Acquisitions and Firm-Specific Performance Thresholds

Timothy B. Folta*
Krannert Graduate School of Management
Purdue University
West Lafayette, IN 47907-1310
Phone: 765 494 9252
Fax : 765 494 9658
Foltat@mgmt.purdue.edu

Jonathan O'Brien
Mendoza College of Business
University of Notre Dame
Notre Dame, IN 46556

November 2005
Draft 1.8

* Correspondence should go to this author

© Timothy B. Folta and Jonathan P. O'Brien

The authors are grateful for suggestions from Thomas Brush, Michael Lubatkin, Raffaele Oriani, Maurizio Sobrero, and participants from workshops at University of Bologna and University of Michigan. Also, we are grateful to Javier Gimeno for his help on a related project.

Abstract:

We develop a model to explain why some firms make acquisitions while other firms with equal performance expectations do not. We argue that the decision to acquire is not strictly a function of expected performance but also depends on a firm's unique threshold of performance. Our model posits that the threshold is determined by investment irreversibility, managers' unique insight into growth opportunities, the personal ambitions of managers, and aspiration levels. Using a sample of over 15,000 acquisitions in the U.S., we find strong support for the model. These findings suggest that firms with low threshold may choose to invest despite comparatively low expected performance.

1.0 Introduction

It is increasingly being recognized that a significant percentage of acquirers lose market value at the time of the transaction – a result that should not occur if managers only make acquisitions with a positive net present value.[1] This result suggests that factors other than expected performance may play a systematic role in the determination to acquire. Interestingly, mounting empirical evidence suggests that the determinants of acquisitions and acquirer's abnormal returns substantially differ. This paper proposes a theoretical reconciliation of apparently conflicting empirical findings about the determinants of acquisition and acquirer's abnormal returns. It also explains why acquirers choose to invest despite the prospect for negative market reactions to the announcement of their transaction.

The maintained hypothesis underlying neoclassical investment theory is that acquisitions are made when expected performance exceeds some acquisition threshold. The acquisition threshold is the level of expected performance above which the dominant organizational constituents will make an acquisition. If we let I* signify the acquisition decision, a representative model of the choice between making an acquisition and not would be

$$I_{jt}^* = \begin{cases} \text{acquisition, if} & P_{jt} \geq T_{jt} \\ \text{No acquisition, if} & P_{jt} < T_{jt} \end{cases}$$

[1] While some studies report significant positive abnormal returns to acquiring firms (Bradley 1980; Asquith, Bruner, and Mullins (1983)), the majority of studies report either insignificant abnormal returns (Asquith, 19083; Chung and Weston, 1982; Acquith and Kim (1982), Eckbo (1983); (Jarrell & Poulsen, 1989; Jensen, 1986)), or significant negative abnormal returns (Agrawal, Jaffe, & Mandelker, 1992; Andrade, Mitchell, & Stafford, 2001; Magenheim & Mueller, 1988)Others have noted that the combined returns of both acquirer and target firms is a better indicator of the total value created by the acquisition. However, even when considering combined returns, Berkovitch and Narayanan (1993) found that 23.6% of acquisitions yielded negative market returns.

where P_{jt} represents the expected net present value (NPV) to an acquisition by firm j at time t, and T_{jt} represents firm j's threshold level of performance required to induce investment. Most theories of investment are guided by the implicit or explicit assumption that T_{jt} is where NPV equals zero, an assumption that incorporates the opportunity cost of capital. This is why, if we assume managers behave according to neoclassical investment theory, we would expect all acquisitions to induce positive market reactions. It is also the reason researchers regard the threshold as unimportant and insignificant when attempting to model the determinants of acquisition events.

We depart from this traditional model by arguing that acquisition thresholds may be extraordinarily important and consequential because they can be influenced by more than just the cost of capital. By elaborating on the theoretical determinants of acquisition thresholds there are profound implications on theoretical and empirical research on acquisitions. For example, by identifying how thresholds differ systematically across firms, we can explain why, given the same level of expected performance, some firms make acquisitions while others do not. We emphasize management's role in boundedly rational search behavior and their potential for having asymmetric access to information about growth opportunities, as determinants of thresholds.

2.0 Acquisition, Expected Performance, and Acquisition Thresholds

Our main thesis is that organizations differ in their acquisition thresholds, and acquisition is determined by whether expected economic performance falls below or above that firm-specific threshold. While thresholds may be shaped by the multiple voluntary participants in the organization (Aoki, 1984; Barnard, 1938; Simon, 1945), the inducements and contributions of most participants are regulated through a nexus of contracts with owners. While it is the owners'

interests, as residual claimants, that are most closely tied to the economic performance of the organization (Alchian & Demsetz, 1972; Meyer & Zucker, 1989), in public companies it is the general manager and management team that act as agents on behalf of the owner and are called to take actions which maximize their firm's performance. The willingness to make acquisitions that produce a negative net present value is partly determined by the strength of the principal-agent relationship. When managers are not properly monitored they may be tempted to maximize their own utility at the expense of shareholders (Morck, Shleifer, and Vishny (1990). Managing larger firms may produce higher salaries and perquisites, come with more prestige, or better ensure the longevity of the firm. Managers need not be opportunistic; rather they may make poor acquisition decisions because of managerial hubris (Roll, 1986; Hayward & Hambrick, 1997), overoptimism, or incompetence.

If there is uncertainty about the payoff associated with an acquisition event, managers and owners may prefer to delay the acquisition rather than commit resources than cannot be easily (or fully) recouped in the event the acquisition is later liquidated (Dixit & Pindyck, 1994).

Acquisition thresholds may also be influenced when managers have information that market participants do not have. If we assume semi-strong efficient markets, managers may have inside information about the value of growth opportunities that is not fully reflected in short-term market returns (Myers & Majiluf, 1984).

A decision to acquire may also be guided by boundedly rational search behavior. According to Cyert and March (1963), firms compare their actual performance against an aspiration level of performance. Firms that operate below aspirations seek to enhance their prospects for achieving a target performance (Levinthal & March, 1981). Under such a scenario, the propensity for a firm to undertake search behavior is enhanced as firm performance decreases

relative to its aspirations. Market returns should be unaffected by prior firm performance because markets should have already accounted for future expected profits. As a result, it seems reasonable to believe that the increased propensity for them to diversify is due to a lower threshold, rather than higher expected performance.

Accordingly, we believe that acquisition thresholds represent a much broader set of considerations than a firm's cost of capital. While several research streams have implicitly alluded to this, none have been explicit. For example, agency theorists have recognized the discrepancy between the determinants of acquisitions and the determinants of abnormal returns to acquirers, but they have not empirically isolated the determinants of firm thresholds. This challenge is compounded by the fact that thresholds cannot be directly observed. Nevertheless, attempts to isolate the determinants of thresholds may be critically important. The most likely candidates are variables that influence expected performance and acquisition in different ways. However, even for those variables influencing expected performance and acquisition in similar ways, it may be important to determine whether the variables effect on the threshold is consequential. For example, a finding that higher relatedness leads to a larger probability of acquisition, could, in principle, obtain even if the hypothesis that relatedness raises expected returns were invalid.

A third criticism is that attempts requiring a direct comparison of expected performance and thresholds must confront a basic selection problem: abnormal returns cannot be directly observed for non-acquisitions. Variables that have a strong effect on acquisition suffer more from self-selection, which biases downward their coefficients on abnormal returns, because firms that survive are expected to have higher values of these variables. This may explain, for example, why the effect of relatedness on abnormal returns is not always significant.

In summary, we believe that firm-specific thresholds are non-zero, have multiple determinants, and, in many cases, have a meaningful impact on the acquisition decision that is unique from the impact of expected performance. Estimation of the model in equation 1 presents three methodological challenges: (1) the unobservability of expected performance when no entry occurs; (2) the endogenous nature of the entry decision (because entry only occurs when expected performance exceeds the threshold); and (3) the total unobservability of the threshold level of performance. Fortunately, a fairly standard econometric technique can resolve these problems. The censored regression (or tobit) with unobserved stochastic thresholds ((Maddala, 1983; Nelson, 1977; Smith, 1980) is appropriate when the dependent variable is only observed when it falls above a particular level or threshold, and this threshold varies from observation to observation as a function of some independent variables.[2] Thus, this methodology deals with the challenges identified above. This method has two other advantages over approaches used in prior research. First, it avoids potential problems of self-selection bias (Heckman, 1979). Second, censored regression estimation can identify the magnitude of individual coefficients for both expected performance and thresholds, and therefore permits tests of hypotheses regarding the relationship of variables to each construct

Our model of thresholds of performance provides a causal link between the concepts of expected performance and acquisition without assuming that they are unidimensional constructs. Acquisition is determined by both the determinants of expected performance and thresholds.

---

[2] This method has been used to estimate the determinants of actual and reservation wages in labor supply applications (Nelson, 1977), and the predictors of market transaction costs and internal organizational costs in studying decisions around organizational forms (Masten, Meehan, & Snyder, 1991). Recently, it has been used to estimate the determinants of entrepreneur's performance and performance threshold in relation to the exit decision (Gimeno, Folta, Cooper, & Woo, 1997).

Certain variables will be purely related to expected performance, while others may influence entry only through the firm's threshold. For variables that simultaneously influence performance and threshold, their entry effect is determined by their combined effects on both. In the next section, we develop hypotheses on how different theories advise the acquisition decision based on their separate effects on abnormal returns and threshold of performance.

3.0 Hypotheses

3.1 Principal-Agent Misalignment

Acquisition decisions may also put the interests of owners and managers in direct conflict. If the incentives of managers and owners are not properly aligned, managers may prefer to grow the firm beyond its optimal scale to benefit from higher compensation (Murphy, 1985), reduced personal risk (Shleifer & Vishny, 1994), more external opportunities, and more non-pecuniary perquisites, such as power and prestige (Jensen, 1986), even though markets may punish such behavior. Thus, we have good reason to believe that managers, in general, will be motivated to over-invest and grow the firm beyond its optimal size because they personally benefit from growing the firm. This incentive to do so is accentuated when there is a lack of incentive alignment between managers and owners, and when there exists excess cash that management can invest. This implies that firms with misaligned principle/agent relationships should have lower thresholds because managers stand to gain personally from the acquisition leading them to invest despite low expected performance. While there remains a debate about whether ownership structure should influence firm performance, Demsetz & Villalonga (2001) have adamantly argued that there should be no systematic relation should exist (after controlling for prior firm performance) because firm performance is "at least as likely to affect ownership structure as ownership structure is to affect firm performance" (p. 216).

Hypothesis 1: Greater incentive misalignment between a firm's principals and agents should have no effect on expected performance (abnormal returns) for acquisition targets, but should lower acquisition thresholds. This implies that the likelihood of acquisition will increase with more incentive alignment between principals and agents.

3.2 Sunk Costs

The value of an option to defer entry increases with an increase in the volatility of the value of the product market investments used to serve the market. Assuming that entry requires some irreversible investment, uncertainty should increase the value of the option to defer. This suggests higher opportunity costs associating with entering immediately, raising the threshold at which firms choose to enter. This effect stands in contrast to expectations from neoclassical theory, which assumes that entry decisions can be costlessly reversed, thereby implying that entry is unaffected by total economic uncertainty (Dixit et al., 1994). Neoclassical models conclude that the systematic component of uncertainty is the only relevant risk for investment decision. When combining neoclassical views with option theory, after controlling for systematic risk, uncertainty should have no direct effect on expected performance but should increase the value of the option to defer. Thus, total uncertainty should negatively affect the likelihood of acquisition due to its positive effect on a firm's threshold level.

Hypothesis 2: Industry uncertainty will have no significant effect on expected performance (abnormal returns) for acquisition targets, but will raise performance thresholds. This implies that the likelihood of acquisition will decrease with industry uncertainty.

3.3 Asymmetric Information about Growth Opportunities

Thresholds of performance may be influenced when managers have different valuations than markets about firm acquisition decisions. If we assume semi-strong efficient markets, managers may have inside information about the value of entry decision that is not fully reflected in short term market returns (Myers et al., 1984). For example, managers may have unique insight into whether acquisition will open up opportunities for the firm to take advantage of growth options that derive largely from its intangible assets. Thus, managers may rationally choose to enter new industries even if they anticipate that markets may not immediately reward their decision to the extent that they should.

Unlike the option to defer, which occurs "naturally", growth options must be initiated at some extra cost from the outset (Trigeorgis, 2000). For example, entry gives the firm the right, but not the obligation, to expand operations in the future if industry conditions turn out favorable. Growth options are valuable because managers have discretion on whether to exercise growth options, creating an asymmetry in their payoff distribution: their lowest value is zero, if not exercised, while their upper value has virtually no bounds. What is not entirely clear whether the value of a firm's growth option will be fully reflected in its abnormal returns. If markets are only semi-strong efficient and growth options are firm-specific, it is possible that markets do not fully recognize a firm's growth options. Growth options are likely to derive largely from intangible assets held by the firm (Myers, 1977); assets which the managers of the firm will likely have much better information about than outsiders. Accordingly, the market may discount the value a firms growth options due to the risk of adverse selection (Akerlof, 1970), but if the value of these growth options is significant, managers may prefer to acquire and exploit more

efficient internal capital markets. Thus, even if a firm has growth options that are expected to yield small abnormal returns, managers may recognize that there is considerably more value associated with having the capability to take advantage of growth opportunities, and reduce their thresholds accordingly.

Hypothesis 3: Firms having more growth options will have higher expected performance (abnormal returns) for acquisition targets, and will have lower performance thresholds. Both these factors suggest that the likelihood of acquisition will increase with growth options.

The resource based view uses economic logic to argue that firms invest in targets that are related to existing (underutilized) resources and capabilities because those assets can be deployed in an advantageous manner to maximize the present value of future cash flows. This suggests that when firms target more related industries, they will have higher expected performance. However, the relatedness of a target to a firm's existing capabilities should also influence management's ability to ascertain the value of growth options.

A second argument is that the relatedness of the target may influence the reversibility of the investment necessary to support entry. Managers of may be unwilling to enter new markets despite large expected returns when entry entails making sunk investments in the midst of high uncertainty. If the firm cannot liquidate the investment for a reasonable value in the event the project fails, it may prefer to avoid the investment until the project's uncertainty is resolved (Dixit et al., 1994). While neoclassical investment theory assumes complete reversibility of investment decisions, real options theory suggests that investment thresholds should explicitly consider how firm decisions bear upon its flexibility (McDonald & Siegel, 1986). If investments in the new industry can be easily re-deployed back to other industries in which the firm already

competes, then the entry decision will be viewed as more reversible. In support of this view, Capron, Mitchell, and Swaminathan (2001) found that, subsequent to acquisitions, greater resource redeployment occurs when the target and acquiring firms share similar strategic features. This also implies that firms targeting industries more unrelated to their portfolio of businesses should have more irreversibility. If firms recognize that entry into related industries involves lower sunk costs, they will lower their investment thresholds to reflect the value of this added flexibility inherent in a less valuable option to defer.

> ***Hypothesis 4: Firms targeting acquisitions in more related industries will have higher expected performance (abnormal returns), and will have lower performance thresholds. Both these factors suggest that the likelihood of acquisition will increase with the relatedness of a firm to the target industry.***

3.4 Aspiration Levels

According to Cyert and March (1963), firms compare their actual performance against an aspiration level of performance. Firms that operate below aspirations seek to enhance their prospects for achieving a target performance (Levinthal et al., 1981). Under such a scenario, the propensity for a firm to undertake search behavior is enhanced as firm performance decreases relative to its aspirations. Market returns should be unaffected by prior firm performance because markets should have already accounted for future expected profits. As a result, it seems reasonable to believe that the increased propensity for them to diversify is due to a lower threshold, rather than higher expected performance. One might arrive at a similar conclusion by using Matsusaka's (2001) view of why firms diversify. Similar to Jovanovic (1981), he characterizes firms as constantly learning about their capabilities. In his model, low performing firms diversify to experiment in determining whether the target industry is a good match for their

capabilities, reasoning that the current match between their capabilities and market conditions is not a good one. Accordingly, we expect performance thresholds to be lower for firms that are performing poorly relative to aspirations, while abnormal returns will be unaffected by relative performance. As a result, relative performance should negatively effect the likelihood of making an acquisition.

Hypothesis 5: Relative performance will have no effect on expected performance (abnormal returns) for acquisition targets, but will raise thresholds for performance. Hence, relative performance will have an indeterminate effect on the likelihood of acquisition, a priori.

[Place Table 1 About Here]

5.0 Research Method

5.1 Data and Dependent Variables

The theoretical model posits that a firm's expected performance and the firm's threshold jointly determine whether the firm will enter. While the firm's threshold is not observable, it can be derived from comparisons of two observable outcomes: diversifying acquisitions and stock market returns around the acquisition events.

I_{jt}, a binary variable, represents an acquisition decision of firm j ("0" if the firm did not acquire a target firm, "1" if the firm acquired a target firm) in year t. The sample of acquisitions comes from the Security Data Company's (SDC) U.S. Mergers and Acquisitions Database. We considered only acquisitions in the SDC data when (1) announcement dates fall between 1991 and 2000; (2) acquiring firms bid for a majority shares of a target firm; (3) the method of purchase (cash, equity, other) was specified, (4) the acquirer is a public firm listed on CRSP, Compustat, and Compact Disclosure during the event window, and (5) we could obtain abnormal

returns on acquisition event.[3] This led to a sample of 15,172 acquisitions. To generate our sample of non-acquisitions, we take an approach similar to Montgomery and Hariharan (1991) and use state-based sampling (Manski & McFadden, 1981). The sample of non-acquisitions was created by randomly generating (with replacement) a sample of 50,000 firm-year observations, and then randomly assigning industries to these observations. After deleting missing observations we are left with 46,908 non-acquisitions.

For those firms that made acquisitions, their expected performance, P_{jt} is generated from the cumulative abnormal return (CAR) associated with the acquisition announcement. The CARs were calculated with respect to a value-weighted market index.[4] The coefficients for the market model (*i.e.*, each firm's beta) were estimated based on daily returns for the 255 trading days spanning days –300 through –46, relative to the announcement. The event window used to calculate the CAR was three days around the announcement date (*i.e.*, -1,+1). All of the abnormal returns were calculated using the Eventus software package. The full sample of acquisitions had a mean CAR of 1.24% and median CAR of 0.44%. Our empirical model requires that the abnormal returns be strongly associated with the expectations of managers. Thus, we eliminate all observations where the acquirer lost more than 20 percent of its value on announcing the acquisition, since such cases probably represent instances in which the market reaction to an acquisition was very different from the managers' expectations.[5] This resulted in

---

[3] Condition 5 led to the 2,739 acquisitions being dropped. We compared logit models with the full and reduced samples and they produced statistically identical results, leading us to believe that the reduced sample was not biased in any meaningful way.

[4] A market index was preferred to size and market-to-book adjusted CARs because they can be biased (Rau and Vermaelen, 1998).

[5] Thus, our model allows for the possibility that managers will make investments that may be evaluated marginally negatively by the market. However, since we don't believe managers would intentionally make an investment that they expected to result in

138 additional observations being dropped, representing 0.7% of the acquisitions, and leaving us with 15,034 acquisitions in our final sample.[6] P_{jt} is the log of CARs after adjusting the scale so that all returns were positive.

5.2 Independent Variables

Table 1 provides a brief description of the independent variables, and table 2 provides descriptive statistics and correlations. More detailed descriptions are below.

[Place Table 2 About Here]

5.2.1 Measurement of Relatedness. Traditional measures of industry relatedness focus on the similarity of industry SICs. However, this approach is problematic because it is unclear whether the same degree of similarity exists between all pairs of SICs at all levels of analysis. To address this issue, we adopt a measure of industry relatedness similar to that proposed by Teece, Rumelt, Dosi, & Winter (1994), which measures the likelihood that a firm operating in industy *m* will also operate in industry *n*, corrected for the expected degree of relatedness under the null hypothesis that diversification is random. We use Compustat II to develop our matrix of relatedness for all industries in the sample. Our measure differs from the previous authors in that we calculate the index for the 3-digit classification used in this study, and we allow the measure to vary over time. Our measure of relatedness, *Relatedness*, was the minimum distance between the target industry and all of the industries that are already in the firm's portfolio.

---

the loss of a substantial portion of the firm's value, so we eliminated all acquisitions where the acquirer lsot more than 20% of its value. Results of our censored regression model with unobserved stochastic threshold are very similar if we alter the cutoff above -20% returns. We chose this level because it was the level at which we could eliminate the fewest observations and the model would converge.

[6] Logit models estimating acquisition with the sample of 15,172 acquisitions and the sample of 15,034 produced statistically equivalent results, as did regression models estimating abnormal returns on the different samples of acquisition.

5.2.2 Measurement of Uncertainty. Although uncertainty has been modeled many different ways in the management literature, most approaches have been based on the volatility of some time series. Accordingly, we chose to model uncertainty based on industry-specific stock market indices, defined at the 2-digit SIC level.[7] The primary benefit of this approach is that the underlying series considers all expected future profitability, and all sources of uncertainty that may impact that profitability. Following many studies in finance and economics (see (Carruth, Dickerson, & Henley, 2000)), we modeled the stock returns data using generalized autoregressive conditional heteroskedasticity (GARCH) models.[8] The main advantage to employing a GARCH model is that it produces a time varying estimate of the conditional variance of a time series, controlling for any trends that might exist in the data. The GARCH models were run on value-weighted industry portfolios that were developed from the monthly stock returns (adjusted for dividends and splits) for all firms in the CRSP database from 1950 to 2000. We average the monthly conditional variances to get quarterly figures. The variable *Uncertainty* is then computed as the square root of the average quarterly conditional variance.

5.2.3 Measurement of Growth Options. Firms with a high market-to-book derive most of their value from growth opportunities and intangibles, such as human capital and ongoing research (Smith and Watts, 1992; Bizjak, Brickley, and Coles, 1993). These firms can expect to find it more difficult to certify the value of a particular project than firms that derive most of their value from their assets-in-place (Harford, 1999). One proxy for a firm's magnitude of growth options is its average market-to-book ratio. Myers (1977) argued that a high market-to-

---

[7] The 2-digit level of analysis was used to calculate uncertainty because if we defined industries at the 3-digit level, many of the industry portfolios displayed poor fit to the GARCH model that we used to compute uncertainty.

[8] For more details on GARCH models, see Bollerslev (1986). Specifically, we employ a GARCH-M[1,1] model.

book ratio should be associated with a higher proportion of growth opportunities relative to assets in place. We use the variable *Market-to-Book*, the firm's market-to-book ratio, to capture firm growth opportunities. This variable was computed by using the firm market value (*i.e.*, the market value of equity plus book value of debt) listed in Compustat I, then dividing by the total book value of assets.

5.2.4 Measurement of Agency Problems. The existing literature has linked a plethora of firm characteristics to agency problems. We use three measures that have frequently been employed. *CEO Duality* is coded "1" if a firm's Chief Executive Officer is also the Chairman of the Board; otherwise it is "0" (Brenner, Sundaram, & Yermack, 2000; Coles, McWilliams, & Sen, 2001). *Inside Ownership* measures the percentage of the firm owned by insiders (Amihud & Lev, 1981; Brenner et al., 2000; Demsetz et al., 2001; Hyland & Diltz, 2002). Since prior research suggests that ownership levels may have a non-linear relationship with our dependent variables, we also incorporate a squared term. Finally, we measure *Financial Slack* by subtracting the total amount of cash and short term investments that the firm holds from its total long term debt, then dividing by total firm assets. This value is then subtracted from one so that larger values will be associated with more financial slack. Agency problems should be more severe, and thresholds lower, when *CEO Duality* is "1", *Inside Ownership* is low, and *Financial Slack* is high.

5.2.5 Measurement of Relative Performance. Aspiration levels are indicative of level of performance at which a firm is inspired to search for ways to improve its performance. One common referent point is performance relative to competitors (Greve, 1998). We measure *Relative Performance* as the difference between the firm's return on sales and the average industry return on sales.

5.2.6 Measurement of Control Variables. In addition to the variables specified above, proper specification of the theoretical model requires the inclusion of variables correlated with the present value of the entry opportunity. Several industry level variables should influence the attractiveness of entering a given industry. *Concentration* is the industry's Herfindahl concentration index. *Systematic Risk* controls for the systematic risk of each industry, and is calculated as the covariance between the returns on each industry's stock index and the market return over the previous 60 months. The intensity of R&D is approximated by *Industry R&D* and measured by the ratio of total industry R&D to total assets. The incidence of merger waves is approximated by the variable *Waves* - a count of all the acquisitions in the target industry in the past year, as listed in SDC.

Several firm-level factors may also impact the static NPV of the entry decision. *Firm Size* is calculated by the natural log of total firm assets. *Diversification* controls for how diversified the firm was prior to the new entry by measuring the sum of squared shares of each of the firm's business segments. Firm level R&D intensity (*Firm R&D*) was computed in a similar fashion as its industry level counterparts, but for each individual firm. In order to control for a firm's experience in making acquisitions, we included a variable, *Experience*, which is the count of all total acquisitions that the focal firm made in the three years prior to the focal year.

Finally, research suggests that the method of payment will influence abnormal returns to acquisitions. Specifically acquiring firm shareholders are expected to earn higher abnormal returns for cash purchases, because firms issuing stock for purposes of acquisitions signal that their stock price is overvalued relative to what it should be (Myers et al., 1984). Consistent with prior literature, we create two variables, where *All Cash* is equal to "1" if the acquisition is 100 percent cash, and *All Equity* is "1" if the acquisition is 100 percent equity.

[Place Table 2 About Here]

5.3 Model specification

The decision to acquire or not is based on the comparison of the two latent constructs of expected performance and the threshold,

$$P_{jt} = \alpha X + e, \qquad (2)$$

$$T_{jt} = \beta Z + u, \qquad (3)$$

where P_{jt} represent the abnormal returns for acquirer j at time t, and T_{jt} represents the threshold. X and Z are vectors of attributes thought to influence abnormal returns and thresholds, respectively; α and β are coefficient vectors, and e and u are normally distributed random variables. Even though the threshold, T_{jt}, cannot be observed for any observation, and the expected returns (P_{jt}) cannot be observed for non-acquisitions, the full structure of the acquisition decision can be estimated if we know the selection process and if we can observe data or proxies for the expected returns to acquisitions. Since P_{jt} but not T_{jt} is available, the model becomes

I =	Acquisition =	$\alpha X + e,$	if $P_{jt} \geq T_{jt}$	(4)
	Non-Acquisition =	n.a.,	if $P_{jt} < T_{jt}$	(5)

Consistent estimates of the coefficients of equations (2) and (3) can be obtained as long as (i) an independent variable in X is not in Z, or (ii) the covariance between e and u is 0. We imposed the former restriction, including *All Cash* and *All Equity* in X. We estimated the censored regression model on performance and the tobit model on threshold performance simultaneously using maximum likelihood with STATA 6.0.

[Place Table 3 About Here]

6.0 Results

6.1 Model Significance

We tested the significance of the independent variables in the threshold model (columns 1 and 2 of table 3) by examining whether the addition of these variables significantly improved the ability to explain a firm's decision to acquire through its expected performance and its performance threshold. We used a likelihood ratio test to compare the full model with a nested naïve model (not shown) including only control variables. The test was significant ($p < .001$), producing a chi-square value of 12,510 for 20 degrees of freedom, indicating the joint significance of the independent variables of the model.

6.2 Hypothesis Testing

The results of the independent variables generally confirm the separate effects of both expected performance and threshold on the firm's likelihood of making an acquisition. The results from the full model are presented in table 3. Columns 1 and 2 present the coefficients relating to expected performance and threshold, respectively. Column 3 presents the coefficients of a logit model on acquisition. We test the hypotheses by examining these three columns. In general, all our hypotheses receive some support.

6.2.1 Agency Relationship. When managerial objectives deviate significantly from owner's objectives, managers' personal ambitions may impact thresholds. Measures of principal/agent misalignment should influence the propensity to make an acquisition, primarily through an effect on a firm's threshold. We use three measures of misalignment, and the results diverge, leading us to report that hypothesis 1 received mixed support. Consistent with hypothesis 1, we found that firms having CEO duality have lower thresholds ($p<.001$), and as a consequence, are more likely to acquire target firms ($p<.001$). Since CEO Duality does not

influence abnormal returns, this result suggests that the variable's relation to acquisition is determined exclusively by its threshold effect. The interpretation of the effect of inside ownership is complicated due to the existence of non-linearities. The positive coefficients for both Inside Ownership ($p<.001$) and Inside Ownership Squared ($p<.001$) on acquisition indicates that the variable has a monotonic and positive relationship with acquisition, with higher levels of inside ownership having more significant effects. The variable's effect on threshold is non-monotonic, so it is necessary to take the first derivative of this variable. The results indicate that at low levels of inside ownership, there is a negative influence on the threshold. However, when managers own more than 40 percent of the stock, there is a positive influence on the threshold, a result which is consistent with the expectation that when the incentives of agents are aligned with principals they are less likely to diversify their firm's for their own benefit. The measure of financial slack is negatively related to abnormal returns ($p<.01$) and negatively related to threshold ($p<.001$). These results imply that the tendency for firms with financial slack to make acquisitions is due to the lower thresholds and not higher expected performance. In summary, the threshold effects appear much stronger than performance effects for our measures of agency misalignment.

6.2.2 Industry Uncertainty. Hypothesis 2 predicted that industry uncertainty would have a negative influence on acquisition, primarily because uncertainty raises the threshold due to higher opportunity costs of committing. As expected, the likelihood of acquisition is negatively related ($p<.001$) to our measure of industry uncertainty, and positively related to the performance threshold ($p<.001$). Contrary to expectations, greater industry uncertainty decreases expected performance ($p<.01$).

6.2.3 Growth Options. Hypothesis 3 predicted that firms with larger growth options would be more likely to make acquisitions. We reasoned that while growth options should raise abnormal returns, markets might not recognize the full value of a firm's growth opportunity, leading to a significant negative threshold effect. As expected, our measure of growth option, market-to-book, lowers the firm's threshold ($p<.001$) and increases the likelihood of making an acquisition ($p<.001$). An unexpected finding, but one with some precedence in the literature is that market-to-book also lowers expected performance ($p<.001$). If one were to adopt a unidimensional view, market-to-book should have a negative effect on acquisition. Hence, these findings suggest that the variable's effect on the threshold dominate its effect on expected performance.

6.2.4 Relatedness. Acquiring a related firm should raise the expected performance of the acquisition, and lower the threshold because it improves the ability to redeploy assets in the event the entry move fails. Both these factors point toward an increased likelihood of entry. Hypothesis 4 receives strong support. As expected, relatedness improves the likelihood of acquisition ($p<.001$). Moreover, this result is driven by the fact that relatedness increases abnormal returns ($p<.001$) and reduces the threshold ($p<.001$).

6.2.6 Relative Performance. Hypothesis 5 argues that lower relative performance should have no effect on a firm's abnormal returns to acquisitions, but should reduce thresholds. In contrast to expectations, firms with lower relative performance had higher thresholds ($p<.001$). As a result, the farther firms perform below aspiration levels, the lower likelihood they will make an acquisition ($p<.001$).

6.2.7 Other influences. The results in table 3 also illustrate several interesting relationships for the control variables. Several of the firm-level control variables had important

influences on expected performance, threshold, and acquisition. Firm size had a significant negative effects ($p<.001$) on expected performance, suggesting that larger firms had lower abnormal returns for acquisitions. At the same time, this variable had a significant negative effect ($p<.001$) on the threshold. The threshold effect for firm size seems to dominate the variable's effect ($p<.001$) on expected performance, as indicated by a significant greater likelihood that larger and more profitable firms were likely ($p<.001$) to make diversifying acquisitions. More firm R&D seems to significantly reduce ($p< .001$) the likelihood of making a diversifying acquisition, and this effect seem largely due to a higher threshold ($p<.10$) for R&D intensive firms. Firms with more acquisition experience tend to be more likely ($p<.001$) to make acquisitions, due to both higher abnormal returns ($p<.05$) and lower thresholds ($p<.001$).

Several industry control variables also had significant effects on expected performance, threshold, and acquisition. The target industry concentration ratio reduces ($p<.05$) expected performance and raises ($p<.001$) thresholds, leading to a negative effect ($p<.001$) on the likelihood of acquisition. Firms have an increased likelihood of making an acquisition in an industry with higher R&D intensity and higher systematic risk, apparently due to both better expected performance and lower thresholds.

5.3 Effects of Self-Selection Bias

A methodological problem of studying determinants of abnormal returns is that the dependent variable is only available for firms that make acquisitions, yet acquisitions are more likely for firms with higher expected performance. This creates a self-selection problem. To highlight the effects of self-selection bias on the analysis of abnormal returns, we compare column 4 in table 3, a simple ordinary least squares regression model without correction for self-selection bias, with column 1, which corrects for this bias. The magnitude of the self-selection

problem will differ for each predictor variable, depending on whether the variable is expected to be related to the selection function, in this case, acquisition. Variables that have a strong effect on acquisition, suffer more from self-selection, which biases downward their coefficients on abnormal returns in an uncorrected regression model, because firm that survive are expected to have higher values of these variables. By modeling abnormal returns effects with only acquiring firms, the distributions of affected variables fall within a narrower range, creating effects that are less significant. At its extreme, this bias might lead to the conclusion that variables have no effect when in fact they do; as is the case with Relatedness, CEO Duality, Financial Slack, Merger Waves, Systematic Risk, Industry R&D, and Acquisition Experience. In the case of target relatedness, for example, this bias might lead one to conclude that target relatedness has no effect on abnormal returns, when after eliminating survivorship bias, there appears to be a strong positive effect.[9] Looking at the economic significance of this bias, if a target falls within the 80% of relatedness instead of the 50%, the abnormal return increases by roughly 0.36% in the censored regression model (model 1), while in the non-censored regression (model 4) it increases only 0.01%.

In some cases self-selection bias can make insignificant coefficients appear to be significant in the expected performance equation. This bias was reflected most visibly in our measures of inside ownership. From column 4 it appears that inside ownership has a non-monotonic, u-shaped relationship with abnormal returns, a finding consistent with prior research. However, our results suggest that this conclusion reflects the potentially incorrect interpretation of biased results. Our earlier discussion suggested that firms with lower inside ownership were

[9] Balakrishnan (1988) tried to explain the lack of significant abnormal returns for related firms as due to a series of moves. But, our results suggest it may be due to selection bias.

more likely to enter simply because they were more willing to accept lower levels of expected performance. These examples emphasize the importance of controlling for self-selection bias and are consistent with Barnett, Greve, and Park (1994), who also found that controlling for selection bias substantially influenced the statistical effects of variables on performance.

7.0 Discussion

In this paper, we have challenged the unidimensional model that has argued that entry decisions are a result of expected performance. Our theoretical model and empirical results suggest that entry is made more likely by higher expected performance, but is not uniquely determined by it. Rather organizations have different required thresholds for performance, and acquisition is determined by whether expected performance falls above (or below) the threshold. Our results suggest that the thresholds of performance are fundamentally reduced when: a firm targets a more related firm, an option to defer acquisition has little value, acquisition creates a valuable growth option, a firm has more potential agency costs, the industry is in the midst of a merger wave, and a firm has lower aspiration levels. This paper is the first, we believe to provide empirical support for the assertion that thresholds of performance differ systematically across firms and play an important and distinct role in determining acquisition. Several of the results are worth highlighting because of the significant implications they have on existing theory.

First, we found that firms targeting more related industries have higher expected performance, as widely expected by resource based theory. However, the propensity to enter into related domains seems to be driven largely by lower thresholds in such domains. This explanation for related entry has not played an important role in resource based theory, but by isolating this variable's threshold effect our results strongly suggest the prevalence for related

entry is due to the lower sunk cost associated with such entry, and not merely higher expected performance due to synergy effects. This finding has significant implications for how we should interpret prior empirical work, and suggests strategic management scholars should think about the dual impact that relatedness may have on the acquisition decision. Our results also suggest that the effect of relatedness on abnormal returns is understated unless one controls for sample selection bias, a process that is seldom implemented in practice.

Second, we found that for some variables, their effect on expected performance and threshold was contradictory. For example, growth options and financial slack decreased expected performance and thresholds. However, by demonstrating that these variables have a positive influence on acquisition, our results suggest that their dominant influence is on the threshold. Apparently, changes in these variables influence thresholds more than abnormal returns.

Third, we found that some factors have important effects on acquisition, even when they do not influence expected performance. Factors such as CEO duality, inside ownership, and relative performance do not have any tangible effects on expected performance. Yet firms with higher levels of these attributes are willing to accept a lower level of expected performance to make an acquisition.

These findings provide strong support for our threshold model of entry and reconcile many of the inconsistent relationships previously found in diversification research: some factors significantly influence both expected performance and entry (relatedness), some influence entry more than expected performance (option to defer, performance relative to aspirations), and some influence entry but not performance (growth options, principal/agent misalignment). This evidence suggests that there are differences in determinants of expected performance and entry

and that research agendas ignoring the manager's choice to accept a given level of expected performance are incomplete.

There are some findings that, while not central to our theory, are quite intriguing. For example, it is not surprising that firms with acquisition experience should have higher abnormal returns, to the extent that they have developed the capabilities or scale to integrate target firms. At the same time, firms with more acquisition experience have lower thresholds. This invites speculation that for such firms, growth by acquisition becomes and inert part of a firm's strategic repertoire. An identical finding for merger waves may lead to different speculation. The fact that firms have lower thresholds in the midst of industry merger waves may suggest that their managers are irrationally adopting herd behavior. Finally, the fact that industry concentration raises thresholds may be the most indirect evidence yet that entry barrier effects are separate from performance effects.

Alternative Explanations

Our empirical findings may have alternative explanations. Our model assumes markets are semi-strong efficient, and abnormal returns reflect market expectations about performance expectations. If markets have already anticipated its reactions, then that would have the effect of weakening the performance effect, and enhancing the threshold effect. There is no reason we know of why this would produce systematic relationships with independent variables. However, certain variables may correlate with the market's ability to anticipate acquisition behavior. For example, markets may anticipate entry into related domains, which could account for the large threshold effect. It would seem to suggest, however, that relatedness should negatively influence abnormal returns, a result which does not occur. It may also be that markets anticipate diversified entry by firms having misaligned principal/agent relationships. Information on

corporate governance is widely available, and a plethora of research has documented the propensity for diversified entry in the face of inadequate governance. Again, one would expect a negative performance effect, which we do not find.

There are also some empirical limitations to our research, mainly because of shortcomings in data availability and measurement. Because we characterize thresholds as being partly a function of governance mechanisms, it was necessary to focus on public firms where such data was systematically available. It would be illuminating to replicate this study including private firms or firms in a single industry. In such contexts, we might better be able to approximate growth options and performance aspirations.

The concept of the threshold of performance outlined in this study can serve as an integrating construct for understanding all types of investment opportunities for all types of firms, not merely acquisitions for public firms. We have taken an initial step at answering why organizations differ in their thresholds, and have brought multiple theoretical perspectives to bear upon this question.

8.0 References

Agrawal, A., Jaffe, J. F., & Mandelker, G. N. 1992. The post-merger performance of acquiring firms: A reexamination of an anomaly. Journal of Finance, 47(4): 1605-1621.

Akerlof, G. A. 1970. The market for 'lemons': Quality, uncertainty, and the market mechanism. Quarterly Journal of Economics, 84: 488-500.

Alchian, A. A. & Demsetz, H. 1972. Production, information costs, and economic organization. American Economic Review, 62: 777-795.

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

Andrade, D., Mitchell, M., & Stafford, E. 2001. New evidence and perspectives on mergers. Journal of Economic Perspectives, 15(2): 103-120.

Aoki, M. 1984. The Co-operative Game Theory of the Firm. Oxford, UK: Oxford University Press.

Barnard, C. I. 1938. The Functions of the Executive. Cambridge, MA: Harvard University Press.

Berkovitch, E. & Naraynan, M. P. 1993. Motives for takeovers: An empirical investigation. Journal of Financial and Quantitative Analysis, 28(3): 347-362.

Bollerslev, T. 1986. Generalized autoregressive conditional heteroskedasticity. Journal of Econometrics, 31: 307-327.

Brenner, M., Sundaram, R. K., & Yermack, D. 2000. Altering the terms of executive stock options. Journal of Financial Economics, 57: 103-128.

Capron, L., Mitchell, W., & Swaminathan, A. 2001. Asset divestiture following horizontal acquisitions: A dynamic view. Strategic Management Journal, 22: 817-844.

Carruth, A., Dickerson, A., & Henley, A. 2000. What do we knout about investment under uncertainty? Journal of Economic Surveys, 14(2): 119-153.

Coles, J. W., McWilliams, V. B., & Sen, N. 2001. An examination of the relationship of governance mechanisms to performance. Journal of Management, 27: 23-50.

Cyert, R. M. & March, J. G. 1963. A Behavioral Theory of the Firm. Englewood Cliffs, NJ: Prentice-Hall.

Demsetz, H. & Villalonga, B. 2001. Ownership structure and corporate performance. Journal of Corporate Finance, 7(3): 209-233.

Dixit, A. K. & Pindyck, R. S. 1994. Investment Under Uncertainty. Princeton, NJ: Princeton University Press.

Gimeno, J., Folta, T. B., Cooper, A. C., & Woo, C. Y. 1997. Survival of the fittest? Entrepreneurial human capital and the persistence of underperforming firms. Administrative Science Quarterly, 42(4): 750-783.

Greve, H. R. 1998. Performance aspirations, and risky organizational change. Administrative Science Quarterly, 43: 58-86.

Heckman, J. J. 1979. Sample selection bias as a specification error. Econometrica, 47: 153-161.

Hyland, D. C. & Diltz, J. D. 2002. Why firms diversify: An empirical examination. Financial Management, 31(1): 51-81.

Jarrell, G. A. & Poulsen, A. 1989. The returns to acquiring firms in tender offers: Evidence from three decades. Financial Management, 18: 12-19.

Jensen, M. C. 1986. Agency Costs of Free Cash Flow, Corporate-Finance, and Takeovers. American Economic Review, 76(2): 323-329.

Jovanovic, B. 1981. Entry with Private Information. Bell Journal of Economics, 12(2): 649-660.

Levinthal, D. & March, J. G. 1981. A Model of Adaptive Organizational Search. Journal of Economic Behavior & Organization, 2(4): 307-333.

Maddala, G. S. 1983. Limited-Dependent and Qualitative Variables in Econometrics. Cambridge U.K.: Cambridge University Press.

Magenheim, E. B. & Mueller, D. C. 1988. Are acquiring firm shareholders better off after an acquisition? In J. C. Jr. & L. Lowenstein & S. Rose-Ackerman (Eds.), Knights, Raiders and Targets. Oxford, UK: Oxford University Press.

Manski, C. F. & McFadden. 1981. Alternative estimators and sample designs for discrete choice analysis. In C. F. Manski & D. McFadden (Eds.), Structural Analysis of Discrete Data with Econometric Applications: 2-50. Cambridge, MA: MIT Press.

Masten, S. E., Meehan, J. W., & Snyder, E. A. 1991. The Costs of Organization. Journal of Law Economics & Organization, 7(1): 1-25.

Matsusaka, J. G. 2001. Corporate diversification, value maximization, and organizational capabilities. The Journal of Business, 74(3): 409-431.

McDonald, R. & Siegel, D. 1986. The value of waiting to invest. Quarterly Journal of Economics, 101(4): 707-727.

Meyer, M. W. & Zucker, L. G. 1989. Permanently Failing Organizations. Newbury Park, CA: Sage.

Montgomery, C. A. & Hariharan, S. 1991. Diversified expansion by large established firms. Journal of Economic Behavior & Organization, 15(1): 71-89.

Murphy, K. 1985. Corporate performance and managerial remuneration: An empirical analysis. Journal of Accounting & Economics, 7: 11-42.

Myers, S. C. 1977. Determinants of Corporate Borrowing. Journal of Financial Economics, 5(2): 147-175.

Myers, S. C. & Majiluf, N. S. 1984. Corporate financing and investment decisions when firms have information that investors do not. Journal of Financial Economics, 13: 575-591.

Nelson, F. D. 1977. Censored regression models with unobserved stochastic censoring thresholds. Journal of Econometrics, 6.

Shleifer, A. & Vishny, R. W. 1994. Politicians and Firms. Quarterly Journal of Economics, 109(4): 995-1025.

Simon, H. A. 1945. Administrative Behavior. New York: Free Press.

Smith, J. P. 1980. Female Labor Supply: Theory and Estimation. Princeton, NJ: Princeton University Press.

Teece, D. J., Rumelt, R. P., Dosi, G., & Winter, S. G. 1994. Understanding corporate coherence - Theory and evidence. Journal of Economic Behavior & Organization, 23(1): 1-30.

Trigeorgis, L. 2000. Real Options: Managerial Flexibility and Strategy in Resource Allocation. Cambridge, MA: The MIT Press.

Table 1: Hypotheses

Factor	Effect on Expected Profit	Effect on Required Threshold	Net Effect on the likelihood of acquisition
Incentive Misalignment	0	-	+
Uncertainty	0	+	-
Unique Information about Growth Options	+	-	+
Relatedness of Target	+	-	+
Relative Performance	0	+	-

Table 2: Variables, Definitions, and Sources

Variable	Definition	Source
Relatedness	the likelihood that a firm operating in industry j will also operate in industry m, corrected for the expected degree of relatedness under the null hypothesis that diversification is random, where j represents the closest business segment in firm k's portf	Compustat
Industry Uncertainty	annual conditional variances generated from GARCH-M (1,1) model	CRSP
Market-to-Book	firm market value divided by the total book value of assets.	Compustat
CEO Duality	"1" if CEO is also Chairman of the Board; "0" otherwise	Compact Disclosure
Inside Ownership	Percent of stock owned by insiders	Compact Disclosure
Number of Large Blockholders	Number of blockholders owning at least 5 percent	Compact Disclosure
Financial Slack	the total amount of cash and short term investments that the firm holds subtracted from its total long term debt, then dividing by total firm assets. This value is then subtracted from one so that larger values will be associated with more financial slack	Compustat
Relative Performance	the difference between the firm's performance and the average industry performance.	Compustat
Waves	The total number of acquisitions in the target industry in the sample in the prior year.	SDC
Concentration	Four firm concentration ratio	Compustat
Systematic Risk	the covariance between the returns on each industry's stock index and the market return over the previous 60 months.	CRSP
Industry R&D	ratio of total industry R&D to total assets.	Compustat
Firm Size	natural log of total firm assets	Compustat
Firm Diversification	the sum of squared shares of each of the firm's business segments.	Compustat
Firm R&D	Ratio of firm R&D to total assets	Compustat
Acquisition Experience	Total number of acquisitions by the acquirer in the prior 3 years	SDC
All Cash	Equal to "1" if acquirer purchased with 100% cash, "0" otherwise.	SDC
All Equity	Equal to "1" if acquirer purchased with 100% equity, "0" otherwise.	SDC

Table 2: Descriptive Statistics and Pearson Correlation Coefficients (n=61,942)

	Variable	Mean	Std. Dev.	Min.	Max.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1	Relatedness	0.160	0.349	0.000	1.000	1.00																	
2	Industry Uncertainty	0.064	0.024	0.027	0.492	-0.05	1.00																
3	Market-to-Book	2.088	4.002	0.000	201.172	0.04	0.06	1.00															
4	CEO Duality	0.523	0.499	0.000	1.000	0.05	0.00	-0.01	1.00														
5	Inside Ownership	19.638	23.442	0.000	99.990	-0.06	0.00	0.04	-0.03	1.00													
6	Inside Ownership squared	935.176	1852.204	0.000	9998.000	-0.05	0.00	0.03	-0.03	0.93	1.00												
7	Number of Large Blockholders	3.267	2.521	0.000	31.000	0.03	0.03	-0.02	0.04	0.05	-0.01	1.00											
8	Financial Slack	0.973	0.385	-18.760	2.000	-0.02	0.03	0.18	-0.06	0.03	0.00	0.00	1.00										
9	Relative Performance	-0.025	1.509	-346.524	4.066	0.03	0.00	-0.14	0.01	-0.01	-0.01	0.02	-0.02	1.00									
10	Waves	16.934	67.780	0.000	907.000	0.34	0.12	0.12	0.02	-0.02	-0.02	0.03	0.09	0.02	1.00								
11	Concentration	0.089	0.120	0.008	1.000	-0.17	0.32	-0.02	-0.02	0.03	0.02	0.00	-0.01	-0.01	-0.12	1.00							
12	Systematic Risk	1.034	0.426	-2.978	3.732	0.09	-0.02	0.03	0.00	0.02	0.01	-0.01	0.03	0.01	0.14	-0.15	1.00						
13	Industry R&D	0.007	0.033	0.000	0.461	0.26	-0.09	0.04	0.01	-0.03	-0.03	0.01	0.07	0.02	0.24	-0.12	0.10	1.00					
14	Firm Size	5.132	2.357	-3.863	13.444	0.22	0.01	-0.13	0.15	-0.29	-0.21	0.00	-0.21	0.09	0.08	-0.06	0.00	0.04	1.00				
15	Firm Diversification	0.132	0.229	0.000	0.894	0.10	0.04	-0.09	0.09	-0.16	-0.11	-0.08	-0.15	0.02	0.00	-0.02	0.00	-0.02	0.40	1.00			
16	Firm R&D	0.540	13.856	-0.027	1639.000	-0.01	0.00	0.05	-0.01	0.00	0.00	0.01	0.06	-0.02	0.00	-0.01	0.00	0.01	-0.04	-0.02	1.00		
17	Acquisition Experience	2.412	4.888	0.000	79.000	0.22	0.04	0.02	0.06	-0.15	-0.11	-0.02	-0.10	0.02	0.15	-0.06	0.02	0.05	0.41	0.19	-0.02	1.00	
18	All Equity	0.047	0.211	0.000	1.000	0.30	0.01	0.12	0.02	-0.01	-0.01	0.03	0.08	0.01	0.25	-0.08	0.10	0.18	0.04	-0.02	0.00	0.08	1.00
19	All Cash	0.140	0.347	0.000	1.000	0.54	-0.05	-0.01	0.05	-0.09	-0.07	0.00	-0.06	0.03	0.19	-0.13	0.06	0.15	0.28	0.14	-0.01	0.25	-0.09

Table 3: Parameter Estimates of Expected Performance, Threshold of Performance, and Acqusition

	Joint Maximum Likelihood Model							
	Expected Performance CAR(-1,+1) (1)		Threshold of Performance (2)		Binomial Logit on Acquisition (3)		Non-censored Regression on CAR(-1,+1) (4)	
Variables	**Coef.**	**S.E.**	**Coef.**	**S.E.**	**Coef.**	**S.E.**	**Coef.**	**S.E.**
Relatedness	0.358 ***	(0.008)	-1.413 ***	(0.028)	6.874 ***	(0.122)	0.012	(0.007)
Industry Uncertainty	-0.472 **	(0.171)	0.696 **	(0.244)	-6.263 ***	(0.843)	-0.395 *	(0.156)
Market-to-Book	-0.008 ***	(0.001)	-0.017 ***	(0.001)	0.029 ***	(0.003)	-0.005 ***	(0.001)
CEO Duality	0.013	(0.007)	-0.036 ***	(0.010)	0.198 ***	(0.032)	-0.005	(0.006)
Inside Ownership	0.000	(0.000)	-0.003 ***	(0.001)	0.012 ***	(0.002)	-0.001 **	(0.000)
Inside Ownership squared	0.000	(0.000)	0.000 ***	(0.000)	0.000 ***	(0.000)	0.000 **	(0.000)
Number of Large Blockholders	0.002	(0.001)	-0.006 **	(0.002)	0.022 ***	(0.006)	0.000	(0.001)
Financial Slack	-0.038 **	(0.012)	-0.121 ***	(0.017)	0.379 ***	(0.052)	-0.012	(0.011)
Relative Performance	-0.004	(0.019)	-0.115 ***	(0.024)	0.566 ***	(0.079)	-0.016	(0.018)
Waves	0.000 **	(0.000)	-0.004 ***	(0.000)	0.027 ***	(0.001)	0.000	(0.000)
Concentration	-0.105 *	(0.045)	0.375 ***	(0.055)	-1.961 ***	(0.190)	0.078	(0.043)
Systematic Risk	0.036 ***	(0.010)	-0.121 ***	(0.014)	0.531 ***	(0.039)	-0.015	(0.010)
Industry R&D	0.152 *	(0.068)	-0.957 ***	(0.180)	3.478 ***	(0.526)	0.013	(0.059)
Firm Size	-0.009 ***	(0.002)	-0.044 ***	(0.003)	0.183 ***	(0.009)	-0.011 ***	(0.002)
Firm Diversification	-0.001	(0.015)	0.016	(0.023)	0.051	(0.070)	0.002	(0.014)
Firm R&D	0.000	(0.000)	0.001 *	(0.001)	-0.003	(0.002)	0.001	(0.000)
Acquisition Experience	0.001 *	(0.001)	-0.019 ***	(0.001)	0.075 ***	(0.003)	0.000	(0.000)
All Equity	0.580 ***	(0.012)					-0.031 **	(0.010)
All Cash	0.630 ***	(0.010)					0.019 *	(0.008)
Log-likelihood		-20,095.96			-15034.342			
N		61942			61942		15034	

** p < .05; *** p < .01; **** p < .001