

Multiple Bids as a Consequence of Target Management Resistance: A Count Data Approach

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Abstract. In this article, we focus on the question of target management resistance and the incidence of subsequent bids. A Poisson count data model is used where the dependent variable represents the number of bids (count) received and the independent variables comprise target management actions and firm specific characteristics. Of the target management actions considered, legal defense and the entry of a white knight are associated with additional bids. With respect to firm specific characteristics, we find that a high initial bid premium deters subsequent bids. Firm size is also significant and has an interesting relationship with the number of bids received. Larger target firms tend to receive more bids; however, the number of bids tails off for firms with assets exceeding \$12 billion.

Key words: Hostile takeovers, bidding contests, poisson model

1. Introduction

Target managements facing hostile tender offers often resist the takeover attempt by way of litigation and a whole range of anti-takeover measures. This defensive activity has led to some controversy and the formulation of two competing hypotheses.¹ The managerial entrenchment hypothesis essentially holds that in undertaking defensive actions, incumbent managers act in self-interest (to hold on to their jobs/perquisites) and against the interests of stockholders. The stockholder interest hypothesis contends that a diverse body of stockholders are at a competitive disadvantage when confronted with a hostile tender offer. They empower incumbent management to take actions necessary to elicit a fair bid price. It has been shown that when the tender offer fails, the stock price reverts to the pre-contest level (see Bradley et al. (1983)). In such cases, since target stockholders lose their premium, it could be argued ex post that target management was driven by entrenchment motives. From the stockholders' perspective, target management resistance ought to generate an auction that eventually leads to a successful takeover.

In this article, we consider a related but somewhat narrower question. We analyze successful tender offers which almost by definition are wealth enhancing to investors who hold stock in the target firm prior to the public announcement of the first bid. Our sample consists of target firms where management initially resisted the tender offer but eventually capitulated either to the original bidder or to some other bidder who may have entered the bidding process. From our sample construction, it should be clear that we have consciously

chosen to study those target firms whose managements appear to have been guided by stockholder interest, at least when viewed ex post. Our intention is not to revisit the management entrenchment versus stockholder interest hypotheses per se. Rather, conditioned on the premise that target management has acted in stockholder interest, our aim is to study (a) the nature of target management actions that lead to an auction type process and (b) whether an auction is spurred or inhibited by firm specific characteristics that are beyond management's immediate sphere of influence. We believe that our study contributes to the literature on the effects of target management resistance and may have implications for corporate policy.

We employ count data methodology in which the dependent variable represents the number of bids after the initial bid (count) received by the target firm.² For parametric estimation, we assume that our dependent variable follows a Poisson distribution. Furthermore, as estimates may be sensitive to the choice of model, it is essential to test the validity of the parametric assumptions (see MacKinnon (1992)). Accordingly, we implement two tests whose results support the Poisson specification for our application.

The mean of the Poisson distribution is a function of a set of independent variables, which comprise both target management actions and firm specific characteristics. Of the target management actions considered, legal defense and the induction of a white knight into the contest are significant and appear to generate further bids. As regards firm specific characteristics, a high initial bid premium apparently deters third parties from entering the bidding process, and hence is associated with fewer bids. Firm size is also a significant explanatory variable with larger firms receiving more bids. However, by including a size-squared variable we find that beyond a critical point (approximately \$12 billion in assets) the number of bids received by the target firm tends to decline. This finding is interesting since it suggests that in the initial stages, size has information value attracting further bids whereas at higher levels it represents a wealth constraint to bidders.

The rest of the article is organized as follows: In Section 2, we outline the data collection procedure and sample characteristics. Section 3 consists of an overview of count data methodology. Our results are presented in Section 4. Section 5 contains concluding remarks.

2. Data

The sample comprises firms that were targets of tender offers during the period 1978–1985. Target firms were identified from the Schedule 14D-1 filings which appear in the *Securities and Exchange Commission (SEC) News Digest*. A Schedule 14D-1 form has to be filed by the bidder with the SEC prior to the commencement of a tender offer. Subsequently, the *Wall Street Journal Index (WSJI)* was scanned to pick those firms which resisted the tender offer. In addition, the nature of target management resistance and the outcome of the tender offer were recorded. Our sample consists of 126 target firms which were taken over, within an observation period of 52 weeks.

In this study, the dependent variable represents the number of bids (count) after the initial bid received by the target firm. The following explanatory variables are considered; see Table 1 for details of sample characteristics.

Table 1. Descriptive measures of sample variables.

The sample represents 126 firms that were targets of tender offers during the period 1978–1985. Target firms were identified from the Schedule 14D-1 filings which appear in the *Securities and Exchange Commission News Digest*. The *Wall Street Journal Index* was scanned to pick those firms which resisted the tender offer and to record the nature of target management resistance. Relevant firm specific characteristics were obtained from various sources.

Variable	Mean	Std. Dev.
<i>Dependent Variable (count)</i>		
Number of subsequent bids	1.738	1.432
<i>Explanatory Variables</i>		
Legal Defense*	0.428	0.496
Real Restructuring*	0.182	0.387
Financial Restructuring*	0.103	0.305
White Knight*	0.595	0.492
Initial Bid Premium**	1.346	0.189
Institutional Holdings (%)	0.251	0.185
Size***	1.219	3.096
Regulation*	0.269	0.445

*These variables are binary taking value 1 when action is taken; 0 otherwise.

**Represents percentage excess over the stock price 14 days prior to the public announcement; 1.0 represents base level.

***Represents book value of total assets in \$ billions.

2.1. Target Management Actions

- i. **Legal Defense** takes value 1 if target management responds with a lawsuit; 0 otherwise. The choice of this variable is due to the Jarrell (1985) study. Jarrell concluded that target managements appear to take a value maximizing gamble by engaging in legal defensive activity. If the filing of a lawsuit, or the threat to do so, creates a delay in the tender offer process, this may allow other bidders to enter. On the other hand, if the lawsuit is perceived to be more than a delaying tactic, the original bidder may decide to withdraw the offer and other potential bidders may be similarly deterred. However, given the nature of our sample and the results from the Jarrell study, we expect this variable to have a positive influence on the number of bids received.
- ii. **Real Restructuring** takes value 1 if target management proposes some change in the asset structure; 0 otherwise.
- iii. **Financial Restructuring** takes value 1 if target management proposes some change in the ownership structure; 0 otherwise.

The two variables cited above were originally characterized by the Dann and DeAngelo (1988) study. This study strongly indicts target management for entrenchment behavior. If the Dann and DeAngelo findings carry over to our sample, we may

observe these type of actions dampening the auction process. However, as previously pointed out, our sample consists of successful tender offers which implies, at least ex post, that management may have been trying to secure the best deal for stockholders. Of course, it is always possible that management may have been actually trying to protect their own interests and gave up the fight on realizing that it was a lost cause. We are therefore neutral as to the effects of proposed changes in asset/ownership structure on the auction process.

- iv. **White Knight** takes value 1 if target management invites a friendly third party to enter the bidding; 0 otherwise.³ Our definition of a white knight resembles that followed by Banerjee and Owers (1992). This type of management action differs substantially from the type of actions discussed above. By inviting a friendly bidder into the contest, management is signaling that it is prepared to cede at least some control. The entry (or potential entry) of at least one additional bidder is expected to stimulate the auction process.

2.2. Firm Specific Characteristics

- v. **Initial Bid Premium** represents the percentage excess of the first hostile bid price over the market price of the firm's stock fourteen working days prior to the tender offer announcement. The idea is to select a time frame that allows for information leakage prior to the public announcement.⁴ We expect this variable to exercise a negative influence on additional bids. Our reasoning is that third party bidders are likely to be deterred by a high initial bid. This could be due either to a perception that the bidder is overpaying⁵ or the bid is preemptive in nature, which by definition should deter subsequent bids.
- vi. **Institutional Holdings** percentage serves as a proxy for stockholder independence. The percentage of institutional holdings to total outstanding stock was ascertained from the Standard & Poors' Stockholder Guide. If institutions play a monitoring role, target managements are less likely to engage in overt entrenchment behavior. Also, the presence of a seemingly uncommitted block of stockholders is clearly a plus from the perspective of potential bidders.⁶ Accordingly, we expect this variable to have a positive influence on the number of bids.
- vii. **Size** represents the total assets of the target firm, in book value terms, in \$ (billions). This information was collected from Compustat/Annual reports. The effect of size on the auction process is not obvious. If capital rationing is a practical reality, then size may operate as a wealth constraint to potential bidders. On the other hand, size may also proxy as an information variable. Tender offers for large firms are likely to receive more media coverage and thereby attract the attention of opportunistic bidders. We therefore include a size-squared variable to capture the potential non-monotonic effect of size on the expected number of bids.
- viii. **Regulation** takes value 1 if either the Federal Trade Commission or the Justice Department intervenes by way of requesting additional information or mounting a court challenge to the tender offer; 0 otherwise. We expect regulatory scrutiny to have a negative effect on the auction process.

3. Methodology

Information on many economic variables appears in the form of a count denoting the number of times a phenomenon has occurred. Regression models that fail to explicitly take this characteristic of the dependent variable into account are clearly inefficient. Count data regression models belong to a class of limited dependent variable models in which the dependent variable, Y_i , takes on only non-negative integer values. Recently, such models have been employed in econometric research with such applications as: number of visits to a doctor (Cameron and Trivedi (1986)), number of patents issued (Hausman et al. (1984)), number of daily homicides (Grogger (1990)), number of strikes (Cameron and Trivedi (1990)). In this article, we employ such a model in the context of the number of takeover bids received by a target firm after the initial bid.

Poisson regression models have been often used as a benchmark for analyzing count data. The Poisson probability distribution for Y_i is

$$P(Y_i = y_i) = \exp^{-\lambda_i} \lambda_i^{y_i} / y_i!, \quad i = 1, 2, \dots, N, \quad (3.1)$$

where $y_i = 0, 1, 2, \dots$, denotes the realized value of the dependent variable Y_i . Furthermore, the independent variables X_{ij} ($j = 1, \dots, k$) are incorporated by considering a regression specification of the form

$$\lambda_i = \exp(X_i \beta), \quad (3.2)$$

where β is an unknown vector of k parameters to be estimated. This specification ensures non-negative predictions given by $\hat{y} = \exp(X_i \hat{\beta})$.⁷ The parameter vector $\hat{\beta}$ is estimated by maximizing the following log-likelihood function derived from (3.1):

$$\mathcal{L} = \sum_{i=1}^N [-\exp(X_i \beta) + y_i(X_i \beta) - \ln(y_i!)]. \quad (3.3)$$

The mean of Y_i , conditional on X_i , is given by $E(Y_i/X_i) = \lambda_i = \exp(X_i \beta)$. Therefore, as $\partial E(Y_i/X_i) / \partial X_{ij} = \beta_j E(Y_i/X_i)$, the coefficients are interpreted as average proportionate changes in $E(Y_i/X_i)$ for a unit change in X_i .⁸

A property of the Poisson regression model is the conditional mean-variance equality of Y_i viz. $E(Y_i/X_i) = \text{Var}(Y_i/X_i) = \lambda_i$. This equality is often considered restrictive since real data frequently exhibit overdispersion. As failure of the above restriction can lead to distorted inferences, specification tests for a Poisson model are based on inspecting the conditional mean-variance discrepancies in the sample. A test of overdispersion is given by:⁹

$$T = \sum_{i=1}^N [(Y_i - \lambda_i)^2 - Y_i] / (2 \sum \lambda_i^2)^{1/2}, \quad (3.4)$$

where, asymptotically, T has a standard normal distribution under the null hypothesis of no extra variations with λ_i replaced by its maximum likelihood estimate. The value of this

statistic in our sample is -1.02 , implying no extra Poisson variations. Dean and Lawless (1989) propose an adjustment which makes the above test perform better in smaller samples. The sample value of this adjusted test statistic is -0.30 , which still supports the Poisson model.

4. Results

The central question that we seek to address in this study is whether target management resistance is associated with setting an auction process in motion. As outlined above, we employ a count data approach to capture the auction element in a takeover contest. A basic but relevant question is whether target stockholders are in fact better off under an auction scenario, i.e., are additional bids necessarily wealth enhancing?

To lay this foundation, we report the results of a standard event study analysis in Table 2. We compute cumulative average abnormal returns (CARS) over three event windows: $(-5, 60)$, $(0, 60)$ and $(+5, 60)$. This is done for the total sample as well as subsamples representing firms that received zero, one, two, three or more bids beyond the initial bid.

Table 2. CARS % (Z-Statistics¹ in parentheses).

Cumulative average abnormal returns (CARS)² over various event windows for the total sample and various subsamples based on number of additional bids received; day 0 corresponds to public announcement date of tender offer.

	Event Windows		
	$(-5, 60)$	$(0, 60)$	$(+5, 60)$
Total Sample ($N = 125$) ³	33.49 (24.40)*	20.59 (15.55)*	8.25 (6.63)*
Zero Bids Beyond Initial Bids ($N = 9$)	17.83 (3.53)*	8.76 (2.03)**	-3.65 (-0.35)
One Bid Beyond Initial Bid ($N = 62$)	37.50 (17.72)*	22.93 (10.96)*	8.83 (3.86)*
Two Bids Beyond Initial Bid ($N = 31$)	24.52 (10.64)*	13.94 (6.29)*	4.25 (2.66)*
Three or More Bids Beyond Initial Bid ($N = 23$)	40.92 (13.23)*	27.90 (9.68)*	16.76 (6.24)*

*represents significance at $\alpha = 0.01$

**represents significance at $\alpha = 0.05$

1. Z-Statistics computed as per standard procedure in the literature. Refer to Dodd and Warner (1983) for details.
2. CARS estimated based on the standard market model approach. Market model parameters were estimated from days -150 through -31 relative to the event date.
3. One firm had to be dropped from the original sample due to insufficient data points in the estimation period.

Table 3. Poisson model estimation results.

A Poisson count data model is estimated where the dependent variable represents the number of bids (count) after the initial bid received by the target firm. The explanatory variables considered are various target management actions and firm specific characteristics.

Variable	Coefficient	t-Statistics
Constant	0.986	1.846**
<i>Target Management Actions</i>		
Legal Defense	0.260	1.723**
Real Restructuring	-0.195	-1.015
Financial Restructuring	0.074	0.341
White Knight	0.481	3.030*
<i>Firm Specific Characteristics</i>		
Initial Bid Premium	-0.677	-1.798**
Institutional Holdings	-0.361	-0.853
Size	0.178	2.970*
Size Squared	-0.007	-2.416*
Regulation	-0.029	-0.183

*represents significance at $\alpha = 0.01$

**represents significance at $\alpha = 0.10$

Tests of Poisson Specification (Mean-Variance Equality)

Standard Test Statistic = -1.02 ($p = 0.3078$)

Dean-Lawless Adjusted Test Statistic = -0.30 ($p = 0.7642$)

The pattern that emerges confirms the intuition that target stockholders are indeed better off receiving more rather than fewer bids. The CARS are highest for the “three or more bids” subsample and lowest for the “zero bids” subsample across all event windows. Moreover, the mean CARS for subsamples with higher bids is significantly greater than the mean CARS for subsamples with lower bids within each event window.¹⁰ This is verified by a series of “differences in means” t-tests at the referee’s suggestion.

The estimation results of the Poisson model are presented in Table 3. We find that of the target management action variables, legal defense and white knight are significant with positive coefficients (implying more counts) as hypothesized. Legal defense probably works by inducing delay in the process that allows potential bidders to enter. This result broadly comports with the Jarrell (1985) study, which was carried out in the more traditional wealth measurement (excess returns) framework. The white knight variable is strongly significant (p -value = 0.003). Clearly the entry of a friendly bidder facilitates the auction process and benefits target stockholders. This finding also complements the recent results reported by Banerjee and Owers (1992), who show that white knight bidders on average experience negative returns. While a takeover contest is generally not a zero-sum game, we infer that a white knight strategy by target management is successful in bidding up the offer price. The financial and real restructuring variables appear to be neutral in terms of their effect on the number of bids received by target firms.

So far as firm specific characteristics are concerned only the initial bid premium and size variables are significant. The level of institutional ownership and regulatory intervention apparently do not influence the bidding process. The bid premium coefficient is negative, which implies that a high initial bid premium deters subsequent bids. This result suggests that there may be value to preemptive bidding.¹¹

An interesting result pertains to the relationship between target firm size and the number of bids received. We reiterate our reasoning regarding the size variable as follows: *ceteris paribus*, an increase in target firm size is associated with fewer bids; the idea being that potential bidders would bump into a wealth constraint. Alternatively, since media coverage of the takeover contest is generally proportionate to target firm size, a larger firm may attract more bids by virtue of being in the public eye. In a sense, subsequent bidders enjoy an informational free ride. As both these effects may be present, we attempt to capture the postulated non-monotonic relationship between size and expected bids by including a size-squared variable along with a size variable.¹²

From Table 3, we find that both the size and size-squared variables are strongly significant with positive and negative coefficients respectively. This suggests that for smaller firms, the information effect dominates the wealth constraint effect leading to further bids. However, size represents a wealth constraint that operates as a deterrent to additional bids for very large target firms. The information effect for these firms may be muted since they are extensively covered by the financial press even prior to the takeover bid.

We investigate the size effect further by simulating the number of additional bids associated with different firm sizes holding other regressors constant at their mean values (refer to Figure 1). We observe that for most firms the information effect appears to be predominant. It is possible that the size variable captures more than just information release, via media coverage, about a target firm going into play. For instance, Roll (1988) summarizes the argument regarding the connection between executive rewards and firm size. The managers of the bidder firms may have an incentive for growth, including growth by takeover, even when there is no anticipated gain for their shareholders. This can be an added rationale for larger target firms attracting more bids.

The wealth constraint effect is significant only for firms with total assets exceeding \$12 billion, which represent a small proportion of our sample. At first glance, the finding that the wealth constraint kicks in at such a high level is surprising. However, it should be noted that the late seventies and eighties (the period represented by our sample) were characterized by relatively easy access to debt capital for corporate restructuring activity.

5. Conclusion

In this article we implement a relatively new methodology in the area of corporate finance. We use a count data model to explain the variations in the numbers of bids received by firms whose managements resist takeover. We first confirm using a standard event study approach that there is a positive association between the number of bids received and target stockholder wealth. We find that of the target management actions considered, legal defensive activity and the induction of a white knight are significantly associated with additional bids. Our findings spring from an examination of successful tender offers and may provide policy directions to future target managements, whose intent is to maximize stockholder interest.

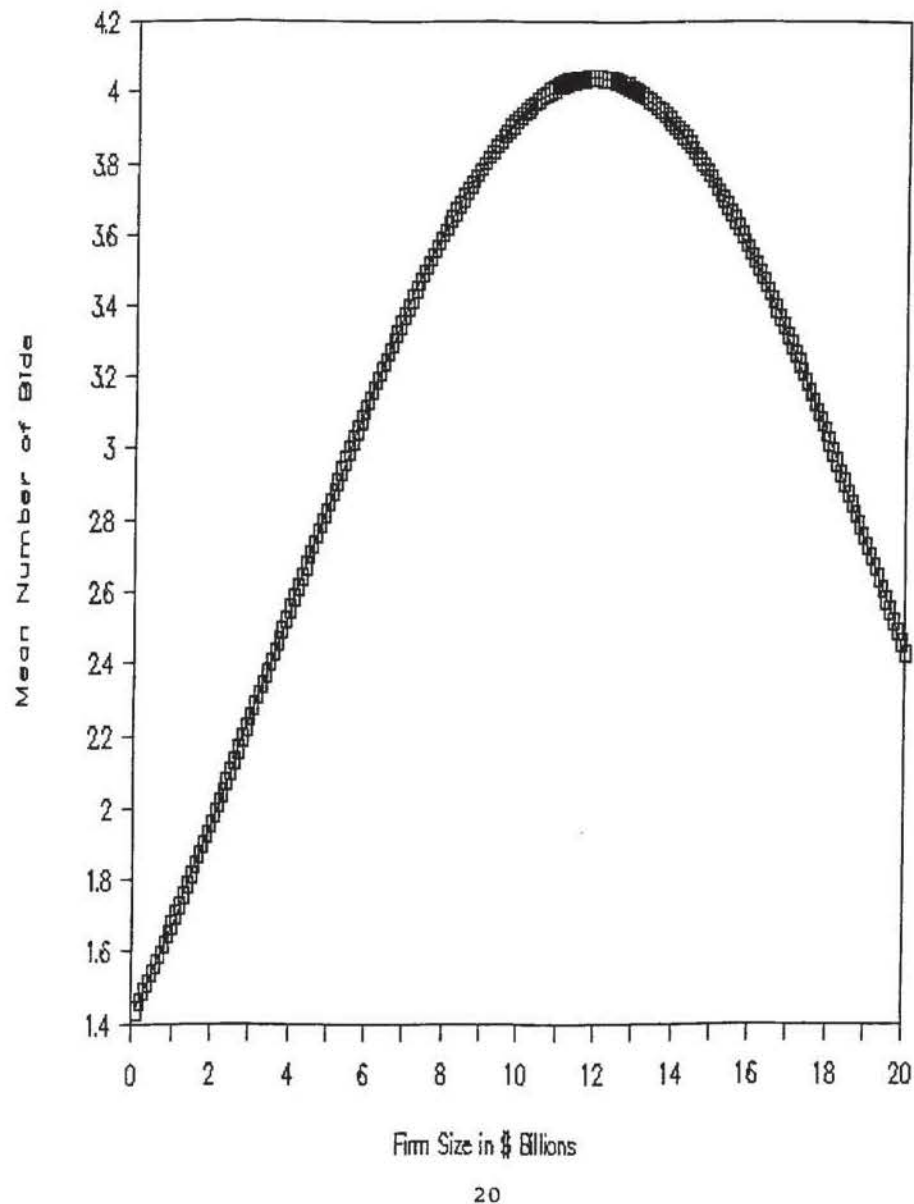


Figure 1. Simulated effect of firm size on mean number of bids.

In a more positive line of inquiry, we also examine various firm specific characteristics and their effect on the auction process. A high initial bid premium seems to preempt further bids. Further, firm size has a non-monotonic effect on additional bids. Except for very large target firms (assets exceeding \$12 billion), size is positively associated with additional bids.

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Notes

1. See, for example, DeAngelo and Rice (1983).
2. We confirm using a standard event study approach that additional bids are in fact wealth enhancing to target stockholders. Details are provided in the results section.
3. The inclusion of this variable is due to the referee's suggestion that we consider the influence of friendly bids.
4. The precedent for fourteen days was set in Walking (1985), who employs a logit model to predict takeover success.
5. For instance, refer to Varaiya and Ferris (1987) for an analysis of the winner's curse.
6. Refer to Brickley, Lease and Smith (1988) on the role of institutional investors in the context of voting on anti-takeover amendments proposed by management.
7. Note that the standard linear regression models do not guarantee non-negative predictions.
8. In linear regression models, the coefficients $\beta_j = \partial E(Y_i/X_i)/\partial X_{ij}$ simply measure changes in $E(Y_i/X_i)$ for a unit change in X_{ij} .
9. Refer to Cameron and Trivedi (1990) and Dean and Lawless (1989) for details.
10. The one kink in the pattern is that the CARS for the "two bid" subsample are lower than those for the "one bid" subsample. Other than this one irregularity, our results support the association between number of bids and stockholder wealth maximization.
11. Refer to Fishman (1988) for a theoretical treatment of preemptive bidding in takeover contests.
12. Even though our specification, (3.2), implies non-linear influences of regressors on expected counts, the non-monotonic effect of a given regressor is captured by including its squared value as an additional variable.

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