; Powell, 1997).[23] Second, the models exclude variables that would not theoretically influence the likelihood of receiving a bid. These include whether the initial target was publicly listed, the method of payment, stock-price run-up in the initial acquisition, abnormal volume in

[22] The results are robust to the use of the cross-derivative-method proposed in Ai and Norton (2003), which corrects coefficient-estimates and standard errors of interaction terms Ai and Norton (2003); Brambor, Roberts Clark, and Golder (2006); Norton, Wang, and Ai (2004); Powers (2005)

[23] The results are unchanged in models that replace HHI with a dummy that equals 1 if the number of firms in the industry is in the top 25% of all industries.

the initial acquisition, the tech-status of the initial target, and the industry-relatedness of the bidder and the target.[24]

The results are in Table 9. They show that ATPs do not entrench managers of HTV companies. There are two key results. First, for four HTV proxies, HTV firms that have more ATPs are less likely to be targeted (the coefficient on 'I(GIM$\geq$ 10) $\times$ I(HTV)' is negative and significant for all HTV variables except HighError). Second, HTV firms that have more ATPs are more likely to be acquired if they make a value destroying takeover. That is, the coefficient on I(CAR$<$ 0) $\times$ I(GIM$\geq$ 10) $\times$ I(HTV) is positive in all models, and is significant for the HTV variables: High Variability, High Dispersion, and High Forecast Error. Together, these results suggest that ATPs do not insulate HTV firms from disciplinary takeovers, but do protect them from opportunistic ones.

I note that the coefficient on the I(GIM$\geq$ 10) indicator is insignificantly positive. This may indicate that ATPs do not per se insulate managers from takeovers. However, this is consistent with prior literature (see Humphery-Jenner, 2012b), and the interaction term I(CAR$<$ 0) $\times$ I(GIM$\geq$10) is insignificantly negative (albeit smaller in sign). This suggests that ATPs might make it less likely that a firm who makes a value-destroying takeover will be taken over.

[Insert Table 9 about here]

These results combined with the foregoing results suggest that ATPs enable HTV companies to make acquisitions that are more profitable and that ATPs do not entrench managers of HTV companies. Together, these results strongly support the theory that ATPs enable managers of HTV companies to focus on value creation.

[24] Robustness tests include all the original variables. The results are qualitatively the same.

## 5.6 The reaction to takeover premiums

The prediction is that the market should react positively to the takeover premiums that HTV firms pay. The regression specification is:

$$
\begin{aligned}
\text{CAR} = f(&\text{I(HTV)}, \text{I(GIM}\geq 10), \text{Proxy Premium}^{(i)}, \\
&\text{I(HTV)} \times \text{Proxy Premium}^{(i)}, \text{I(GIM}\geq 10) \times \text{Proxy Premium}^{(i)}, \\
&\text{I(HTV)} \times \text{Proxy Premium}^{(i)} \times \text{I(GIM}\geq 10), \text{Controls})
\end{aligned} \tag{12}
$$

Here, CAR is the 5-day cumulative abnormal return surrounding the announcement of the takeover; I(GIM$\geq$ 10) indicates if the firm has a GIM index of at least 10 and I(HTV) is one of five HTV indicators. The proxy premium (denoted 'Proxy Premium$^{(i)}$') is the average premium paid for firms in the target's SIC 2-digit industry in that year, where the takeover premium is variously the transaction value divided by the target's stock price $i$-days before the acquisition, where $i$-days is various 3-days, 11-days, or 21-days . The controls are as in Section 5.2 and include the appropriate two-way interactions. The models use robust standard errors clustered by 3-digit SIC industry and include industry dummies. Prediction 2.5 implies that there should be a positive coefficient on the triple interaction term 'I(HTV) $\times$ Proxy Premium$^{(i)}$ $\times$ I(GIM$\geq$ 10)'.

The results are in Table 10. The key result is that the coefficient on 'I(HTV) $\times$ Proxy Premium$^{(i)}$ $\times$ I(GIM$\geq$ 10)' is positive and significant for four of the five HTV variables for all proxy premium specifications. The coefficient on 'Proxy Premium' is positive. This appears surprising; however, reflects the inclusion of 'Proxy Premium' in several interaction terms, and 'Proxy Premium' has a significant negative univariate correlation with CARs. The table omits control variables for brevity, although they are largely consistent with the results reported in Section 5.2.

These results imply that entrenched HTV firms use takeover premiums productively to acquire high-value targets.

[Insert Table 10 about here]

## 5.7 Robustness

This section ensures that the results are robust.

**Other governance variables:** The results are robust to other ATP-measures. Specifically, the results hold in models that use I(CBOARD) and I(PPILL), dummies that equal 1 if the firm has a classified board or has poison pills, respectively. The results also hold in models that use the Gompers, Ishii, and Metrick (2003) index or the Bebchuk, Cohen, and Ferrell (2009) index (denoted 'BCF').

**Clustering, industry effects, and year effects:** The results are robust to industry, year and firm clustering. The results hold in models that replace year fixed effects, with standard errors clustered by year and industry. The results also hold in models that cluster standard errors by firm rather than by industry. The results are qualitatively the same when industry is defined using SIC 2-digit, 3-digit, and 4-digit codes. The results are also robust to clustering by the acquirer's family or 'ultimate parent'. The results are qualitatively similar when using SIC 2-digit dummies (in addition to year dummies) and/or including state-of-incorporation dummies.

**Multicollinearity Issues:** The results are robust to multi-collinearity. The VIF does not exceed two for any variable in the models. Nonetheless, the relation between the HTV variable, ATPs and the dependent variables holds in models that replace the bidder and deal control variables with principal components that reflect the bidder and deal characteristics. I suppress the results for brevity.

**Variable Definitions:** The results are robust to the examination of Tobin's Q, and industry adjusted Tobin's Q, 1, 2, or 3 years after the acquisition. The industry adjusted Tobin's Q is also robust to the subtraction of either the industry mean or median, and for industry being defined as the firm's 2-digit, 3-digit, or 4-digit SIC industry.

The results hold in different definitions of CARs, holding in models that use the event windows (-1,1), (-2,2), and (-5,5).

The results are robust to definition of takeover premium, holding in models that define premium as the transaction value divided by the target's market value 11-days, 21-days, or 31-days before the acquisition announcement.

**Endogeneity:** The results are robust to endogeneity between ATPs and other corporate characteristics. I ensure robustness to endogeneity in several ways. There are two sources of endogeneity: (1) between ATPs and the dependent variables; and, (2) between the controls and the dependent variables. I address both. There is no perfect way to address endogeneity; however, I address it in several ways to provide some confidence that it does not drive the results.

1. I instrument firm-specific ATP variable with the average level of ATPs in the firm's home-state. The rationale is that managers may take advantage of all the takeover protection they can get in their home state. Thus, they may tend towards the mean level of ATPs. However, there is no reason to per se suspect that the mean level of ATPs should be correlated with corporate performance. Thus, the state-average level of ATPs should satisfy by the relevance requirement and the exclusion restriction. The full first stage model predicts whether a firm has a GIM index of at least 10 in a given year as a function of its size, leverage, free cash flow, and the average GIM index in the firm's home state. I also include state dummies, SIC 2-digit dummies, and year dummies, and cluster standard errors by 3-digit SIC code.

   I find that the results are qualitatively the same when I use the state average level of

ATPs as an instrument. The results are in Columns 1-5 of Table 11. The key result is that the coefficient on the predicted I(GIM $\geq$ 10) variable is statistically significant in all models.

2. I address endogeneity by replacing the ATP index with a 'Residual ATP' index that is the residual from a first-stage regression that predicts the level of ATPs (following Harford, Humphery-Jenner, and Powell, 2012; Murphy and Topel, 2002; Pagan, 1984). The 'Residual ATP' represents that proportion of the ATP index that is not due to other firm and governance characteristics.[25] For brevity, I only report the second stage regression that examines acquisition CARs. The results are in Table 11.[26] The key findings are that (1) the coefficient on the 'Residual GIM' variable is negative and significant whereas (2) the coefficient on the interaction of the 'Residual GIM' variable with the 'HTV' variable is positive and significant in all models. This supports the hypothesis that ATPs can create value in HTV companies. There is similar support for the other models in the paper.

3. I ensure robustness to endogeneity between the dependent variables and the non-ATP controls. Masulis et al. (2007) indicate that there might be endogeneity between the controls and takeover performance. They address this by replacing the firm-specific variable with the industry average for the control variables. Similarly, I replace the controls with industry-averages. The results are qualitatively robust to using the industry averages variables (the results are unreported for brevity, but are available on request).

[25]These characteristics are: a dummy that equals one if the firm was sued under a shareholder class action in the last 12 months, the proportion of inside directors, a CEO-chairman duality indicator, the log of the CEO's age, the log of the CEO's tenure, the proportion of incentive pay to total pay, the level of insider ownership, a high-tech dummy, the natural log of assets, the firm's tobin's Q, the industry-adjusted operating performance over assets, and the HHI.

[26]First stage models and further details are available upon request.

4. I employ a method similar to that in Arping and Sautner (2012): In Method 1 above I only instrument the variable I(GIM≥10). However, Arping and Sautner (2012) indicate that it is better to instrument both I(GIM≥10) and its interaction terms (i.e. 'I(HTV) × I(GIM≥10)'). The results are qualitatively the same as for Method 1.

5. I ensure robustness by focusing on firms that listed before 1990. One way to address endogeneity is to use the observation that it became more difficult for existing firms to implement ATPs after 1990. Subsequently, if the firm was listed before 1990, then it is unlikely to have changed its level of ATPs significantly over the time-period. Thus, I ensure that the results are robust to reducing the sample to only contain firms that listed before 1990 (following Bebchuk et al., 2009; Gompers et al., 2003; Masulis et al., 2007).

[Insert Table 11 about here]

**Other Governance Factors:** The results are robust to controlling for other CEO and board characteristics. I control for several categories of variable:

First, I control for whether the acquirer has a 5% blockholder (variable: I(5% Blockholder)). I obtain this data from the Thomson Reuters 13f filings. The rationale is that prior literature shows that institutional investors can monitor companies and improve corporate governance (Burns et al., 2010; Demiralp et al., 2011; Helwege et al., 2012).

Second, I control for CEO-level characteristics. CEO-chairperson duality (variable: I(CEO is Chair)) might worsen corporate governance (Dunn, 2004; Humphery-Jenner, 2012b). CEO age and tenure (variables: ln(CEO age) and ln(CEO tenure)) might connote increased managerial power and entrenchment, which would worsen governance (Antia et al., 2010; Humphery-Jenner, 2012b). Higher levels of CEO equity ownership (variable: CEO Pct Ownership) and equity based grants (variable: CEO Equity Based Pay/Total Pay) might improve governance by aligning CEO and shareholder incentives (Benson and Davidson, 2009). I obtain the additional CEO data from Execucomp.

Third, I control for board-level characteristics. The independence of the audit committee and governance can influence governance and inhibit fraud (Xie et al., 2003), so I control for the proportion of executive directors on the audit committee and the governance committee (variables: 'Prop Exec Audit Committee' and 'Prop Exec Gov Committee'). Similarly, board independence (variable: Prop Exec Directors) could improve governance (Cornett et al., 2009).[27] There is some evidence that having a larger proportion of women on the board (variable: Prop Female Directors) influence corporate governance (Adams and Ferreira, 2009; Adams and Funk, 2012). I also control for the proportion of directors who attend fewer than 75% of the board meetings (variable: Prop Bad Attendance) to control for the importance of attending meetings to monitoring. The director data is from IRRC's directors database.

Fourth, I control for a proxy for earnings management (variable: Discretionary Accruals/ Total Accruals). Earnings management is a widely used sign of bad corporate governance (see e.g. Hazarika et al., 2012). The level of discretionary accruals is a common proxy for earnings management (Chahine et al., 2012; DeBoskey and Jiang, 2012; Hochberg, 2012; Lee and Masulis, 2011). I calculate the proportion of discretionary accruals to total accruals following the approach in Hribar and Collins (2002). I use data from Compustat. The process is as follows.

1. I calculate the level of accruals using Equation (13)

$$ACC = \Delta CA - \Delta CL - \Delta Cash - \Delta STDEBT - DEP \tag{13}$$

Where, $\Delta CA$ is the change in current assets (Compustat: act), $\Delta CL$ is the change in

[27]However, I note that some other studies indicate that structure independence is not itself sufficient to improve governance (Capezio et al., 2011).

current liability (Compustat: lct), $\Delta Cash$ is the change in cash holdings (Compustat: ch), $\Delta STDEBT$ is the change in short term debt (Compustat: dlc) and $DEP$ is the depreciation (Compustat: dp).

2. I use Equation (14) to calculate the 'expected' level of accruals from a regression of $ACC$ on the firm's change in revenues, and its level of fixed property and plant.

$$ACC = \alpha + \beta_1(\Delta Rev) + \beta_2 PPE + \varepsilon \tag{14}$$

   Where, $\Delta Rev$ is the change in revenues (Compustat: sale), and $PPE$ is the firms fixed property and plant (Compustat: ppegt). I also include 2-digit SIC industry dummies and year dummies and use robust standard errors clustered by firm.

3. I calculate the level of non-discretionary accruals ($NDACC$) by using the coefficients estimated in Equation (14).

$$NDACC = \hat{\alpha} + \hat{\beta}_1(\Delta Rev - \Delta AR) + \hat{\beta}_2 PPE \tag{15}$$

   Where, $\Delta AR$ is the change in accounts receivable (Compustat: recch).

4. The discretionary accruals ($DACC$) are then $ACC - NDACC$.

5. The ratio of discretionary accruals to total accruals is then $DACC/ACC$.

The results for models that control for additional governance factors are in Table 12. The dependent variable is the acquirer CAR. Requiring additional governance variables significnatly reduces the sample size (to 1832 observations). However, the main result is that the interaction term 'I(HTV) × I(GIM≥ 10)' is positive and statistically significant in most models. This suggests that entrenchment improves HTV acquirers' acquisitions even after controlling for additional governance variables.

[Insert Table 12 about here]

# 6 Conclusion

This paper examines whether ATPs can ameliorate agency conflicts of managerial risk aversion, thereby enabling managers to focus on long-term strategic objectives.

I examine this issue within the framework suggested in Masulis et al. (2007) and Harford et al. (2012). I test the impact of managerial entrenchment on the takeover decisions of HTV firms. I show that if an acquirer is both (a) high-tech or is hard-to-value and (b) entrenched, then its acquisitions receive a more positive market response, and are more likely to involve value-creating innovation. Further, this entrenchment does not seem to insulate HTV bidders from subsequently becoming targets if they make bad takeover decisions. Overall, the results tend to suggest that entrenchment can be beneficial in high-tech and innovative firms.

Unlike prior literature, which has focused on messy proxies for long-term value, this paper focuses on the market's reaction to an event, about which ATPs may convey new news. In so doing, this addresses the inconsistent findings in the literature that ATPs may reduce value for some, but not for all, firms. These results contribute to two bodies of literature. First, they contribute the governance literature by clarifying the relation between ATPs and firm value. Second, they contribute to the managerial incentive literature by showing one way to reduce agency conflicts of managerial risk-aversion. The findings in this paper suggest that future research could focus on the precise types of firm for which ATPs might destroy value.

# Appendix: Proofs

*Proof of Proposition 3.1.* For clarity of exposition, solution proceeds in several steps.

First, recall that the manager's optimization problem is:

$$\begin{aligned}
\max_{\mathbf{x}} \quad & \left\{ \min_{\mathcal{R},\mathcal{Y},\mathcal{E}} \int U_m \left[ g(\mathbf{x}^T\mathbf{r}) \right] p(\mathbf{r}) d\mathbf{r} \right\} \\
s.t. \quad & \min_{\mathcal{R},\mathcal{Y},\mathcal{E}} \left( \mathbf{x}^T\mathbf{y} - \int_0^{\eta(A)} \mathbf{x}^T\mathbf{r} p(\mathbf{r}) d\mathbf{r} \right) \geq \eta(A) \\
& \mathbf{x}^T\mathbf{1} = 1
\end{aligned}$$

Second, recall that the incentive compensation increases monotonically with returns, but does so at a decreasing rate; that is, $g' > 0$, and $g'' < 0$. Thus, maximizing over $g(\mathbf{x}^T\mathbf{r})$ is equivalent to maximizing over $\mathbf{x}^T\mathbf{r}$. Therefore, the optimization problem becomes:

$$\max_{\mathbf{x}} \quad \left\{ \min_{\mathcal{R},\mathcal{Y},\mathcal{E}} \int U_m \left[ \mathbf{x}^T\mathbf{r} \right] p(\mathbf{r}) d\mathbf{r} \right\} \tag{16}$$

$$s.t. \quad \min_{\mathcal{R},\mathcal{Y},\mathcal{E}} \left( \mathbf{x}^T\mathbf{y} - \int_0^{\eta(A)} \mathbf{x}^T\mathbf{r} p(\mathbf{r}) d\mathbf{r} \right) \geq \eta(A) \tag{17}$$

$$\mathbf{x}^T\mathbf{1} = 1 \tag{18}$$

Third, note that (a) the returns are Gaussian, and (b) the manager is risk averse with $U'_m > 0$ and $U''_m < 0$. Following well-established result in portfolio optimization under a Gaussian distribution (see for example Cornuejols and Tütüncü, 2007; Pulley, 1981; Rockafellar and Uryasev, 2000; Simaan, 1997), Equation (16) becomes:

$$\begin{aligned}
\max_{\mathbf{x}} \quad & \min_{\mathcal{R},\mathcal{Y},\mathcal{E}} \left( \mathbf{x}^T\mathbf{y} \right) \\
s.t. \quad & \max_{\mathcal{R},\mathcal{Y},\mathcal{E}} \left( \mathbf{x}^T\boldsymbol{\Sigma}\mathbf{x} \right) = \sigma
\end{aligned}$$

Fourth, note that the returns are Gaussian. Further, recall that the manager chooses $\mathbf{x}$ such that $\mathbb{P}\left[\mathbf{x}^T\mathbf{y} \leq \eta_A\right] = \alpha$. Thus, consistent with Gourieroux, Laurent, and Scaillet (2000), El Ghaoui, Oks, and Oustry (2003), Scaillet (2004), and Bertsimas, Lauprete, and Samarov (2004):

$$\mathbb{P}\left(\mathbf{x}^T\mathbf{y} \leq \eta_A\right) = \alpha = \int_{-\infty}^{z_\alpha} p(\mathbf{r}) d\mathbf{r}$$

Thus,

$$\frac{\left[\mathbf{x}^T\mathbf{y} - \eta(A)\right]}{\sqrt{\mathbf{x}^T\boldsymbol{\Sigma}\mathbf{x}}} = z_\alpha$$

Thus, letting $z_A = z_\alpha$

$$\eta(A) = \mathbf{x}^T\mathbf{y} - z_A\sqrt{\mathbf{x}^T\boldsymbol{\Sigma}\mathbf{x}}$$

Therefore, the constraint in Equation (17) induces the following relation,

$$\min_{\mathcal{R},\mathcal{Y},\mathcal{E}} \left( \mathbf{x}^T\mathbf{y} - \int_0^{\eta(A)} \mathbf{x}^T\mathbf{r}p(\mathbf{r})d\mathbf{r} \right) \geq \eta(A)$$
$$\Leftrightarrow \min_{\mathcal{R},\mathcal{Y},\mathcal{E}} \left( \mathbf{x}^T\mathbf{y} - z_A\sqrt{\mathbf{x}^T\mathbf{\Sigma}\mathbf{x}} \right) \geq \eta(A) \tag{19}$$

Here, $\eta(A)$ is the takeover threshold, and $z_A$ is the $z$-statistic associated with the takeover threshold. Note that $\eta(A)$ decreases with the level of ATPs, and conversely, the absolute value of $z_A$ increases with the level of ATPs.

Fifth, now note that the firm will set the level of ATPs such that Equation (17) binds in the optimum. Combine these relations together to obtain the new optimization problem:

$$\max_{\mathbf{x}} \quad \min_{\mathcal{R},\mathcal{Y},\mathcal{E}} \quad \left(\mathbf{x}^T\mathbf{y}\right) \tag{20}$$
$$s.t. \quad \max_{\mathcal{R},\mathcal{Y},\mathcal{E}} \left(\mathbf{x}^T\mathbf{\Sigma}\mathbf{x}\right) = \sigma \tag{21}$$
$$\min_{\mathcal{R},\mathcal{Y},\mathcal{E}} \left(\mathbf{x}^T\mathbf{y} - z_A\sqrt{\mathbf{x}^T\mathbf{\Sigma}\mathbf{x}}\right) = \eta(A) \tag{22}$$
$$\mathbf{x}^T\mathbf{1} = 1 \tag{23}$$

Sixth, transform the problem into an ordinary optimization problem by eliminating the uncertainty sets. The approach follows that in Tütüncü and Koenig (2004), Calafiore (2007), and Cornuejols and Tütüncü (2007). This induces the modified optimization problem:

$$\max_{\mathbf{x}} \quad \mathbf{x}^T\underline{\mathbf{y}} \tag{24}$$
$$s.t. \quad \mathbf{x}^T\bar{\mathbf{\Sigma}}\mathbf{x} = \sigma \tag{25}$$
$$\mathbf{x}^T\underline{\mathbf{y}} - z_A\sqrt{\mathbf{x}^T\bar{\mathbf{\Sigma}}\mathbf{x}} = \eta(A) \tag{26}$$
$$\mathbf{x}^T\mathbf{1} = 1 \tag{27}$$

Seventh, perform a change of variables in Equation (26). Here, $\left[\mathbf{x}^T\underline{\mathbf{y}} - \eta(A)\right] = z_A\sqrt{\mathbf{x}^T\bar{\mathbf{\Sigma}}\mathbf{x}}$. Thus,

$$\left[\mathbf{x}^T\underline{\mathbf{y}} - \eta(A)\right] = z_A\sqrt{\mathbf{x}^T\bar{\mathbf{\Sigma}}\mathbf{x}}$$
$$(\mathbf{x}^T\underline{\mathbf{y}})^2 - 2\eta(A)\mathbf{x}^T\underline{\mathbf{y}} + \eta^2 = z_A^2\mathbf{x}^T\bar{\mathbf{\Sigma}}\mathbf{x}$$
$$0 = \eta(A)^2 - 2\eta(A)\mathbf{x}^T\underline{\mathbf{y}} + \mathbf{x}^T\mathbf{\Omega}\mathbf{x}$$

Where,

$$\mathbf{\Omega} = \underline{\mathbf{y}}\mathbf{y}^T - z_A^2\bar{\mathbf{\Sigma}}$$

Note that $\mathbf{\Omega} = \underline{\mathbf{y}}\mathbf{y}^T - z_A^2\bar{\mathbf{\Sigma}}$ is symmetric. To see this,

$$\begin{aligned}
\Omega^T &= \left[\underline{\mathbf{y}}\mathbf{y}^T - z_A^2\bar{\mathbf{\Sigma}}\right]^T \\
&= \left(\underline{\mathbf{y}}\mathbf{y}^T\right)^T - z_A^2\bar{\mathbf{\Sigma}}^T \\
&= \mathbf{y}\underline{\mathbf{y}}^T - z_A^2\bar{\mathbf{\Sigma}} \\
&= \mathbf{\Omega}
\end{aligned}$$

Eigth, re-write the optimization problem using the foregoing results:

$$\begin{aligned}
\max_{\mathbf{x}} \quad & \mathbf{x}^T\underline{\mathbf{y}} && (28)\\
s.t. \quad & \eta(A)^2 - 2\eta(A)\mathbf{x}^T\underline{\mathbf{y}} + \mathbf{x}^T\mathbf{\Omega}\mathbf{x} = 0 && (29)\\
& \mathbf{x}^T\mathbf{1} = 1 && (30)
\end{aligned}$$

Ninth, differentiate with respect to $\mathbf{x}$ and set to zero to obtain an optimum. This induces the system of equations:

$$\begin{aligned}
\underline{\mathbf{y}} - 2\eta(A)\underline{\mathbf{y}}\lambda_1 + 2\lambda_1\mathbf{\Omega}\mathbf{x} + \lambda 2\mathbf{1} &= 0 && \text{Derivative} && (31)\\
\eta(A)^2 - 2\eta(A)\mathbf{x}^T\underline{\mathbf{y}} + \mathbf{x}^T\mathbf{\Omega}\mathbf{x} &= 0 && \text{Constraint 1} && (32)\\
\mathbf{1}^T\mathbf{x} &= 0 && \text{Constraint 2} && (33)
\end{aligned}$$

Tenth, solve Equation (31) with respect to $\mathbf{x}$ to obtain the optimal investment vector. Here, this is

$$\begin{aligned}
\mathbf{x}^* &= (2\Omega)^{-1}\left(2\eta(A)\underline{\mathbf{y}} - \underline{\mathbf{y}}\lambda_1^{-1} - (\lambda_2/\lambda_1)\mathbf{1}\right)\\
&= \left(2\underline{\mathbf{y}}\mathbf{y}^T - 2z_A^2\bar{\mathbf{\Sigma}}\right)^{-1}\left(2\eta(A)\underline{\mathbf{y}} - \underline{\mathbf{y}}\lambda_1^{-1} - (\lambda_2/\lambda_1)\mathbf{1}\right) \qquad (34)
\end{aligned}$$

□

*Proof of Proposition 3.2.* To see this, recall that the manager chooses the investment portfolio $\mathbf{x}^* = \left(2\underline{\mathbf{y}}\mathbf{y}^T - 2z_A^2\bar{\mathbf{\Sigma}}\right)^{-1}\left(2\eta(A)\underline{\mathbf{y}} - \underline{\mathbf{y}}\lambda_1^{-1} - (\lambda_2/\lambda_1)\mathbf{1}\right)$. Thus, the firm's total return is:

$$\underline{\mathbf{y}}^T\mathbf{x}^* = \underline{\mathbf{y}}^T\left(2\underline{\mathbf{y}}\mathbf{y}^T - 2z_A^2\bar{\mathbf{\Sigma}}\right)^{-1}\left(2\eta(A)\underline{\mathbf{y}} - \underline{\mathbf{y}}\lambda_1^{-1} - (\lambda_2/\lambda_1)\mathbf{1}\right)$$

Now note that the Lagrange multipliers are positive. Further, recall that (a) $\eta(A)$ decreases with ATPs and (b) $z_A$ increases with the level of ATPs. Now, the term $z_A^2\bar{\mathbf{\Sigma}}$ represents the combined impact of ATPs and return-variance. Thus, increasing ATPs and return-variance increases the term $z_A^2\bar{\mathbf{\Sigma}}$. Noting the negative sign and inverse power, this means that increasing the term $z_A^2\bar{\mathbf{\Sigma}}$ increases $\underline{\mathbf{y}}^T\mathbf{x}^*$. Thus, if the firm's assets are more risky, then increasing ATPs increases the firm's total returns.

□

# Tables

Table 1: Variable definitions

| *Variable* | *Definition* |
|---|---|
| **Dependent Variables** | |
| CAR | The cumulative abnormal returns accruing to the bidder for the five days surrounding the announcement (from days -2, to +2). Abnormal returns are the difference between actual returns and predicted returns. The predicted return is based on an OLS estimation of the market model with parameters computed over the pariod 11 days to 210 days before the announcement. |
| Ind Adj Tobin's Q | The bidder's industry adjusted Tobin's Q $i$ years after the acquisition. The paper reports the results for $i = 1$. The bidder's Tobin's Q is its market value of assets over its book value of assets. The market value of assets is the firm's market capitalization plus book assets less its book equity. In compustat terms this is (at - ceq+csho×price)/(at). The firm's industry adjusted Tobin's Q is its Tobin's Q less the average Tobin's Q in the firm's SIC 4-digit industry. |
| I(CAR$\geq$ 0 $\times$) I(R&D$_{t+i}$ $>$ R&D$_{t-1}$) | The interaction of (a) an indicator that equals one if the CAR is positive, and (b) an indicator that equals one if the R&D expenditure in year $t + i$ exceeds that in year $t - i$, where year $t$ is the acquisition year. |
| I(CAR$\geq$ 0) $\times$ I(Target Tech) | The interaction of (a) an indicator that equals one if the CAR is positive and (b) an indicator that equals one if the target is in a high-tech industry as defined in Loughran and Ritter (2002). |
| I(Bid For) | An indicator that equals one if the initial acquirer receives a takeover bid within 4 years of the acquisition |
| **Valuation Difficulty Variables** | |
| I(Software) | A dummy variable that equals 1 if the acquirer is in the computer software industry. These have the 4-digit SIC codes: 7371, 7372, 7373, 7374, 7375, 7378, 7379. |
| I(Medical) | A dummy variable that equals 1 if the acquirer is in the medical industry. Loughran and Ritter (2004) define these as firms with 4-digit SIC code of 3841 or 3845. However, the results also hold in an extended definition of medical firms as being classified as as optical (SIC code 3827), surgical (SIC code 3841), orthopedic (SIC code 3842), dental (SIC code 3843), electromedical (SIC code 3845), opthalmic (SIC code 3851), or pharmaceutical (SIC code 2834). The reported models use the Loughran and Ritter (2004) specification. |
| I(High Dispersion) | A dummy variable that equals one if the average of the standard deviation of analyst forecasts is in the top 25% of the IBES population. The calculation is as follows. For each forecast period IBES reports the standard deviation of the analyst forecasts. Compute the average of the standard deviations over the course of the year. The variable HighAveOfSd equals one if the average of the standard deviations is in the top 25% of the IBES population. |
| I(High Variability) | This is based upon the 1-period ahead analyst forecasts made over the 12 months before the acquisition announcement. Here, each forecast period, IBES reports the mean one-period-ahead analyst forecast. Compute the standard deviation of the mean analyst forecasts over the course of the year. The variable HighSdOfAve equals one if the standard deviation of the mean analyst forecasts is in the top 25% of the IBES population. |
| I(High Forecast Error) | A dummy variable that equals one if the firm's average absolute forecast error is in the top 25% of the IBES population. For each forecast period, the absolute forecast error is the absolute value of the difference between the earnings forecast and the actual earnings. An acquirer is a HighError firm if the average absolute forecast error over the year before the acquisition is in the top 25% of the IBES population. |
| **Governance Variables** | |
| GIM | The index of 24 ATPs used in Gompers, Ishii, and Metrick (2003). A firm's gim score is the number of these 24 ATPs that the firm has. |

| | |
|---|---|
| I(GIM$\geq$ 10) | An indicator that equals 1 if the firm has a gim score of at least 10 and has a classified board, and equals 0 otherwise. The reported models use this as the key governance variable. |
| BCF | The index of 6 ATPs used in Bebchuk, Cohen, and Ferrell (2009). A firm's bcf score is the number of these 6 ATPs the firm has. |
| I(CBOARD) | An indicator that equals 1 if the firm has a classified board. |
| I(PPILL) | An indicator that equals 1 if the firm has a classified board. |
| **Firm level variables** | |
| ln(Assets) | The natural log of the acquirer's total assets (Compustat code: at). |
| P/RIV | The firm's stock price ('P') to a measure of its true value (Residual Income Value, 'RIV'). The computation of RIV is as in Harford, Humphery-Jenner, and Powell (2012). |
| FCF/Assets | The firm's free cash flow scaled by the market value of assets. In Compustat codes, the free cash flow is (oibdp-xint - txt-capx)/(at - ceq+csho$\times$price), and the market value of assets is (at - ceq+csho$\times$price), where 'price' is the firm's share price 35 days before the announcement. |
| Debt/Assets | The long-term debt (Compustat: dltt) scaled by the market value of assets (Compustat: at - ceq+csho$\times$price, where 'price' is the firm's share price 35 days before the announcement soruced from CRSP). |
| Tobin's Q | Tobin's Q is the market value of assets (at - ceq+csho$\times$price, where 'price' is the firm's share price 35 days before the announcement) scaled by the book value of assets (Compustat: at). |
| I(Serial Acquirer) | An indicator that equals one if the acquirer has previously engaged in three or more acquisitions. This data is from SDC platinum. |
| **Deal level variables** | |
| Run-up | The RunUp variable is the firm's buy-and-hold-abnormal-return (BHAR) earned over the period 210 days to 11 days before the takeover. The abnormal returns are based on an OLS estimation of the market model computed over 200 days before this period. |
| Volume Run-up | The measure of abnormal volume on day $t$ is the turnover on day $t$ less that predicted by an OLS estimation of a turnover-based market-model (computed over a prior 200 day period). The 'Volume' variable is the cumulative abnormal volume over the window from 10-days to 30-days before the announcement. |
| TV/Assets | The transaction value divided by the bidder's market value 11 days before the announcement. |
| I(Both Tech) | 'BothTech' equals one if both the bidder and target are in high-tech industries as defined in Loughran and Ritter (2002).[28] |
| I(Diversifying) | An indicator that equals one if the bidder and target are in different Fama-French 48 industries. The results are qualitatively the same when defining diversifying acquisitions as those in which the bidder and target are in different 2-digit, 3-digit, and 4-digit SIC codes. |
| I(Cross-border) | An indicator that equals one if the bidder and target are based in different countries. |
| I(Friendly Deal) | An indicator that equals one if SDC codes the deal as neither hostile nor unsolicited. |
| I(Multi Bidders) | An indicator that equals one if there was more than one bidder. |
| Method of Payment & Target Status interactions | The indicators 'Public', 'Private', 'Subsidiary' represent an acquisition of a listed target, an unlisted target, a subsidiary. The terms 'Cash' and 'Stock' equal one if the bidder paid with some cash, or with only stock, respectively. The models control for the interactions of the variables. |
| IndustryM&A | The total value of the takeover transactions in the target's industry in the past year |
| I(CAR$<$ 0) | An indicator variable that equals one if the bidder's market value falls following the acquisition (i.e. the 5-day CAR is negative). |

[28]They define high tech firms as firms in the industries: computer hardware (SIC codes: 3571, 3572, 3575, 3577, 3578); comunications equipment (3661, 3663, 3669); electronics (3671, 3672, 3674, 3675, 3677, 3678, 3679); navigation equipment (3812); measuring and controlling devices (3823, 3825, 3826, 3827, 3829); medical instruments (3841, 3845); telephone equipment (4812, 4813); communications services (4899); and software (7371, 7372, 7373, 7374, 7375, 7378, 7379).

| **Additional Variables Used in Robustness Tests** | |
|---|---|
| I(5% Blockholder) | An indicator that equals one if the bidder has at least one institutional shareholder with a holding of at least 5%. The data is from the Thomson Reuters 13f filing database. |
| Discretionary Accruals/Total Accruals | The ratio of discretionary accruals to total accruals as calculated using the method in Section 5.7. |
| CEO Pct Ownership | The percentage of the company's stock that the CEO holds (data from Execucomp). |
| CEO Equity Based Pay/Total Pay | The proportion of equity based pay to total pay in Execucomp (in Execucomp codes: rstkgrnt/tdc1). |
| ln(CEO Age) | The natural log of the CEO's age as reported in Execucomp. |
| ln(CEO Tenure) | The natural log of one plus the CEO's tenure as reported in Execucomp. |
| I(CEO is Chair) | An indicator that equals one if the CEO is also the chairperson of the board as reported in IRRC's directors database. |
| Num Directors | The number of directors as reported in IRRC's directors database. |
| Prop Exec Directors | The proportion of directors who are employees of the company (as opposed to 'grey' directors or 'independent' directors) as reported in IRRC's directors database. |
| Prop Bad Attendance | The proportion of directors who attended fewer than 75% of the board meetings as reported in IRRC's directors database. |
| Prop Female Directors | The proportion of directors who are female as reported in IRRC's directors database. |
| Prop Execs on Audit Committee | The proportion of the audit committee who are also executive directors as reported in IRRC's directors database. |
| Prop Execs on Governance Committee | The proportion of the governance committee who are also executive directors as reported in IRRC's directors database. |
| I(Delaware Incorporation) | An indicator that equals one if the firm is incorporated in Delaware. |

Table 2: Takeovers by year

The sample comprises a total of 3935 acquisitions made between 1990 and 2005. Column 1 contains the total number of acquisitions in a given year. Column 2 (Column 3) contains the number of acquisitions that are by a software (non-software) company. Column 4 (Column 5) contains the number of acquisitions that are by a medical (non-medical) company). Column 6 contains the average of the standard deviation in analyst forecasts. Column 7 contains the standard deviation of the mean analyst forecast. Column 8 contains the average forecast error.

| Year | Total [1] | Software [2] | Non-Software [3] | Medical [4] | Non-Medical [5] | High Dispersion [6] | High Variability [7] | High Error [8] |
|---|---|---|---|---|---|---|---|---|
| 1990 | 119 | 11 | 108 | 2 | 117 | 0.090 | 0.157 | 0.338 |
| 1991 | 109 | 5 | 104 | 2 | 107 | 0.281 | 0.319 | 0.736 |
| 1992 | 121 | 12 | 109 | 3 | 118 | 0.064 | 0.101 | 0.159 |
| 1993 | 201 | 14 | 187 | 10 | 191 | 0.077 | 0.150 | 0.188 |
| 1994 | 225 | 11 | 214 | 10 | 215 | 0.063 | 0.099 | 0.161 |
| 1995 | 225 | 26 | 199 | 8 | 217 | 0.083 | 0.144 | 0.180 |
| 1996 | 232 | 17 | 215 | 11 | 221 | 0.069 | 0.121 | 0.156 |
| 1997 | 236 | 13 | 223 | 4 | 232 | 0.066 | 0.123 | 0.925 |
| 1998 | 382 | 40 | 342 | 15 | 367 | 0.079 | 0.212 | 0.331 |
| 1999 | 322 | 18 | 304 | 16 | 306 | 0.084 | 0.227 | 0.243 |
| 2000 | 279 | 31 | 248 | 8 | 271 | 0.125 | 0.330 | 0.430 |
| 2001 | 252 | 22 | 230 | 11 | 241 | 0.071 | 0.324 | 0.281 |
| 2002 | 319 | 55 | 264 | 12 | 307 | 0.058 | 0.197 | 0.338 |
| 2003 | 289 | 52 | 237 | 14 | 275 | 0.063 | 0.207 | 0.179 |
| 2004 | 336 | 40 | 296 | 18 | 318 | 0.058 | 0.169 | 0.173 |
| 2005 | 288 | 41 | 247 | 20 | 268 | 0.059 | 0.162 | 0.172 |
| Overall | 3935 | 408 | 3527 | 164 | 3771 | 0.087 | 0.190 | 0.312 |

Table 3: Summary Statistics

Table 3 contains summary statistics for the sample. All figures are means. Table 1 defines the variables. Column 1 examines all firms in the sample. Columns 2-6 examine sub-sample of firms that are HTV. The HTV definition is in the column title.

| HTV Variable | All Firms | Software | Medical | High Dispersion | High Variability | High Error |
|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Panel A: Dependent and Related Variables | | | | | | |
| CAR | 0.301 | 0.035 | -0.017 | 0.122 | -0.006 | 0.500 |
| Ind Adj Tobin's $Q_{t+3}$ | 0.155 | 0.190 | 0.300 | -0.043 | -0.100 | -0.099 |
| Ind Adj Tobin's $Q_{t+2}$ | 0.173 | 0.334 | 0.284 | -0.032 | -0.060 | -0.115 |
| Ind Adj Tobin's $Q_{t+1}$ | 0.192 | 0.406 | 0.339 | -0.060 | -0.043 | -0.067 |
| I(Tgt Tech) | 0.258 | 0.806 | 0.421 | 0.216 | 0.309 | 0.277 |
| I($R\&D_{t+2} > R\&D_{t-1}$) | 0.915 | 0.902 | 0.872 | 0.814 | 0.840 | 0.848 |
| I($R\&D_{t+1} > R\&D_{t-1}$) | 0.910 | 0.868 | 0.848 | 0.827 | 0.840 | 0.857 |
| I(Acquired) | 0.133 | 0.211 | 0.116 | 0.188 | 0.144 | 0.089 |
| Proxy Premium$^{(3)}$ | 1.139 | 1.526 | 1.178 | 1.139 | 1.267 | 1.202 |
| Proxy Premium$^{(11)}$ | 1.196 | 1.586 | 1.273 | 1.191 | 1.329 | 1.256 |
| Proxy Premium$^{(21)}$ | 1.228 | 1.662 | 1.303 | 1.214 | 1.354 | 1.293 |
| Panel B: Governance Variables | | | | | | |
| GIM | 9.418 | 8.137 | 9.220 | 9.288 | 9.164 | 8.946 |
| BCF | 2.270 | 1.730 | 2.018 | 2.161 | 2.146 | 1.929 |
| I(CBOARD) | 0.629 | 0.458 | 0.640 | 0.583 | 0.588 | 0.473 |
| I(GIM$\geq$ 10) | 0.484 | 0.270 | 0.439 | 0.487 | 0.455 | 0.473 |
| I(BCF$\geq$ 3) | 0.450 | 0.260 | 0.360 | 0.386 | 0.391 | 0.295 |
| Panel C: Control Variables | | | | | | |
| Assets (USDm) | 12154 | 2121 | 4643 | 18025 | 14777 | 25662 |
| Ind Adj Tobin's $Q_{t-1}$ | 0.426 | 1.001 | 0.886 | 0.143 | 0.345 | 0.235 |
| Tobin's $Q_{t-1}$ | 1.972 | 3.115 | 3.353 | 1.580 | 1.934 | 1.618 |
| P/RIV | 2.137 | 3.652 | 3.198 | 1.699 | 1.759 | 0.591 |
| FCF/Assets | 0.017 | 0.020 | 0.032 | -0.001 | 0.004 | -0.009 |
| Debt/Assets | 0.166 | 0.057 | 0.110 | 0.205 | 0.183 | 0.221 |
| Run-up | -0.071 | -0.098 | -0.086 | -0.073 | -0.128 | -0.073 |
| Ind M&A | 0.022 | 0.038 | 0.036 | 0.020 | 0.023 | 0.017 |
| TV/Assets | 0.133 | 0.090 | 0.113 | 0.170 | 0.148 | 0.195 |
| I(Diversifying) | 0.369 | 0.328 | 0.372 | 0.363 | 0.407 | 0.438 |
| I(Cash Paymebt) | 0.552 | 0.525 | 0.579 | 0.565 | 0.572 | 0.580 |
| I(Stock Payment) | 0.448 | 0.475 | 0.421 | 0.435 | 0.428 | 0.420 |
| I(Private Target) | 0.364 | 0.500 | 0.305 | 0.277 | 0.367 | 0.268 |
| I(Public Target) | 0.317 | 0.297 | 0.378 | 0.343 | 0.290 | 0.348 |
| I(Subsidiary Target) | 0.314 | 0.201 | 0.317 | 0.371 | 0.337 | 0.384 |
| I(Multi Bidders) | 0.020 | 0.017 | 0.037 | 0.030 | 0.027 | 0.036 |
| Volume Run-up | 0.072 | -0.105 | 0.163 | 0.057 | 0.120 | 0.120 |
| I(Cross-border) | 0.007 | 0.005 | 0.006 | 0.013 | 0.006 | 0.009 |
| I(Friendly Deal) | 0.989 | 0.988 | 0.976 | 0.983 | 0.987 | 0.991 |
| I(Serial Acquirer) | 0.200 | 0.201 | 0.116 | 0.124 | 0.160 | 0.071 |
| HHI | 0.154 | 0.106 | 0.091 | 0.144 | 0.152 | 0.120 |

Table 4: Univariate Statistics for HtV firms

Table 4 contains univariate statistics for HtV firms sorted by whether they have a GIM index of at least 10. All figures are sample means. The column title denotes the HtV measure. Panel A examines firms with GIM$\geq$ 10; Panel B examines firms with GIM$<$ 10; and, Panel C takes the difference of Panel A and Panel B. The variables under analysis are: CAR is the 5-day cumulative abnormal return. $\Delta$IaTobinQ$_{t-1}^{t+i}$ is the change in industry-adjusted tobin's Q between year $t+i$ and year $t-1$, where $t$ is the acquisition year. TgtTech indicates that the target is a high-tech target as defined in Loughran and Ritter (2002). $\mathbb{I}(\text{R\&D}_{t+i} > \text{R\&D}_{t-1})$ equals one if the R&D expenditure in year $t+i$ exceeds that in year $t-1$. Bid$\times$CAR$<0$ equals one if the initial acquirer is acquired within 4-years of the initial acquisition and the initial acquisition had a negative CAR. Superscripts ***, **, and * denote a significant different from zero in Panel A and Panel B and denote a significant difference in means in Panel C.

| | Software | Medical | High Dispersion | High Variability | High Error |
|---|---|---|---|---|---|
| **Panel A: GIM$\geq$ 10** | | | | | |
| CAR | 1.146 | 0.679* | 0.231*** | 0.295* | 1.737*** |
| $\Delta$Ind Adj Tobin's $Q_{t-1}^{t+1}$ | -0.117 | -0.541*** | -0.117*** | -0.230*** | 0.071 |
| $\Delta$Ind Adj Tobin's $Q_{t-1}^{t+2}$ | -0.290 | -0.603** | -0.092*** | -0.181** | 0.113*** |
| $\Delta$Ind Adj Tobin's $Q_{t-1}^{t+3}$ | -0.416 | -0.866** | -0.080*** | -0.210* | 0.130*** |
| $\Delta$Ind Adj Tobin's $Q_{t-1}^{t+1} \times \Delta R\&D_{t-1}^{t+1}$ | -0.169 | -0.930 | 0.007* | -0.095 | 0.007 |
| $\Delta$Ind Adj Tobin's $Q_{t-1}^{t+2} \times \Delta R\&D_{t-1}^{t+2}$ | -0.439* | -0.774* | -0.026 | 0.014* | -0.186** |
| $\Delta$Ind Adj Tobin's $Q_{t-1}^{t+3} \times \Delta R\&D_{t-1}^{t+3}$ | -1.279* | -2.291** | -0.064 | -0.064 | -0.192* |
| I(Bid For) $\times$ I(CAR$<$ 0) | 0.164*** | 0.083** | 0.080*** | 0.084*** | 0.038 |
| **Panel B: GIM$<$ 10** | | | | | |
| CAR | -0.375*** | -0.562*** | 0.018*** | -0.257*** | -0.611** |
| $\Delta$Ind Adj Tobin's $Q_{t-1}^{t+1}$ | -0.765*** | -0.436*** | -0.310*** | -0.643*** | -0.601** |
| $\Delta$Ind Adj Tobin's $Q_{t-1}^{t+2}$ | -0.975*** | -0.516*** | -0.306*** | -0.676*** | -0.648** |
| $\Delta$Ind Adj Tobin's $Q_{t-1}^{t+3}$ | -1.149*** | -0.489** | -0.295*** | -0.711*** | -0.615** |
| $\Delta$Ind Adj Tobin's $Q_{t-1}^{t+1} \times \Delta R\&D_{t-1}^{t+1}$ | -0.569*** | -0.791* | -0.497* | -0.814*** | -1.279 |
| $\Delta$Ind Adj Tobin's $Q_{t-1}^{t+2} \times \Delta R\&D_{t-1}^{t+2}$ | -0.930*** | -1.828** | -0.354* | -1.152*** | -0.794 |
| $\Delta$Ind Adj Tobin's $Q_{t-1}^{t+3} \times \Delta R\&D_{t-1}^{t+3}$ | -1.570*** | -0.987*** | 0.089 | -0.714*** | 0.879 |
| I(Bid For) $\times$ I(CAR$<$ 0) | 0.057*** | 0.065** | 0.058*** | 0.041*** | 0.000 |
| **Panel C: Difference: GIM$\geq$ 10 - GIM$<$ 10** | | | | | |
| CAR | 1.521 | 1.241** | 0.213* | 0.552* | 2.347* |
| $\Delta$Ind Adj Tobin's $Q_{t-1}^{t+1}$ | 0.648*** | 0.105 | 0.193** | 0.413*** | 0.672** |
| $\Delta$Ind Adj Tobin's $Q_{t-1}^{t+2}$ | 0.685*** | 0.087 | 0.215** | 0.495*** | 0.760** |
| $\Delta$Ind Adj Tobin's $Q_{t-1}^{t+3}$ | 0.732** | 0.377 | 0.215** | 0.501*** | 0.745** |
| $\Delta$Ind Adj Tobin's $Q_{t-1}^{t+1} \times \Delta R\&D_{t-1}^{t+1}$ | 0.400*** | 0.140*** | 0.504** | 0.720* | 1.285** |
| $\Delta$Ind Adj Tobin's $Q_{t-1}^{t+2} \times \Delta R\&D_{t-1}^{t+2}$ | 0.492** | 1.054** | 0.328* | 1.166 | 0.609** |
| $\Delta$Ind Adj Tobin's $Q_{t-1}^{t+3} \times \Delta R\&D_{t-1}^{t+3}$ | 0.292* | 1.305** | 0.154 | 0.651 | 1.071 |
| I(Bid For) $\times$ I(CAR$<$ 0) | 0.107*** | 0.018 | 0.022** | 0.043*** | 0.038 |

Table 5: Univariate statistics by governance and software classification

Table 5 contains the univariate for the 5-day market model abnormal return, sorted by the level of ATPs, for the takeover performance of high valuation difficulty versus low valuation difficulty companies. Panels A - E measure valuation difficulty based upon being in the software industry, being in the medical industry, having high forecast dispersion, having high forecast variability and having high forecast error. The numbers are sample mean 5-day CARs. Table 1 defines the variables. Numbers in brackets are p-values. Superscripts ***, **, and * denote significance at 1%, 5%, and 10%, respectively using ttests for means and non-parametric sign tests for medians.

| | All | GIM $\geq$ 10 | GIM $<$ 10 | Difference |
|---|---|---|---|---|
| All | 0.301*** | -0.036 | 0.617*** | -0.653*** |
| Software | 0.035 | 1.146* | -0.375 | 1.521 |
| Non-Software | 0.332 | -0.108*** | 0.788 | -0.896*** |
| Difference | -0.296 | 1.254** | -1.162* | |
| Medical | -0.017 | 0.679*** | -0.562 | 1.241** |
| Non-Medical | 0.315*** | -0.064 | 0.673*** | -0.737*** |
| Difference | -0.332 | 0.743** | -1.235 | |
| High Dispersion | 0.122 | 0.231* | 0.018 | 0.213* |
| Low Dispersion | 0.330*** | -0.078 | 0.712*** | -0.790*** |
| Difference | -0.208 | 0.309** | -0.694*** | |
| High Variability | -0.006 | 0.295*** | -0.257 | 0.552* |
| Low Variability | 0.381*** | -0.115 | 0.862*** | -0.977*** |
| Difference | -0.387 | 0.410** | -1.119*** | |
| High Forecast Error | 0.500 | 1.737* | -0.611 | 2.347* |
| Low Forecast Error | 0.295*** | -0.086 | 0.654*** | -0.740*** |
| Difference | 0.205 | 1.823** | -1.264 | |

Table 6: 5-day CARs Regression Results

Table 6 contains OLS estimates of Equation 6. The dependent variable is the 5-day market model cumulative abnormal return. The column title indicates the valuation difficulty dummy. Table 1 defines the variables. Numbers in brackets are p-values. Superscripts ***, **, and * denote significance at 1%, 5%, and 10%, respectively.

| HTV Variable | Software | Medical | High Dispersion | High Variability | High Forecast Error |
|---|---|---|---|---|---|
| | [1] | [2] | [3] | [4] | [5] |
| I(GIM≥ 10) | -0.758*** | -0.665** | -0.714** | -0.857*** | -0.678** |
| | [0.005] | [0.026] | [0.026] | [0.007] | [0.022] |
| I(HTV) | -0.930*** | -1.464*** | -0.442 | -0.744** | -1.261 |
| | [0.005] | [0.000] | [0.355] | [0.035] | [0.201] |
| I(GIM≥ 10) × I(HTV) | 1.858*** | 1.858*** | 0.929* | 1.316** | 3.128** |
| | [0.000] | [0.002] | [0.095] | [0.010] | [0.013] |
| ln(Assets) | -0.373*** | -0.376*** | -0.373*** | -0.368*** | -0.372*** |
| | [0.000] | [0.000] | [0.000] | [0.000] | [0.000] |
| Tobin's Q | 0.304** | 0.310** | 0.298** | 0.286** | 0.299** |
| | [0.021] | [0.016] | [0.021] | [0.031] | [0.019] |
| P/RIV | -0.080*** | -0.082*** | -0.081*** | -0.082*** | -0.082*** |
| | [0.000] | [0.000] | [0.000] | [0.000] | [0.000] |
| FCF/Assets | 5.946 | 6.535 | 6.081 | 5.727 | 6.185 |
| | [0.152] | [0.120] | [0.144] | [0.172] | [0.150] |
| Debt/Assets | 3.017*** | 3.252*** | 3.223*** | 3.099*** | 3.130*** |
| | [0.009] | [0.006] | [0.006] | [0.008] | [0.007] |
| Run-up | 0.059 | 0.057 | 0.066 | 0.012 | 0.073 |
| | [0.874] | [0.878] | [0.860] | [0.975] | [0.846] |
| Ind M&A | 2.542 | 1.901 | 1.363 | 1.848 | 1.064 |
| | [0.642] | [0.715] | [0.790] | [0.720] | [0.834] |
| TV/Assets | 0.574 | 0.546 | 0.588 | 0.589 | 0.585 |
| | [0.517] | [0.538] | [0.512] | [0.505] | [0.512] |
| I(Both Tech) | 0.514 | 0.45 | 0.504 | 0.49 | 0.482 |
| | [0.118] | [0.137] | [0.118] | [0.121] | [0.136] |
| I(Both Tech) × TV/Assets | -7.158*** | -7.307*** | -7.509*** | -7.446*** | -7.641*** |
| | [0.000] | [0.000] | [0.000] | [0.000] | [0.000] |
| I(Diversifying) | 0.01 | -0.003 | 0.002 | 0.006 | -0.003 |
| | [0.963] | [0.988] | [0.992] | [0.977] | [0.991] |
| I(Public Target) × I(Cash Payment) | 0.304 | 0.306 | 0.287 | 0.261 | 0.32 |
| | [0.447] | [0.438] | [0.469] | [0.515] | [0.414] |
| I(Public Target) × I(Stock Payment) | -2.011*** | -1.993*** | -1.998*** | -2.011*** | -2.003*** |
| | [0.000] | [0.000] | [0.000] | [0.000] | [0.000] |
| I(Private Target) × I(Cash Payment) | 0.387 | 0.373 | 0.397 | 0.37 | 0.388 |
| | [0.187] | [0.201] | [0.175] | [0.206] | [0.190] |
| I(Private Target) × I(Stock Payment) | 0.238 | 0.222 | 0.198 | 0.217 | 0.206 |
| | [0.647] | [0.657] | [0.692] | [0.662] | [0.678] |
| I(Subsidiary Target) × I(Cash Payment) | 1.071*** | 1.073*** | 1.085*** | 1.072*** | 1.092*** |
| | [0.002] | [0.002] | [0.001] | [0.002] | [0.001] |
| I(Multi Bidders) | -1.578** | -1.582** | -1.595** | -1.610** | -1.551** |
| | [0.013] | [0.013] | [0.012] | [0.011] | [0.015] |
| Volume Run-up | 0.159 | 0.165 | 0.157 | 0.161 | 0.161 |
| | [0.156] | [0.140] | [0.153] | [0.142] | [0.144] |
| I(Cross-border) | 2.879** | 2.834** | 2.944** | 2.863** | 2.922** |
| | [0.023] | [0.024] | [0.023] | [0.024] | [0.020] |
| I(Friendly Deal) | -2.617*** | -2.565*** | -2.471*** | -2.522*** | -2.507*** |
| | [0.002] | [0.002] | [0.003] | [0.002] | [0.003] |
| I(Serial Acquirer) | 0.201 | 0.169 | 0.192 | 0.175 | 0.184 |
| | [0.428] | [0.486] | [0.436] | [0.480] | [0.450] |
| Constant | 4.973*** | 4.920*** | 4.784*** | 4.971*** | 4.835*** |
| | [0.000] | [0.000] | [0.000] | [0.000] | [0.000] |
| Observations | 3,935 | 3,935 | 3,935 | 3,935 | 3,935 |
| R-squared | 6.60% | 6.50% | 6.50% | 6.60% | 6.60% |

Table 7: Industry Adjusted Tobin's Q

Table 7 examines the relation between governance, risk and post-takeover performance, as proxied by Industry-Adjusted Tobin's Q. It contains OLS estimates of Equation (7). The dependent variable is the industry adjusted Tobin's Q one year after the acquisition. The column title contains the valuation difficulty variable. Table 1 defines the variables. Numbers in brackets are p-values. Superscripts ***, **, and * denote significance at 1%, 5%, and 10%, respectively.

| HTV Variable | Software [1] | Medical [2] | High Dispersion [3] | High Variability [4] | High Forecast Error [5] |
|---|---|---|---|---|---|
| Ind Adj Tobin's Q Before | 0.198*** | 0.195*** | 0.196*** | 0.196*** | 0.197*** |
| | [0.003] | [0.003] | [0.003] | [0.004] | [0.003] |
| I(GIM≥ 10) | -0.091 | -0.109*** | -0.08 | -0.109 | -0.074 |
| | [0.122] | [0.009] | [0.195] | [0.100] | [0.176] |
| I(HTV) | -0.175** | -0.374** | -0.194** | -0.292*** | -0.158 |
| | [0.014] | [0.028] | [0.012] | [0.000] | [0.114] |
| I(GIM≥ 10) × I(HTV) | 0.200*** | 0.876*** | 0.052* | 0.168* | 0.096** |
| | [0.008] | [0.000] | [0.062] | [0.077] | [0.046] |
| ln(Assets) | -0.019 | -0.016 | -0.012 | -0.012 | -0.015 |
| | [0.232] | [0.314] | [0.450] | [0.447] | [0.313] |
| P/RIV | 0.007 | 0.006 | 0.006 | 0.005 | 0.006 |
| | [0.189] | [0.244] | [0.249] | [0.326] | [0.235] |
| FCF/Assets | 0.930** | 0.989** | 0.668* | 0.545 | 0.886** |
| | [0.033] | [0.016] | [0.076] | [0.148] | [0.034] |
| Debt/Assets | -1.130*** | -1.070*** | -1.067*** | -1.089*** | -1.076*** |
| | [0.000] | [0.000] | [0.000] | [0.000] | [0.000] |
| TV/Assets | -0.199*** | -0.193*** | -0.184*** | -0.191*** | -0.189*** |
| | [0.003] | [0.002] | [0.003] | [0.004] | [0.003] |
| I(Both Tech) | -0.013 | -0.028 | -0.04 | -0.038 | -0.023 |
| | [0.778] | [0.494] | [0.401] | [0.417] | [0.609] |
| I(Both Tech) × TV/Assets | -0.265 | -0.333* | -0.315 | -0.275 | -0.361* |
| | [0.178] | [0.086] | [0.100] | [0.136] | [0.068] |
| I(Diversifying | -0.009 | -0.008 | -0.009 | 0 | -0.007 |
| | [0.846] | [0.854] | [0.847] | [0.994] | [0.871] |
| I(Cross-border) | -0.175 | -0.207 | -0.149 | -0.181 | -0.169 |
| | [0.163] | [0.122] | [0.220] | [0.162] | [0.173] |
| I(Serial Acquirer) | 0.06 | 0.056 | 0.046 | 0.051 | 0.054 |
| | [0.304] | [0.318] | [0.408] | [0.366] | [0.336] |
| Constant | 0.420** | 0.388* | 0.376* | 0.425** | 0.372* |
| | [0.048] | [0.058] | [0.066] | [0.038] | [0.065] |
| Observations | 3,709 | 3,709 | 3,709 | 3,709 | 3,709 |
| R-squared | 21.80% | 22.30% | 21.90% | 22.30% | 21.70% |

Table 8: Valuation Creating Innovation

Table 8 examines whether ATPs enable HtV firms to make takeovers that both increase innovation and firm value. The panel heading states the dependent variable in each model. The control variables are suppressed for brevity. They are as in Table 6, except the models omit 'BothTech' and 'Tech×RelSize' to avoid endogeneity. Table 1 defines the variables. Numbers in brackets are p-values. Superscripts ***, **, and * denote significance at 1%, 5%, and 10%, respectively.

| | Software | Medical | High Dispersion | High Variability | High Error |
|---|---|---|---|---|---|
| Panel A: Dependent Variable: I(CAR≥ 0) × I(Target Tech) | | | | | |
| GIM≥ 10 | -0.444** | -0.403** | -0.435** | -0.425*** | -0.425** |
| | [0.037] | [0.019] | [0.016] | [0.004] | [0.012] |
| HtV | 0.652** | -0.702 | -0.122 | 0.254 | 0.098 |
| | [0.027] | [0.107] | [0.523] | [0.198] | [0.819] |
| HtV × GIM≥ 10 | 0.551** | 0.476** | 0.474* | 0.234 | 1.218** |
| | [0.012] | [0.035] | [0.066] | [0.350] | [0.011] |
| Controls | Yes | Yes | Yes | Yes | Yes |
| Constant | -1.781 | -1.132 | -1.171 | -1.221 | -1.244 |
| | [0.119] | [0.321] | [0.310] | [0.287] | [0.267] |
| Observations | 3935 | 3935 | 3935 | 3935 | 3935 |
| Pseudo-R2 | 20.20% | 19.20% | 19.00% | 19.20% | 19.20% |
| Panel B: Dependent Variable: I(CAR≥ 0) × I(R&D$_{t+1}$ > R&D$_{t-1}$) | | | | | |
| I(GIM≥ 10) | -0.237*** | -0.191** | -0.236** | -0.287*** | -0.208** |
| | [0.001] | [0.031] | [0.014] | [0.001] | [0.014] |
| I(HTV) | -0.293*** | -0.473*** | -0.394** | -0.351*** | -0.506* |
| | [0.000] | [0.000] | [0.016] | [0.008] | [0.068] |
| I(HTV) × I(GIM≥ 10) | 0.568*** | 0.248 | 0.380* | 0.505*** | 0.880*** |
| | [0.000] | [0.169] | [0.055] | [0.005] | [0.003] |
| Controls | Yes | Yes | Yes | Yes | Yes |
| Constant | 0.866** | 0.823** | 0.818** | 0.883** | 0.806** |
| | [0.035] | [0.039] | [0.041] | [0.033] | [0.045] |
| Observations | 3935 | 3935 | 3935 | 3935 | 3935 |
| Pseudo-R2 | 3.59% | 3.56% | 3.62% | 3.67% | 3.56% |
| Panel C: Dependent Variable: I(CAR≥ 0) × I(R&D$_{t+2}$ > R&D$_{t-1}$) | | | | | |
| I(GIM≥ 10) | -0.223*** | -0.192** | -0.211** | -0.257*** | -0.194** |
| | [0.001] | [0.024] | [0.022] | [0.003] | [0.018] |
| I(HTV) | -0.254*** | -0.461*** | -0.349** | -0.280** | -0.423* |
| | [0.001] | [0.000] | [0.022] | [0.026] | [0.094] |
| I(HTV) × I(GIM≥ 10) | 0.555*** | 0.502*** | 0.28 | 0.417** | 0.778** |
| | [0.000] | [0.003] | [0.181] | [0.023] | [0.019] |
| Controls | Yes | Yes | Yes | Yes | Yes |
| Constant | 1.071*** | 1.052*** | 1.039*** | 1.085*** | 1.024*** |
| | [0.005] | [0.004] | [0.004] | [0.004] | [0.005] |
| Observations | 3935 | 3935 | 3935 | 3935 | 3935 |
| Pseudo-R2 | 3.63% | 3.60% | 3.64% | 3.65% | 3.59% |
| Panel D: Dependent Variable: I(CAR≥ 0); Sample restricted to acquisitions of high-tech targets | | | | | |
| I(GIM≥ 10) | -0.317** | -0.159 | -0.237 | -0.274 | -0.14 |
| | [0.035] | [0.398] | [0.215] | [0.165] | [0.379] |
| I(HTV) | -0.255*** | -0.726** | -0.456* | -0.15 | 0.286 |
| | [0.007] | [0.048] | [0.060] | [0.232] | [0.599] |
| I(HTV) × I(GIM≥ 10) | 0.678*** | 0.504* | 0.999*** | 0.691** | 0.12 |
| | [0.000] | [0.051] | [0.002] | [0.030] | [0.896] |
| Controls | Yes | Yes | Yes | Yes | Yes |
| Observations | 1016 | 1016 | 1016 | 1016 | 1016 |
| Pseudo-R2 | 6.08% | 6.04% | 6.12% | 6.06% | 5.80% |

Table 9: Takeover Likelihood Predictions

Table 9 contains logit estimates of Equation 11. The dependent variable is a dummy that equals one if the acquirer receives a takeover bid within four years of the initial acquisition. The title of each column indicates the valuation difficulty variable. Table 1 defines the variables. Numbers in brackets are p-values. Superscripts ***, **, and * denote significance at 1%, 5%, and 10%, respectively.

| | Software<br>(1) | Medical<br>(2) | High Dispersion<br>(3) | High Variability<br>(4) | High Error<br>(5) |
|---|---|---|---|---|---|
| I(CAR< 0) | -0.444** | -0.457*** | -0.267 | -0.179 | -0.397*** |
| | [0.013] | [0.003] | [0.113] | [0.346] | [0.010] |
| I(GIM≥ 10) | 0.042 | 0.242 | 0.401* | 0.367* | 0.263 |
| | [0.804] | [0.236] | [0.084] | [0.063] | [0.173] |
| I(HTV) | 0.13 | -0.402 | 1.270*** | 0.823*** | 0.286 |
| | [0.454] | [0.273] | [0.000] | [0.000] | [0.594] |
| I(GIM≥ 10) × I(CAR< 0) | -0.07 | -0.113 | -0.337 | -0.502** | -0.162 |
| | [0.765] | [0.583] | [0.195] | [0.017] | [0.417] |
| I(GIM≥ 10) × I(HTV) | -1.619*** | -1.530* | -1.013** | -0.726** | -1.321 |
| | [0.000] | [0.090] | [0.038] | [0.014] | [0.146] |
| I(CAR< 0) × I(HTV) | 0.033 | 0.367 | -1.092*** | -1.226*** | -14.632*** |
| | [0.846] | [0.280] | [0.004] | [0.002] | [0.000] |
| I(CAR< 0) × I(GIM≥ 10) × I(HTV) | 0.153 | 1.899 | 1.623*** | 1.982*** | 16.650*** |
| | [0.525] | [0.198] | [0.009] | [0.000] | [0.000] |
| ln(Assets) | -0.067 | -0.113 | -0.127 | -0.114 | -0.111 |
| | [0.489] | [0.259] | [0.216] | [0.277] | [0.272] |
| HHI | -1.663* | -2.039** | -1.997** | -2.021** | -1.960** |
| | [0.089] | [0.027] | [0.041] | [0.031] | [0.029] |
| Tobin's Q | -0.266* | -0.205 | -0.19 | -0.207 | -0.22 |
| | [0.079] | [0.212] | [0.223] | [0.190] | [0.180] |
| P/RIV | 0.004 | 0.005 | 0.005 | 0.005 | 0.004 |
| | [0.332] | [0.258] | [0.300] | [0.263] | [0.318] |
| FCF/Assets | 6.800*** | 7.123*** | 8.084*** | 7.621*** | 6.886*** |
| | [0.000] | [0.000] | [0.000] | [0.000] | [0.000] |
| Debt/Assets | -0.869 | -1.062 | -1.163 | -1.105 | -1.086 |
| | [0.365] | [0.204] | [0.173] | [0.185] | [0.204] |
| I(Serial Acquirer) | -0.655*** | -0.615*** | -0.567*** | -0.573*** | -0.617*** |
| | [0.000] | [0.000] | [0.000] | [0.000] | [0.000] |
| Constant | -1.036 | -0.622 | -0.786 | -0.837 | -0.641 |
| | [0.127] | [0.295] | [0.220] | [0.148] | [0.268] |
| Observations | 3935 | 3935 | 3935 | 3935 | 3935 |
| Pseudo R-squared | 8.48% | 7.12% | 7.98% | 7.73% | 7.21% |

Table 10: Takeover Premium Regressions

Table 10 examines the market's reaction to premiums paid by HtV firms that have more ATPs. The dependent variable is the 5-day CAR based on an OLS estimation of the market model. All models include the same controls as in Section 5.2 (suppressed for brevity). All models use the 'Industry Average' premium (similarly to Harford, Humphery-Jenner, and Powell, 2012; Officer, 2007). The column title contains HtV variable. Table 1 defines the variables. Numbers in brackets are p-values. Superscripts ***, **, and * denote significance at 1%, 5%, and 10%, respectively.

| | Software | Medical | High Dispersion | High Variability | High Forecast Error |
|---|---|---|---|---|---|
| **Panel A: 3-Day Premium** | | | | | |
| I(GIM≥ 10) | -0.616* | -0.581 | -0.541 | -0.548 | -0.549 |
| | [0.094] | [0.134] | [0.167] | [0.152] | [0.158] |
| Proxy Premium$^{(3)}$ | 0.214 | 0.205 | 0.238 | 0.252 | 0.22 |
| | [0.224] | [0.197] | [0.157] | [0.118] | [0.174] |
| I(HTV) | -1.118*** | -0.205 | -0.412 | -0.302 | 0.628 |
| | [0.002] | [0.851] | [0.257] | [0.384] | [0.510] |
| I(HTV) × Proxy Premium$^{(3)}$ | 0.21 | -0.641 | -0.197 | -0.309 | -0.665 |
| | [0.456] | [0.331] | [0.290] | [0.336] | [0.194] |
| I(GIM≥ 10) × Proxy Premium$^{(3)}$ | -0.149 | -0.086 | -0.215 | -0.256 | -0.124 |
| | [0.513] | [0.670] | [0.322] | [0.145] | [0.537] |
| I(HTV) × I(GIM≥ 10) × Proxy Premium$^{(3)}$ | 0.860*** | 1.050*** | 0.840** | 0.767** | 1.263 |
| | [0.000] | [0.000] | [0.021] | [0.022] | [0.157] |
| Controls | Yes | Yes | Yes | Yes | Yes |
| Observations | 3,169 | 3,169 | 3,169 | 3,169 | 3,169 |
| R-squared | 6.60% | 6.50% | 6.60% | 6.60% | 6.50% |
| **Panel B: 11-Day Premium** | | | | | |
| I(GIM≥ 10) | -0.594 | -0.551 | -0.512 | -0.523 | -0.521 |
| | [0.103] | [0.154] | [0.190] | [0.172] | [0.179] |
| Proxy Premium$^{(11)}$ | 0.227 | 0.222 | 0.252 | 0.264* | 0.236 |
| | [0.168] | [0.137] | [0.114] | [0.081] | [0.125] |
| I(HTV) | -1.129*** | -0.189 | -0.433 | -0.332 | 0.628 |
| | [0.002] | [0.870] | [0.229] | [0.335] | [0.510] |
| I(HTV) × Proxy Premium$^{(11)}$ | 0.206 | -0.595 | -0.189 | -0.278 | -0.631 |
| | [0.432] | [0.367] | [0.295] | [0.364] | [0.182] |
| I(GIM≥ 10) × ProxyPremium$^{(11)}$ | -0.161 | -0.107 | -0.235 | -0.274 | -0.142 |
| | [0.450] | [0.577] | [0.250] | [0.100] | [0.454] |
| I(HTV) × I(GIM≥ 10) × Proxy Premium$^{(11)}$ | 0.839*** | 0.925*** | 0.844** | 0.772** | 1.201 |
| | [0.000] | [0.000] | [0.013] | [0.013] | [0.165] |
| Controls | Yes | Yes | Yes | Yes | Yes |
| Observations | 3,169 | 3,169 | 3,169 | 3,169 | 3,169 |
| R-squared | 6.60% | 6.50% | 6.60% | 6.60% | 6.50% |
| **Panel C: 21-Day Premium** | | | | | |
| I(GIM≥ 10) | -0.576 | -0.534 | -0.501 | -0.511 | -0.512 |
| | [0.115] | [0.169] | [0.203] | [0.185] | [0.192] |
| Proxy Premium$^{(21)}$ | 0.213 | 0.211 | 0.228 | 0.247* | 0.22 |
| | [0.193] | [0.153] | [0.149] | [0.096] | [0.146] |
| I(HTV) | -1.310*** | -0.239 | -0.478 | -0.356 | 0.475 |
| | [0.000] | [0.837] | [0.186] | [0.296] | [0.623] |
| I(HTV) × Proxy Premium$^{(21)}$ | 0.31 | -0.551 | -0.141 | -0.253 | -0.55 |
| | [0.256] | [0.399] | [0.421] | [0.387] | [0.233] |
| I(GIM≥ 10) × Proxy Premium$^{(21)}$ | -0.184 | -0.13 | -0.253 | -0.298* | -0.162 |
| | [0.390] | [0.489] | [0.204] | [0.074] | [0.386] |
| I(HTV) × I(GIM≥ 10) × Proxy Premium$^{(21)}$ | 0.806*** | 0.947*** | 0.868*** | 0.814*** | 1.34 |
| | [0.000] | [0.000] | [0.009] | [0.007] | [0.110] |
| Controls | Yes | Yes | Yes | Yes | Yes |
| Observations | 3,177 | 3,177 | 3,177 | 3,177 | 3,177 |
| R-squared | 6.50% | 6.50% | 6.50% | 6.60% | 6.50% |

Table 11:

Table 11 contains results from the two-step regression processes. Columns 1-5 use an instrumental variable process in which I replace the dictatorship dummy with the predicted dictatorship dummy. Section 5.7 describes the procedure. The instrumental variable is the average GIM index in the firm's home state and year. Columns 6-10 use a two step procedure that replaces the dictatorship dummy with the residual from a first stage regression that predicts the level of ATPs. Numbers in brackets are p-values. Superscripts ***, **, and * denote significance at 1%, 5%, and 10%, respectively.

| HTV Variable | Software (1) | Medical (2) | High Dispersion (3) | High Variability (4) | High Error (5) | Software (6) | Medical (7) | High Dispersion (8) | High Variability (9) | High Error (10) |
|---|---|---|---|---|---|---|---|---|---|---|
| Predicted I(GIM≥ 10) | -0.68 | -0.58 | -0.688 | -0.856 | -0.527 | | | | | |
| | [0.126] | [0.226] | [0.193] | [0.111] | [0.269] | | | | | |
| Predicted I(≥ 10) × I(HTV) | 2.417*** | 2.753*** | 1.616* | 1.859** | 1.363 | | | | | |
| | [0.000] | [0.000] | [0.089] | [0.048] | [0.457] | | | | | |
| Residual I(GIM≥10) | | | | | | -0.203*** | -0.178*** | -0.180*** | -0.196** | -0.179*** |
| | | | | | | [0.001] | [0.006] | [0.007] | [0.011] | [0.005] |
| Residual I(GIM≥10)*I(HTV) | | | | | | 0.349*** | 0.243*** | 0.092* | 0.119** | 0.770** |
| | | | | | | [0.000] | [0.005] | [0.054] | [0.032] | [0.023] |
| I(HTV) | -1.137*** | -2.077*** | -0.792 | -1.014* | -0.481 | -0.76 | -0.707 | 0.242 | 0.367 | 1.098 |
| | [0.004] | [0.000] | [0.321] | [0.083] | [0.716] | [0.121] | [0.261] | [0.592] | [0.291] | [0.296] |
| ln(Assets) | -0.378*** | -0.370*** | -0.375*** | -0.371*** | -0.371*** | -0.409*** | -0.401*** | -0.402*** | -0.403*** | -0.391*** |
| | [0.000] | [0.000] | [0.000] | [0.000] | [0.000] | [0.000] | [0.000] | [0.000] | [0.000] | [0.000] |
| Tobin's Q | 0.328** | 0.332** | 0.311** | 0.300** | 0.318** | 0.404*** | 0.424*** | 0.409*** | 0.411*** | 0.410*** |
| | [0.015] | [0.012] | [0.019] | [0.031] | [0.018] | [0.003] | [0.001] | [0.002] | [0.002] | [0.002] |
| P/RIV | -0.081*** | -0.081*** | -0.080*** | -0.081*** | -0.081*** | -0.086*** | -0.085*** | -0.086*** | -0.086*** | -0.090*** |
| | [0.000] | [0.000] | [0.000] | [0.000] | [0.000] | [0.001] | [0.000] | [0.001] | [0.001] | [0.000] |
| FCF/Assets | 5.028 | 5.418 | 4.742 | 4.462 | 5.064 | 11.846** | 12.600** | 12.636** | 12.852** | 12.133** |
| | [0.195] | [0.166] | [0.226] | [0.262] | [0.200] | [0.020] | [0.015] | [0.016] | [0.017] | [0.018] |
| Debt/Assets | 3.282*** | 3.513*** | 3.480*** | 3.396*** | 3.463*** | 4.743*** | 5.176*** | 5.081*** | 5.123*** | 5.034*** |
| | [0.004] | [0.003] | [0.003] | [0.004] | [0.003] | [0.000] | [0.000] | [0.000] | [0.000] | [0.000] |
| Run-up | -0.007 | -0.018 | -0.02 | -0.073 | -0.017 | -0.497 | -0.468 | -0.45 | -0.456 | -0.445 |
| | [0.984] | [0.959] | [0.956] | [0.840] | [0.961] | [0.309] | [0.348] | [0.365] | [0.347] | [0.368] |
| Industry M&A | 3.587 | 2.823 | 2.576 | 2.815 | 2.497 | -3.192 | -5.002 | -5.689 | -5.652 | -5.429 |
| | [0.512] | [0.595] | [0.613] | [0.582] | [0.625] | [0.668] | [0.484] | [0.420] | [0.426] | [0.443] |
| TV/Assets | 0.5 | 0.497 | 0.518 | 0.511 | 0.517 | -2.490** | -2.465** | -2.470** | -2.455** | -2.436** |
| | [0.549] | [0.549] | [0.535] | [0.538] | [0.536] | [0.033] | [0.035] | [0.036] | [0.036] | [0.038] |
| I(Both Tech) | 0.577* | 0.497 | 0.554* | 0.547* | 0.541* | 0.755 | 0.654 | 0.726 | 0.729 | 0.685 |
| | [0.085] | [0.103] | [0.088] | [0.087] | [0.097] | [0.113] | [0.132] | [0.123] | [0.104] | [0.134] |
| I(Both Tech) × TV/Assets | -7.340*** | -7.517*** | -7.539*** | -7.423*** | -7.573*** | -7.320* | -7.912** | -8.057** | -8.058** | -7.967** |
| | [0.000] | [0.000] | [0.000] | [0.000] | [0.000] | [0.061] | [0.049] | [0.041] | [0.042] | [0.045] |
| I(Diversifying) | -0.048 | -0.042 | -0.042 | -0.035 | -0.038 | 0.101 | 0.092 | 0.111 | 0.092 | 0.125 |
| | [0.826] | [0.847] | [0.846] | [0.872] | [0.863] | [0.731] | [0.757] | [0.709] | [0.759] | [0.677] |
| I(Public Target) × I(Cash Payment) | 0.293 | 0.276 | 0.28 | 0.272 | 0.28 | 0.597 | 0.558 | 0.549 | 0.559 | 0.543 |
| | [0.474] | [0.495] | [0.489] | [0.503] | [0.485] | [0.273] | [0.300] | [0.308] | [0.294] | [0.316] |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| I(Public Target) × I(Stock Payment) | -2.151*** | -2.118*** | -2.123*** | -2.122*** | -2.135*** | -2.088*** | -2.069*** | -2.061*** | -2.058*** | -2.065*** |
| | [0.000] | [0.000] | [0.000] | [0.000] | [0.000] | [0.000] | [0.000] | [0.000] | [0.001] | [0.000] |
| I(Private Target) × I(Cash Payment) | 0.301 | 0.314 | 0.323 | 0.295 | 0.317 | 0.118 | 0.109 | 0.122 | 0.115 | 0.133 |
| | [0.316] | [0.294] | [0.282] | [0.326] | [0.291] | [0.780] | [0.797] | [0.776] | [0.786] | [0.758] |
| I(Private Target) × I(Stock Payment) | 0.133 | 0.159 | 0.136 | 0.135 | 0.153 | 0.204 | 0.171 | 0.178 | 0.196 | 0.178 |
| | [0.800] | [0.765] | [0.799] | [0.799] | [0.773] | [0.770] | [0.802] | [0.793] | [0.771] | [0.794] |
| I(Subsidiary Target) × I(Cash Payment) | 0.961*** | 0.986*** | 0.987*** | 0.976*** | 0.986*** | 1.510*** | 1.538*** | 1.537*** | 1.540*** | 1.557*** |
| | [0.005] | [0.005] | [0.004] | [0.005] | [0.004] | [0.004] | [0.004] | [0.004] | [0.003] | [0.004] |
| I(Multi Bidders) | -1.654** | -1.633** | -1.715*** | -1.718*** | -1.669** | -1.202* | -1.147* | -1.161* | -1.223* | -1.109 |
| | [0.011] | [0.012] | [0.009] | [0.008] | [0.010] | [0.092] | [0.094] | [0.090] | [0.069] | [0.106] |
| Volume Run-up | 0.127 | 0.135 | 0.126 | 0.132 | 0.13 | 0.125 | 0.134 | 0.127 | 0.127 | 0.128 |
| | [0.260] | [0.226] | [0.252] | [0.228] | [0.243] | [0.295] | [0.269] | [0.291] | [0.291] | [0.283] |
| I(Cross-border) | 3.270** | 3.206** | 3.307** | 3.239** | 3.256** | 3.27 | 3.452 | 3.519 | 3.564 | 3.498 |
| | [0.019] | [0.022] | [0.021] | [0.023] | [0.020] | [0.386] | [0.364] | [0.354] | [0.358] | [0.360] |
| I(Friendly Deal) | -2.533*** | -2.580*** | -2.512*** | -2.534*** | -2.557*** | -1.52 | -1.417 | -1.338 | -1.427 | -1.386 |
| | [0.002] | [0.002] | [0.003] | [0.002] | [0.002] | [0.113] | [0.119] | [0.135] | [0.116] | [0.131] |
| I(Serial Acquirer) | 0.177 | 0.151 | 0.191 | 0.168 | 0.175 | 0.368 | 0.333 | 0.343 | 0.337 | 0.338 |
| | [0.466] | [0.521] | [0.425] | [0.483] | [0.470] | [0.374] | [0.405] | [0.394] | [0.394] | [0.398] |
| Constant | 4.864*** | 4.816*** | 4.795*** | 4.942*** | 4.726*** | 3.438** | 3.267** | 3.120** | 3.163** | 3.138** |
| | [0.000] | [0.000] | [0.000] | [0.000] | [0.000] | [0.021] | [0.019] | [0.024] | [0.026] | [0.026] |
| Observations | 3,871 | 3,871 | 3,871 | 3,871 | 3,871 | 2,498 | 2,498 | 2,498 | 2,498 | 2,498 |
| R-squared | 6.50% | 6.50% | 6.40% | 6.50% | 6.40% | 8.70% | 8.50% | 8.50% | 8.50% | 8.50% |

Table 12: Controlling for Additional Governance Variables

Table 12 contains OLS regressions that control for additional governance variables The dependent variable is the 5-day market model cumulative abnormal return. The column title indicates the valuation difficulty dummy. Table 1 defines the variables. Numbers in brackets are p-values. Superscripts ***, **, and * denote significance at 1%, 5%, and 10%, respectively.

| HTV Variable | Software<br>[1] | Medical<br>[2] | High Dispersion<br>[3] | High Variability<br>[4] | High Forecast Error<br>[5] |
|---|---|---|---|---|---|
| I(GIM≥ 10) | -1.102*** | -1.165*** | -1.170*** | -1.237** | -1.104*** |
| | [0.009] | [0.004] | [0.008] | [0.011] | [0.006] |
| I(HTV) | -1.198** | -1.802*** | -0.49 | -0.169 | -0.787 |
| | [0.019] | [0.000] | [0.594] | [0.821] | [0.588] |
| I(GIM≥ 10) × I(HTV) | 0.835** | 2.080*** | 1.265** | 1.034 | 5.693** |
| | [0.046] | [0.001] | [0.023] | [0.292] | [0.030] |
| I(5% Blockholder) | -0.573 | -0.495 | -0.61 | -0.586 | -0.518 |
| | [0.740] | [0.778] | [0.725] | [0.738] | [0.767] |
| Discretionary Accruals/Total Accruals | -0.059 | -0.061 | -0.054 | -0.053 | -0.05 |
| | [0.317] | [0.296] | [0.354] | [0.356] | [0.373] |
| CEO Pct Ownership | 10.242 | 3.503 | -2.645 | -0.663 | 0.703 |
| | [0.868] | [0.953] | [0.964] | [0.991] | [0.991] |
| CEO Equity Based Pay/Total Pay | 1.559 | 1.622 | 1.55 | 1.598 | 1.615 |
| | [0.132] | [0.121] | [0.142] | [0.130] | [0.124] |
| ln(CEO Age) | 0.395 | 0.595 | 0.491 | 0.513 | 0.435 |
| | [0.758] | [0.626] | [0.701] | [0.686] | [0.736] |
| ln(CEO Tenure) | -0.056 | -0.059 | -0.066 | -0.074 | -0.063 |
| | [0.624] | [0.605] | [0.555] | [0.517] | [0.582] |
| I(CEO is Chair) | 0.185 | 0.182 | 0.188 | 0.177 | 0.191 |
| | [0.297] | [0.304] | [0.287] | [0.317] | [0.285] |
| Num Directors | -0.063 | -0.048 | -0.05 | -0.048 | -0.047 |
| | [0.351] | [0.483] | [0.448] | [0.459] | [0.489] |
| Prop Exec Directors | 0.34 | 0.321 | 0.562 | 0.5 | 0.539 |
| | [0.861] | [0.872] | [0.780] | [0.800] | [0.788] |
| Prop Bad Attendance | -0.351 | -1.03 | -0.885 | -0.832 | -0.842 |
| | [0.923] | [0.781] | [0.812] | [0.823] | [0.823] |
| Prop Female Directors | -2.985 | -2.817 | -2.638 | -2.795 | -2.783 |
| | [0.146] | [0.174] | [0.198] | [0.182] | [0.177] |
| Prop Execs on Audit Committee | -2.03 | -1.793 | -2.27 | -3.265 | -1.963 |
| | [0.889] | [0.902] | [0.878] | [0.825] | [0.893] |
| Prop Execs on Governance Committee | 6.815 | 8.304 | 7.662 | 7.273 | 6.95 |
| | [0.348] | [0.260] | [0.300] | [0.326] | [0.342] |
| I(Delaware Incorporation) | -0.001 | -0.042 | -0.016 | 0.004 | -0.057 |
| | [0.997] | [0.910] | [0.968] | [0.992] | [0.882] |
| ln(Assets) | -0.426*** | -0.433*** | -0.427*** | -0.429*** | -0.412*** |
| | [0.002] | [0.002] | [0.002] | [0.002] | [0.002] |
| Tobin's Q | 0.533*** | 0.538*** | 0.521*** | 0.531*** | 0.522*** |
| | [0.005] | [0.008] | [0.006] | [0.006] | [0.006] |
| P/RIV | -0.095*** | -0.097*** | -0.096*** | -0.097*** | -0.097*** |
| | [0.001] | [0.000] | [0.000] | [0.000] | [0.000] |
| FCF/Assets | 14.445* | 15.267** | 14.310* | 14.908* | 15.184** |
| | [0.057] | [0.045] | [0.067] | [0.052] | [0.045] |
| Debt/Assets | 7.055*** | 7.475*** | 7.344*** | 7.341*** | 7.171*** |
| | [0.000] | [0.000] | [0.000] | [0.000] | [0.000] |
| Run-up | -0.208 | -0.235 | -0.225 | -0.24 | -0.183 |
| | [0.506] | [0.452] | [0.471] | [0.463] | [0.560] |
| Ind M&A | -6.182 | -7.155 | -7.962 | -7.796 | -8.519 |
| | [0.457] | [0.348] | [0.304] | [0.311] | [0.271] |
| TV/Assets | -2.210** | -2.194** | -2.119* | -2.110* | -2.103* |
| | [0.042] | [0.041] | [0.055] | [0.051] | [0.053] |
| I(Both Tech) | 0.855* | 0.715* | 0.819* | 0.820* | 0.784* |
| | [0.061] | [0.083] | [0.071] | [0.063] | [0.073] |
| I(Both Tech) × TV/Assets | -7.124** | -7.534** | -7.766** | -7.884** | -7.964** |
| | [0.042] | [0.046] | [0.033] | [0.031] | [0.024] |
| I(Diversifying) | 0.293 | 0.306 | 0.351 | 0.338 | 0.357 |
| | [0.409] | [0.395] | [0.331] | [0.345] | [0.318] |
| I(Public Target) × I(Cash Payment) | 1.148** | 1.127** | 1.081** | 1.110** | 1.133** |

| | | | | | |
|---|---|---|---|---|---|
| | [0.034] | [0.035] | [0.042] | [0.038] | [0.038] |
| I(Public Target) × I(Stock Payment) | -2.188*** | -2.123*** | -2.153*** | -2.145*** | -2.119*** |
| | [0.000] | [0.000] | [0.000] | [0.000] | [0.000] |
| I(Private Target) × I(Cash Payment) | 0.826* | 0.826* | 0.843* | 0.821 | 0.879* |
| | [0.097] | [0.098] | [0.092] | [0.101] | [0.087] |
| I(Private Target) × I(Stock Payment) | 0.365 | 0.425 | 0.324 | 0.343 | 0.304 |
| | [0.720] | [0.673] | [0.755] | [0.731] | [0.761] |
| I(Subsidiary Target) × I(Cash Payment) | 1.708*** | 1.741*** | 1.729*** | 1.742*** | 1.771*** |
| | [0.004] | [0.004] | [0.004] | [0.005] | [0.004] |
| I(Multi Bidders) | -0.105 | -0.036 | -0.025 | -0.133 | -0.006 |
| | [0.913] | [0.970] | [0.979] | [0.890] | [0.995] |
| Volume Run-up | 0.135 | 0.151 | 0.134 | 0.137 | 0.128 |
| | [0.166] | [0.125] | [0.151] | [0.152] | [0.167] |
| I(Friendly Deal) | -1.853 | -1.694 | -1.621 | -1.795 | -1.711 |
| | [0.131] | [0.167] | [0.169] | [0.137] | [0.161] |
| I(Serial Acquirer) | 0.189 | 0.152 | 0.187 | 0.173 | 0.184 |
| | [0.616] | [0.682] | [0.613] | [0.641] | [0.618] |
| Constant | 2.765 | 1.68 | 1.966 | 2.013 | 2.028 |
| | [0.615] | [0.752] | [0.722] | [0.715] | [0.715] |
| Observations | 1,832 | 1,832 | 1,832 | 1,832 | 1,832 |
| R-squared | 8.90% | 9.00% | 8.80% | 8.90% | 9.00% |

# References

Adams, R. B., Ferreira, D., 2009. Women in the boardroom and their impact on governance and performance. Journal of Financial Economics 94 (2), 291–309.

Adams, R. B., Funk, P., 2012. Beyond the glass ceiling: Does gender matter? Management Science, DOI: 10.1287/mnsc.1110.1452.

Ahuja, G., Katila, R., 2001. Technnological acquisitions and the innovation performance of acquiring firms: a longitudinal study. Strategic Management Journal 22 (3), 197–220.

Ai, C., Norton, E. C., 2003. Interaction terms in logit and probit models. Economics Letters 80 (1), 123–129.

Allen, F., Gale, D., 1999. Diversity of opinion and financing of new technologies. Journal of Financial Intermediation 8 (1-2), 68–69.

Amihud, Y., Lev, B., 1981. Risk Reduction as a Managerial Motive for Conglomerate Mergers. Bell Journal of Economics 12 (2), 605–617.

Antia, M., Pantzalis, C., Park, J. C., 2010. Ceo decision horizon and firm performance: An empirical investigation. Journal of Corporate Finance 16, 288–301.

Arping, S., Sautner, Z., 2012. Did the sarbanes-oxley act of 2002 make firms less opaque? evidence from analyst earnings forecasts. Working Paper.

Barkema, H. G., Schijven, M., 2008. How do firms learn to make acquisitions? a review of past research and an agenda for the future. Journal of Management 34 (3), 594–634.

Bebchuk, L., Cohen, A., Ferrell, A., 2009. What Matters in Corporate Governance? Review of Financial Studies 22 (2), 783–827.

Bebchuk, L. A., 1992. Federalism and the Corporation: The Desirable Limits on State Competition in Corporate Law. Harvard Law Review 105, 1435–1510.

Bebchuk, L. A., Ferrell, A., 1999. Federalism and Corporate Law: The Race to Protect Managers from Takeovers. Columbia Law Review 99, 1168–1199.

Becker-Blease, J. R., 2011. Governance and innovation. Journal of Corporate Finance 17, 947–958.

Benson, B. W., Davidson, W. N., 2009. Reexamining the managerial ownership effect on firm value. Journal of Corporate Finance 15, 573–586.

Bertsimas, D., Lauprete, G. J., Samarov, A., 2004. Shortfall as a risk measure: properties, optimization and applications. Journal of Economic Dynamics & Control 28, 1353–1381.

Brambor, T., Roberts Clark, W., Golder, M., 2006. Understanding Interaction Models: Improving Empirical Analyses. Political Analysis 14 (1), 63–82.

Brar, G., Giamouridis, D., Liodakis, M., 2009. Predicting European Takeover Targets. European Financial Management 15 (2), 430–450.

Burns, N., Kedia, S., Lipson, M., 2010. Institutional ownership and monitoring: Evidence from financial misreporting. Journal of Corporate Finance 16, 443–455.

Calafiore, G. C., 2007. Ambiguous Risk Measures and Optimal Robust Portfolios. SIAM Journal on Optimization 18 (3), 853–877.

Campbell, J. Y., Polk, C., Vuolteenaho, T., 2010. Growth or Glamour? Fundamentals and Systematic Risk in Stock Returns. Review of Financial Studies 23 (1), 305–344.

Capezio, A., Shields, J., O'Donnell, M., 2011. Too good to be true: Board structural independence as a moderator of CEO pay-for-firm-performance. Journal of Management Studies 48 (3), 487–513.

Carpenter, J. N., 2000. Does Option Compensation Increase Managerial Risk Appetite? Journal of Finance 55 (5), 2311–2331.

Casares, L., Karpoff, J. M., 2002. Takeover Defenses of IPO Firms. Journal of Finance 57 (5), 1857–1889.

Cazier, R. A., 2011. Measuring r&d curtailment among short-horizon ceos. Journal of Corporate Finance 17 (3), 585–594.

Chahine, S., Arthurs, J. D., Filatochev, I., Hoskisson, R. E., 2012. The effects of venture capital syndicate diversity on earnings management and performance of ipos in the us and uk: An institutional perspective. Journal of Corporate Finance, DOI: 10.1016/j.jcorpfin.2011.11.007.

Chemmanur, T., Tian, X., 2010. Do Anti-Takeover Provisions Spur Corporate Innovation? Working Paper, Boston College.

Cheng, S., 2004. R&D Expenditures and CEO Compensation. Accounting Review 79 (2), 305–328.

Cloodt, M., Hagedoorn, J., Van Kranenburg, H., 2006. Mergers and acquisitions: Their effect on the innovative performance of companies in high-tech industries. Research Policy 35 (5), 642–654.

Core, J. E., Guay, W. R., Rusticus, T. O., 2006. Does Weak Governance Cause Weak Stock Returns? An Examination of Firm Operating Performance and Investors Expectations. Journal of Finance 61 (2), 655–687.

Core, J. E., Holthausen, R. W., Larcker, D. F., 1999. Corporate governance, chief executive officer compensation, and rm performance. Journal of Financial Economics 51, 371–406.

Cornett, M. M., McNutt, J. J., Tehranian, H., 2009. Corporate governance and earnings management at large u.s. bank holding companies. Journal of Corporate Finance 15 (4), 412–430.

Cornuejols, G., Tütüncü, R., 2007. Optimization Methods in Finance. Cambridge University Press, New York.

Curtis, A., Fargher, N. L., 2003. A Comparison of Residual Income and Comparable Firm Valuation of Initial Public Offerings . Working Paper, University of New South Wales.

Daines, R., Klausner, M., 2001. Do IPO Charters Maximize Firm Value? Antitakeover Protection in IPOs . Journal of Law, Economics & Organization 17 (11), 83–120.

Danzon, P. M., Epstein, A., Nicholson, S., 2007. Mergers and Acquisitions in the Pharmaceutical and Biotech Industries. Managerial and Decision Economics 28, 307–328.

DeBoskey, D. G., Jiang, W., 2012. Earnings management and auditor specialization in the post-sox era: An examination of the banking industry. Journal of Banking and Finance 36 (2), 613–623.

Dechow, P., Sloan, R., 1991. Executive incentives and the horizon problem: an empirical investigation. Journal of Accounting and Economics 14, 51–89.

Demiralp, I., D'Mello, R., Schlingemann, F. P., Subramaniam, V., 2011. Are there monitoring benefits to institutional ownership? evidence from seasoned equity offerings. Journal of Corporate Finance 17, 1340–1359.

Desyllas, P., Hughes, A., 2010. Do high technology acquirers become more innovative? Research Policy 39, 1105–1121.

DiMasi, J. A., Grabowski, H. G., 2007. The cost of biopharmaceutical r&d: is biotech different? Managerial and Decision Economics 28 (4-5), 469–479.

Dunn, P., 2004. The impact of insider power on fraudulent financial reporting. Journal of Management 30, 397–412.

El Ghaoui, L., Oks, M., Oustry, F., 2003. Worst-Case Value-at-Risk and Robust Portfolio Optimization: A Conic Programming Approach. Operations Research 51 (4), 543–556.

Frakes, M. D., 2007. Classified Boards and Firm Value. Delaware Journal of Corporate Law 32, 113–157.

Franks, J., Mayer, C., 1996. Hostile takeovers and the correction of managerial failure. Journal of Financial Economics 40 (1), 163–181.

Giaccotto, C., Golec, J., Vernon, J., 2011. New estimates of the cost of capital for pharmaceutical firms. Journal of Corporate Finance 17 (3), 526–540.

Gilchrist, S., Himmelberg, C. P., Huberman, G., 2005. Do stock price bubbles influence corporate investment? Journal of Monetary Economics 52 (4), 805–827.

Gomez-Mejia, L. R., Balkin, D. B., Welbourne, T. M., 1990. Influence of venture capitalists on high tech management. Journal of High Technology Management Research 1 (1), 103–118.

Gompers, P., Ishii, J., Metrick, A., 2003. Corporate Governance and Equity Prices. Quarterly Journal of Economics 118 (1), 107–155.

Gourieroux, C., Laurent, J. P., Scaillet, O., 2000. Sensitivity analysis of Values at Risk. Journal of Empirical Finance 7, 225–245.

Grinstein, Y., Hribar, P., 2004. Ceo compensation and incentives: Evidence from m&a bonuses. Journal of Financial Economics 73, 119–143.

Hagedoorn, J., 2002. Inter-firm R&D partnerships: an overview of major trends and patterns since 1960. Research Policy 31 (4), 477–492.

Hagedoorn, J., Cloodt, M., 2003. Measuring innovative performance: is there an advantage in using multiple indicators? Research Policy 32 (8), 1365–1379.

Haleblian, J., Devers, C. E., McNamara, G., Carpenter, M. A., Davison, R. B., 2009. Taking stock of what we know about mergers and acquisitions: A review and research agenda. Journal of Management 35, 469–502.

Haleblian, J., Finkelstein, S., 1993. Top management team size, ceo dominance, and firm performance - the moderating roles of environmental turbulence and discretion. Academy of Management Journal 36, 844–863.

Haleblian, J., Finkelstein, S., 1999. The influence of organizational acquisition experience on acquisition performance: A behavioral learning perspective. Administrative Science Quarterly 44, 25–56.

Hamermesh, L. A., 2006. The Policy Foundations of Delaware Corporate Law. Columbia Law Review 106, 1749–1792.

Harford, J., Humphery-Jenner, M. L., Powell, R. G., 2012. The sources of value destruction in acquisitions by entrenched managers. Journal of Financial Economics, Forthcoming.

Harford, J., Li, K., 2007. Decoupling ceo wealth and firm performance: The case of acquiring ceos. Journal of Finance 62, 917–949.

Hasbrouk, J., 1985. The characteristics of takeover targets: q and other measures. Journal of Banking and Finance 9, 351–362.

Hazarika, S., Karpoff, J. M., Nahata, R., 2012. Internal corporate governance, ceo turnover, and earnings management. Journal of Financial Economics, DOI:10.1016/j.jfineco.2011.10.011.

Helwege, J., Intinoli, V. J., Zhang, A., 2012. Voting with their feet or activism? institutional investors impact on ceo turnover. Journal of Corporate Finance 1, 22–37.

Henry, G. L., 1999. Continuing Directors Provisions: These Next Generation Shareholder Rights Plans are Fair and Reasoned Responses to Hostile Takeover Measures. Boston University Law Review 79, 989–1041.

Hitt, M., Hoskisson, R., Ireland, R. D., Harrison, J., 1991. Effect of Acquisitions on R&D Inputs and Outputs. Academy of Management Journal 34 (3), 693–706.

Hochberg, Y. V., 2012. Venture capital and corporate governance in the newly public firm. Review of Finance, DOI: 10.1093/rof/rfr035.

Hribar, P., Collins, D. W., 2002. Errors in estimating accruals: Implications for empirical research. Journal of Accounting Research 40 (1), 105–134.

Humphery-Jenner, M. L., 2012a. The impact of the EU takeover directive on takeover performance and empire building. Journal of Corporate Finance, DOI: 10.1016/j.jcorpfin.2011.12.004.

Humphery-Jenner, M. L., 2012b. Internal and external discipline following securities class actions. Journal of Financial Intermediation 21 (1), 151–179.

Humphery-Jenner, M. L., Powell, R. G., 2011. Firm size, takeover profitability, and the effectiveness of the market for corporate control: Does the absence of anti-takeover provisions make a difference? Journal of Corporate Finance 17 (3), 418–437.

Irvine, P. J., Pontiff, J., 2009. Idiosyncratic Return Volatility, Cash Flows, and Product Market Competition. Review of Financial Studies 22 (3), 1149–1177.

Jensen, M. C., 1986. Agency costs of free cash flow, corporate finance, and takeovers. American Economic Review 76, 323–329.

Johnson, S. A., Moorman, T. C., Sorescu, S., 2009. A Reexamination of Corporate Governance and Equity Prices. Review of Financial Studeies 22 (11), 4753–4786.

Kapoor, R., Lim, K., 2007. The impact of acquisitions on the productivity of inventors at semiconductor firms: A synthesis of knowledge-based and incentive-based perspectives. Academy of Management Journal 50, 1133–1155.

Kini, O., Kracaw, W., Mian, S., 2004. The Nature of Discipline by Corporate Takeovers. Journal of Finance 59 (4), 1511–1552.

Laamanen, T., 2007. On the role of acquisition premium in acquisition research. Strategic Management Journal 28, 1359–1369.

Lee, C. M., Myers, J., Swaminathan, B., 1999. What is the Intrinsic Value of the Dow? Journal of Finance 54 (5), 1693–1741.

Lee, G., Masulis, R., 2011. Do more reputable financial institutions reduce earnings management by ipo issuers? Journal of Corporate Finance 17 (4), 982–1000.

Loughran, T., Ritter, J., 2004. Why Has IPO Underpricing Changed Over Time? Financial Management 33 (3), 5–37.

Loughran, T., Ritter, J. R., 2002. Why Don't Issuers Get Upset About Leaving Money on the Table in IPOs? Review of Financial Studies 15 (2), 413–444.

Mahoney, J. M., Mahoney, J. T., 1993. An empirical investigation of the effect of corporate charter antitakeover amendments on stockholder wealth. Strategic Management Journal 14 (1), 17–31.

Makri, M., Hitt, M. A., Lane, P. J., 2010. Complementary technologies, knowledge relatedness, and invention outcomes in high technology mergers and acquisitions. Strategic Management Journal 31 (6), 602–628.

Makri, M., Lane, P. J., Gomez-Mejia, L. R., 2006. CEO incentives, innovation, and performance in technology-intensive firms: A reconciliation of outcome and behavior-based incentive schemes. Strategic Management Journal 27, 11.

Maloney, M. T., McCormick, R. E., Mitchell, M. L., 1993. Managerial decision making and capital structure. Journal of Business 66, 189–217.

Martin, K. J., McConnell, J. J., 1991. Corporate Performance, Corporate Takeovers, and Management Turnover. Journal of Finance 46 (2), 671–687.

Masulis, R. W., Wang, C., Xie, F., 2007. Corporate Governance and Acquirer Returns. Journal of Finance 62 (4), 1851–1889.

Masulis, R. W., Wang, C., Xie, F., 2009. Agency Problems at Dual-class Companies. Journal of Finance 64 (4), 1697–1727.

May, D. O., 1995. Do Managerial Motives Influence Firm Risk Reduction Strategies? . Journal of Finance 50 (4), 1291–1308.

Mitchell, M., Lehn, K., 1990. Do Bad Bidders Become Good Targets? Journal of Political Economy 98 (2), 372–398.

Mitchell, O. S., 1983. Fringe Benefits and the Cost of Changing Jobs. Industrial and Labor Relations Review 37 (1), 70–78.

Moeller, S. B., Schlingemann, F. P., 2005. Global diversification and bidder gains: A comparison between cross-border and domestic acquisitions. Journal of Banking and Finance 29, 533–564.

Moeller, S. B., Schlingemann, F. P., Stulz, R. M., 2004. Firm size and the gains from acquisitions. Journal of Financial Economics 73, 201–228.

Moeller, S. B., Schlingemann, F. P., Stulz, R. M., 2005. Wealth Destruction on a Massive Scale? A Study of Acquiring-Firm Returns in the Recent Merger Wave. Journal of Finance 60 (2), 757–782.

Murphy, K. M., Topel, R. H., 2002. Estimation and Inference in Two-Step Econometric Models. Journal of Business and Economic Statistics 20, 88–97.

Nikolov, B., Whited, T. M., 2010. Agency Conflicts and Cash: Estimates from a Structural Model. Working Paper, University of Rochester.

Norton, E. C., Wang, H., Ai, C., 2004. Computing interaction effects and standard errors in logit and probit models. Stata Journal 4 (2), 154–167.

Offenberg, D., 2009. Firm size and the effectiveness of the market for corporate control. Journal of Corporate Finance 15, 66–79.

Officer, M. S., 2007. Premiums in acquisitions of unlisted targets. Journal of Financial Economics 83 (3), 571–598.

Pagan, A., 1984. Econometric Issues in the Analysis of Regressions with Generated Regressors. International Economic Review 25 (1), 221–247.

Palepu, K. G., 1986. Predicting takeover targets: a methodological and empirical analysis. Journal of Accounting and Economics 8, 3–35.

Park, Y., Park, G., 2004. A new method for technology valuation in monetary value: procedure and application . Technovation 24 (5), 387–394.

Petersen, M. A., 2009. Estimating Standard Errors in Finance Panel Data Sets: Comparing Approaches. Review of Financial Studies 22 (1), 435–480.

Powell, R. G., 1997. Modelling takeover likelihood. Journal of Business Finance and Accounting 24, 1009–1030.

Powers, E. A., 2005. Interpreting logit regressions with interaction terms: an application to the management turnover literature. Journal of Corporate Finance 11, 504–522.

Pulley, L. B., 1981. A General Mean-Variance Approximation to Expected Utility for Short Holding Periods. Journal of Financial and Quantitative Analysis 16, 361–373.

Ribstein, L. E., 1989. Takeover Defenses and the Corporate Contract. Georgetown Law Journal 78, 71–151.

Rockafellar, R. T., Uryasev, S., 2000. Optimization of conditional value-at-risk. Journal of Risk 2, 493–517.

Roijakkers, N., Hagedoorn, J., 2006. Inter-firm R&D partnering in pharmaceutical biotechnology since 1975: Trends, patterns, and networks. Research Policy 35 (3), 431–446.

Sapra, H., Subramanian, A., Subramanian, K., 2009. Corporate Governance and Innovation: Theory and Evidence . Working Paper 08-05, University of Chicago.

Scaillet, O., 2004. Nonparametric Estimation and Sensitivity Analysis of Expected Shortfall. Mathematical Finance 14 (1), 115–129.

Scharfstein, D., 1988. The Disciplinary Role of Takeovers. Review of Economic Studies 55 (2), 185–199.

Simaan, Y., 1997. Estimation Risk in Portfolio Selection: The Mean Variance Model versus the Mean Absolute. Management Science 43 (10), 1437–1446.

Stein, J., 1988. Takeover threats and Managerial Myopia. Journal of Political Economy 96, 61–80.

Straska, M., Waller, G., 2010. Do antitakeover provisions harm shareholders? Journal of Corporate Finance 16 (4), 487–497.

Tütüncü, R. H., Koenig, M., 2004. Robust Asset Allocation. Annals of Operations Research 132, 157–187.

Vermeulen, F., Barkema, H., 2001. Learning through acquisitions. Academy of Management Journal 44 (3), 457–476.

Wiseman, R. M., Gomez-Mejia, L. R., 1998. A Behavioral Agency Model of Managerial Risk Taking. Academy of Management Review 23 (1), 133–153.

Woodbury, S. A., 1983. Substitution between Wage and Nonwage Benefits. American Economic Review 73 (1), 166–182.

Wooldridge, J. R., 1988. Competitive decline and corporate restructuring: Is a myopic stock market to blame? Journal of Applied Corporate Finance 1, 26–35.

Xie, B., Davidson, W. N., DaDalt, P. J., 2003. Earnings management and corporate governance: the role of the board and the audit committee. Journal of Corporate Finance 17 (5), 295–316.