

**The Effect of Merger Anticipation  
on Bidder and Target Firm Announcement Period Returns**

by

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**Abstract**

This paper investigates the extent to which investors anticipate bidder and target merger candidacy and if investor anticipations about candidacy affect the distribution of value between bidder and target firm shareholders. We find that investors can predict bidder firms more successfully than target firms. To investigate how value is distributed among bidder and target shareholders, we control for different degrees of predictability in bidder and target selection. Once we account for greater predictability in bidder firm candidacy, the difference between bidder and target firm seven-day cumulative abnormal returns around a merger announcement decreases significantly. Thus, the evidence supports the hypothesis that to some extent the asymmetry in investor anticipations of merger parties causes disparity in bidder and target firm announcement period abnormal returns.

**JEL Descriptors**     G34

**Key words;** Mergers and Acquisitions, Corporate Governance, Announcement Period Stock returns.

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## **The Effect of Merger Anticipation on Bidder and Target Firm Announcement Period Returns**

### **1. Introduction**

Surveying merger studies, Jensen and Ruback (1983), Jarrell et al. (1988), and Andrade et al. (2001) report that announcement period cumulative abnormal returns to target firm shareholders are substantial (around 20 percent) whereas cumulative abnormal returns to bidder firm shareholders are insignificant (around 0 percent). The question remains, why target shareholders seem to be enjoying the majority of value generated by a merger.<sup>1</sup> A crucial assumption in event studies of merger announcements is that investors learn merger-related information in a short window of time. However, if investors can predict merger announcements, this important assumption is violated. To the extent that investors anticipate bidder and target firm candidacy, abnormal returns around merger announcements do not measure the market's full assessment of the benefits that shareholders enjoy. Within the event window, announcement period abnormal returns measure investors' responses only to unanticipated information that announcements convey.

This paper investigates the extent to which investors anticipate bidder and target firm merger candidacy and if investor anticipations about candidacy affect the distribution of announcement period returns between bidder and target firm shareholders. We link anticipations about merger candidacy to stock price announcement period returns using a two-stage model with an adjustment for simultaneous-equations bias. The selection equations model bidder and target candidacy. The structural equations model bidder and target cumulative abnormal returns around merger announcements. We then investigate if and how predictability in merger candidacy affects bidder and target cumulative abnormal returns.

We find that investors can predict bidder firms more successfully than target firms. As a result, some bidder firm, merger-related information is stale at the time of announcements. However, the information that merger announcements reveal about targets is less stale. As a consequence of the difference in the freshness of information revealed at a merger announcement, it is not surprising that previous research has found that target firm CARs are larger in magnitude than bidder CARs. Without controlling for differences in predictability of merger candidacy, it is incorrect to conclude that target shareholders capture the majority of the value gains that mergers generate. Once we account for greater predictability in bidder firm candidacy, the difference between bidder and target firm seven-day cumulative abnormal returns around a merger announcement decreases

significantly. Thus, the evidence supports the hypothesis that to some extent asymmetry in investor anticipations of merger parties causes the disparity in bidder and target firm announcement period abnormal returns.

Several empirical studies investigate investor anticipations in the context of merger programs (Schipper and Thompson (1983), Asquith et al. (1983), Malatesta and Thompson (1985), Fuller et al. (2002), Ismail (2005), and Song and Walkling (2000, 2005)). The focus of these studies is to find a single characteristic that differentiates anticipated and unanticipated bidder firms *or* anticipated and unanticipated target firms. These papers then develop a candidacy model that is limited to a single instrumental variable. While this approach represents an easy and intuitive way to address investor anticipations, a model that considers the effect of investor anticipations about *both* bidder and target candidacy, rather than on *either* bidder or target candidacy, and that allows for multiple motives of mergers can more accurately measure investor anticipations about candidacy.

The contribution of this paper is fourfold: i) we investigate the effect of investor anticipations on both bidder and target candidacy, rather than on either bidder or target candidacy, to allow us to examine how any value that mergers generate is divided between bidder and target shareholders, ii) we develop a more complete model of investor anticipations of both bidder and target firm candidacy by incorporating multiple merger motives; iii) we analyze how investor anticipations about candidacy affect stock price responses to merger announcements; and iv) we investigate what stock price responses to merger announcements reveal about managerial motives underlying the mergers.

The remainder of the paper is organized as follows. Section 2 develops the testable hypotheses. Section 3 outlines the research methodology and describes the data. Sections 4 and 5 report and interpret results of the models of merger candidacy and merger announcement cumulative abnormal returns, respectively. Finally, Section 6 concludes the paper.

## **2. Testable hypotheses**

If managers had no discretion over whether to merge, with whom to merge, or when to merge, merger announcements would be random. Random announcements would mean that investors could not predict merger candidacy. However, merger announcements are not random. Thus, investors can anticipate managerial motives and try to predict merger activity. This leads to our first hypothesis:

*H<sub>10</sub>: Using information available prior to merger announcements, investors can not predict bidder and target firm candidates.*

*H<sub>1a</sub>: Using information available prior to merger announcements, investors can predict bidder and target firm candidates.*

In an efficient market stock prices should incorporate the projected net benefits of possible mergers when they are anticipated. Therefore, if investors can predict merger candidacy, some information revealed in an anticipated merger is stale. Thus, in these anticipated mergers announcement period abnormal returns should be smaller than returns in unanticipated mergers. This leads to our second hypothesis:

*H<sub>20</sub>: Announcement period abnormal returns in anticipated mergers should not be significantly different from abnormal returns in unanticipated mergers.*

*H<sub>2a</sub>: Announcement period abnormal returns in anticipated mergers should be significantly different from abnormal returns in unanticipated mergers.*

Managers choose to merge only when it serves their interests. Thus, investors observe merger announcements only when manager merger-related benefits are sufficiently high. As a result, merger announcements disclose previously unobservable information about motives of bidder and target firm management to investors. To determine the value of the merged firms, investors want to learn as much as possible about managerial motives to merge. Managerial motives mix a desire to generate shareholder value with the pursuit of opportunistic benefits that are good for firm managers but destroy firm value. If investors determine that managerial motives to merge emphasize shareholder value creation, stock price responses to merger announcement should be positive. If investors determine that managers are predominantly pursuing opportunistic benefits with a merger that result in firm value reductions, stock price responses to merger announcement surprises should be negative. Thus, our third hypothesis is:

*H<sub>30</sub>: Investors do not price information revealed about managerial motives as evidenced by insignificant stock price responses to merger announcements.*

*H<sub>3a</sub>: Investors price information revealed about managerial motives as evidenced by insignificant stock price responses to merger announcements.*

### **3. Methodology and Data**

This section develops the two-equation framework used to model investor anticipations of merger candidacy and of bidder and target firm abnormal returns at a merger announcement. The sample used to test the model is then described.

### 3. a. Two-equation model of investor anticipation of and stock price responses to merger announcements

As described above and previously in the literature, managers may be motivated to merge in order to generate shareholder value and/or to pursue opportunistic benefits that benefit managers but destroy firm value. Accordingly, equations 1 and 2 model managerial choice to propose and solicit merger bids, respectively. Specifically, we let  $M_B^*$  and  $M_T^*$  denote imperfectly observable merger-related benefits that bidder and target firm management realize, respectively. The regressors,  $X_{IB}$  and  $X_{IT}$ , are firm and industry characteristics that investors might use to measure managerial merger-related benefits and  $X_{IB}\gamma_B$  and  $X_{IT}\gamma_T$  are investor's estimates of merger benefits that accrue to bidder and target firm management, respectively. Finally,  $\varepsilon_B$  and  $\varepsilon_T$  are the unanticipated or unobservable benefits of the merger.

$$M_B^* = X_{IB}\gamma_B + \varepsilon_B; \quad \begin{array}{l} \text{if } M_B^* > 0, \text{ the bidder proposes a merger bid} \\ \text{if } M_B^* < 0, \text{ the bidder does not propose a merger bid} \end{array} \quad (1)$$

$$M_T^* = X_{IT}\gamma_T + \varepsilon_T; \quad \begin{array}{l} \text{if } M_T^* > 0, \text{ the target receives/solicits a merger bid} \\ \text{if } M_T^* < 0, \text{ the target does not receive/solicit a merger bid} \end{array} \quad (2)$$

Investors cannot directly observe managerial motives or benefits associated with a merger ( $M_B^*$  and  $M_T^*$ ). However, investors do observe merger announcements. We define  $M_{Bidder}$  and  $M_{Target}$  as dummy variables that take a value of 1 if a firm proposes ( $M_{Bidder}$ ) or receives ( $M_{Target}$ ) at least one merger bid in the next quarter and 0 otherwise. We then run probit regressions of  $M_{Bidder}$  and  $M_{Target}$  on predictors of merger candidacy,  $X_{IB}$  and  $X_{IT}$ , to estimate investor's anticipations of bidder and target candidacy.

Managers choose to merge only when it serves their interests. Thus, investors observe merger announcements (i.e.,  $M_{Bidder}$  and  $M_{Target}$  take on a value of one) only when manager merger-related benefits are sufficiently high ( $M_B^* > 0$  and  $M_T^* > 0$ ). As a result, merger announcements disclose direct information about the merger as well as indirect information about managerial motives driving the merger.

Equations 3 and 4, respectively, model bidder and target cumulative abnormal returns (CARs) that are conditional on firms proposing or receiving a merger bid (i.e.,  $CAR_B | M_B^* > 0$  and  $CAR_T | M_T^* > 0$ ). In this model, merger announcements reveal previously unknown information such as identity of the merger partners and

terms of the merger contract ( $X_{2B}$  and  $X_{2T}$ ), as well as about previously unobservable managerial motives ( $\varepsilon_B | M_B^* > 0$  and  $\varepsilon_T | M_T^* > 0$ ). The inferences drawn about managerial motives for a merger influence how investors price the post-announcement enterprise ( $[\varepsilon_B | M_B^* > 0]\beta_{\varepsilon B}$  and  $[\varepsilon_T | M_T^* > 0]\beta_{\varepsilon T}$ , where  $\beta_{\varepsilon B}$  and  $\beta_{\varepsilon T}$  are regression coefficients which measure how investors price the information inferred about managerial motives from the merger announcement). Finally,  $\eta_B$  and  $\eta_T$  are the error terms in the regression equations.

$$CAR_B | M_B^* > 0 = X_{2B}\beta_B + (\varepsilon_B | M_B^* > 0)\beta_{\varepsilon B} + \eta_B; \quad (3)$$

$$CAR_T | M_T^* > 0 = X_{2T}\beta_T + (\varepsilon_T | M_T^* > 0)\beta_{\varepsilon T} + \eta_T. \quad (4)$$

A problem with the model in equations 3 and 4 is that we are using a nonrandomly selected sample to estimate behavioral relationships surrounding the choice to merge. That is, we analyze only those firms that chose to enter a merger. We do not (and can not) identify and analyze those firms that chose not to enter a merger. This procedure results in a specification bias that arises because of a missing data problem, i.e., the regressions estimated on the selected sample of merging firms do not estimate population regression functions. In other words, the regressions in equations 3 and 4 suffer from a simultaneous equations bias in that they confound the behavioral parameters of interest with parameters of the function determining the probability of entrance into the sample.

Heckman (1979) develops a two-stage selection model that estimates behavioral functions using least squares methodology and is free from this simultaneous equations bias. Specifically, Heckman's "lambda" adjusts for the simultaneous equations bias that arises in a single equation structural model when the structural and selection equations are influenced by the same variables. We use Heckman's lambda to study how investor anticipations influence stock market responses to merger announcements.

Heckman's lambda is an instrumental variable constructed using the parameter estimates of the candidacy models. Specifically, in the bidder and target equations 3 and 4, Heckman's lambdas are inverse transformations of the probability that a firm will propose or solicit a merger bid, respectively. The greater the surprise in a merger announcement, the greater is the information revealed about unanticipated merger

motives, and the larger is Heckman's lambda. Hence, Heckman's lambda is intuitively a measure of the extent to which a merger announcement surprises the market. As in Heckman (1979), we let

$$\lambda_j = (\varepsilon_j | M_j^* > 0) = \frac{\phi(-Z_j)}{1 - \Phi(-Z_j)}, \quad j = B, T,$$

where  $\phi$  and  $\Phi$  are, respectively, the density and distribution functions for a standard normal variable  $Z_j$ ,

$$Z_j = \frac{X_{1j}\gamma_j}{\sigma_{11j}^{\frac{1}{2}}}, \text{ and } \lambda_j \text{ is the inverse of Mill's ratio. Lambda is a monotone decreasing function of the probability that a}$$

merger announcement enters the sample,  $\Phi(-Z_j) = 1 - \Phi(Z_j)$ . Thus, equations 5 and 6 represent second-stage structural models of bidder and target CARs, respectively:

$$CAR_B | M_B^* > 0 = X_{2B}\beta_B + \lambda_B\beta_{\lambda B} + \eta_B; \quad (5)$$

$$CAR_T | M_T^* > 0 = X_{2T}\beta_T + \lambda_T\beta_{\lambda T} + \eta_T. \quad (6)$$

A priori we cannot assign a negative or positive coefficient estimate to Heckman's lambda. This is because unanticipated motives for a merger can be a mix of the manager's motives to generate shareholder value and to obtain opportunistic managerial benefits. The coefficient on Heckman's lambda would be positive when investors assess that manager's motives for entering a merger are to promote the interests of shareholders more than to obtain opportunistic benefits that would harm share value. The coefficient of Heckman's lambda would be negative when investors assess that manager's motives for entering a merger are to obtain opportunistic benefits that would harm share value more than to promote the interests of shareholders.

Econometrically, the use of Heckman's lambda allows for the identification of the two-stage selection model. Further, the same set of variables can be used in the selection and structural equations, and both equations would be correctly identified. Regardless, there are some variables that drive the merger decision without affecting CARs and vice versa. The isolation of these variables in the appropriate model (selection or structural) provides a stronger basis for identifying the model. For example, prior to a merger announcement, investors estimate managerial motives for a merger using publicly available information. Accordingly, to predict candidacy we only use information that is publicly available prior to a merger announcement. We do not include information on the items of negotiations, merger terms, and merger fit in the selection model since

investors do not have access to this information prior to the announcements. Conversely, we exclude information that is publicly available prior to a merger announcement from the model of CARs because in efficient markets, share prices should already reflect this information. Accordingly, to evaluate merger announcement CARs, we use only information that becomes available at the merger announcement: items of negotiation, merger terms, fit between merger partners, and unanticipated merger motives.

### **3. b. Sample Data**

The sample examined in this paper includes both merging and nonmerging firms. The sample of merging firms is compiled from the Security Data Company's (henceforth SDC) US Mergers and Acquisitions database. The sample includes those mergers announced between July 1, 1979<sup>2</sup> and December 31, 2004. We focus only on mergers that transfer control rights from the target to the bidder firm. Intent to transfer control rights is characterized by two conditions: i) the bidder owns less than 50 percent of outstanding target shares prior to the merger, and ii) the bidder proposes to own more than 50 percent of outstanding target shares when and if the merger is completed. We use the SDC data items labeled as "menumain" and "formc" to identify those mergers that involve intent to transfer control rights.<sup>3</sup>

The sample of merging firms includes nonfinancial U.S.-based enterprises. We restrict the sample to U.S. firms due to data restrictions on foreign firms. We restrict the sample to nonfinancial firms because the regulatory environment requires a separate analysis for financial institutions. Finally, because share price information cannot be observed for non-public firms, at least one of the two firms involved in the merger must be publicly traded.<sup>4</sup> The sample of nonmerging firms is compiled from the CRSP-COMPUSTAT combined database. We apply the same sample selection criteria to the nonmerging firms as we apply to the merging firms. That is, the nonmerging firm sample includes only U.S.-based, nonfinancial firms.

Recognizing that investors dynamically update their expectations of a merger, we want to use data that are recorded at frequent intervals. The quarterly industrial CRSP-COMPUSTAT database compiles the most frequent financial statement data. Thus, our observation unit is a firm quarter. The sample covers 102 quarters running from the third quarter of 1979 to the fourth quarter of 2004. For the merging and nonmerging firms in the sample, we label each firm in each quarter as a bidder, a target, or a nonmerging firm in that quarter. That is, based on SDC announcement dates for the merging firm sample, a firm in the CRSP-COMPUSTAT sample

is identified as a bidder firm in a given quarter if it proposes at least one merger bid<sup>5</sup> in the next financial statement release quarter, a firm is identified as a target firm if it receives at least one merger bid in the next quarter, and a firm is identified as a nonmerging firm in a given quarter if it neither proposes nor receives a merger bid in the next quarter.<sup>6</sup> We drop any quarter in which we do not identify any bidder or target firms. Using the filters and classification described above, 3,892 firms propose 8,252 bids in 8,079 firm quarters, 3,438 firms receive 3,908 bids in 3,854 firm quarters, and 14,090 firms neither propose nor receive bids in 513,529 firm quarters. Therefore, the bidder subsample includes 8,079 firm quarters, the target subsample includes 3,854 firm quarters, and the nonmerging subsample includes 513,529 firm quarters.

#### **4. Predicting bidder and target candidacy**

In this section, we describe the variables used to predict bidder and target candidacy and thus, management's motives for a merger. As stated above, we include only variables that represent information that is publicly available prior to a merger announcement. All balance sheet data is taken from the CRSP-COMPUSTAT database for each quarter over the sample period. To reduce the effect of outliers, we winsorize the variables at the 1st and 99th percentiles. Table 1 summarizes the variables used in the models. The descriptive statistics for the variables are listed Appendix A to the paper.

##### **4. a. Variables that measure management's motives to generate shareholder value**

Previous studies have found that a merger may increase shareholder value in four ways: i) by reallocating resources to withstand economic disturbances (Gort (1969), Mitchell and Mulherin (1996), Maksimovic and Phillips (2001), and Andrade et al. (2001)); ii) by achieving economies of scale and scope (Gort (1969), Palepu (1986), Ambrose and Megginson (1992), Moeller et al. (2004), and Fluck and Lynch (1999)); iii) by gaining access to additional sources of capital that allow the firm to grow (Fluck and Lynch (1999), Palepu (1986), Ambrose and Megginson (1992), Lang et al. (1989), Holmes and Schmitz (1995), Maksimovic and Phillips (2001), and Jovanovic and Rousseau (2002)); and iv) by exploiting discrepancies in valuation (Gort (1969)).

Mergers may be motivated by management's desire to withstand economic disturbances that may affect firm sales, profit, and value. Thus, larger economic disturbances experienced by a firm could be used to predict bidder and target merger candidacy. We adopt the Mitchell and Mulherin (1996) sales shock variable as our proxy for economic disturbances. That is, we define *sales shock* as the absolute value of the difference

between the two-year median industry<sup>7</sup> sales growth rate and the two-year median sales growth rate for all firms listed in our sample. To account for convexity in the sales shock variable, we include a second variable, the *square of sales shock*.

The desire to reduce costs through economies of scale and scope might also motivate mergers. Two measures of scale and scope are firm size and firm sales levels. If economies of scale or scope exist, firm size, changes in firm size, and changes in firm's sales could predict bidder and target firm merger candidacy (Gort (1969), Palepu (1986), Ambrose and Megginson (1992), and Moeller et al. (2004)). We use the log of total assets as the measure of firm *size*. We define *change in size* as the percentage change in the firm's total assets over the previous two years and *sales growth* as the percentage change in the firm's sales over the previous two years.

Models of economic disturbance and economies of scale and scope both suggest that barriers to entry and exit (due to economic conditions or size) could be used to predict bidder and target candidacy. Gort (1969) and Eckbo et al. (1990) use a measure of concentration ratio as a proxy for barriers to entry. Specifically, they use a concentration ratio as a measure of how much of the output (according to Gort (1969)) or sales (according to Eckbo et al. (1990)) the four largest firms in the industry control. A low concentration ratio is associated with low barriers to entry and exit, and therefore, a higher likelihood of merger. We adopt this measure of barriers to entry and define *concentration ratio* as the ratio of sales of the largest four firms (in terms of sales) to total industry (using a two-digit SIC) sales.

Mergers may enable firms to gain access to additional sources of capital (Fluck and Lynch (1999), Palepu (1986), and Ambrose and Megginson (1992)) and thus, allow well managed firms to grow (Lang et al. (1989), Holmes and Schmitz (1995), Maksimovic and Phillips (2001), and Jovanovic and Rousseau (2002)). Following Palepu (1986) and Ambrose and Megginson (1992), we define *resource-growth-mismatch* as a dummy variable equal to one if i) sales growth for a firm in the last two years is less than the industry median and the long-term debt ratio (ratio of book value of long-term debt to total assets) is greater than the industry median, or ii) if sales growth in the last two years is greater than the industry median and the long-term debt ratio is less than the industry median, and zero otherwise. The measure represents management motives to access new sources of capital. That is, this variable identifies firms with either growth opportunities but

insufficient capital access, or with insufficient growth opportunities but capital access. Thus, larger resource-growth-mismatch experienced by a firm could be used to predict merger candidacy.

Further, bidder firms with superior management that acquire poorly managed target firms (and their underutilized capital) are more likely to employ post-merger assets more efficiently. A gauge of a well managed firm is profitability, which we measure as *return on assets (ROA)*. *ROA* is calculated as the ratio of net income before extraordinary (or nonrecurring) items to total assets. Thus, a larger *ROA* for a firm could be used to predict merger candidacy.

Gort (1969) predicts that discrepancies in valuation may prompt mergers. Gort measures discrepancies in firm valuation as of low share turnover. Specifically, the fewer the shares traded of a firm relative to shares outstanding, the less transparent is the share price. Thus, when share turnover is low it is more difficult to determine the extent of any discrepancies in valuation between bidder and target firm management. Following Gort, we expect that the lower a firm's share turnover, the more likely it is that the firm proposes and/or receives a merger bid. We define *share turnover* as the ratio of the number of shares of stock traded for the firm to the total shares outstanding and use this measure as a proxy for discrepancies in valuation. Share data are collected from the CRSP-COMPUSTAT quarterly database, which lists the number of shares traded and outstanding in each quarter. A low share turnover could be used by investors to predict merger candidacy.

#### **4. b. Variables that measure management's motives to generate opportunistic benefits**

Jensen and Meckling (1976) model investment decisions when imperfect contracting and costly monitoring allow management to pursue opportunistic benefits. Similarly, Jensen (1986) predicts that managers of firms with abundant "free cash" flows are more likely to propose mergers to build empires and less likely to enter mergers that would cause management to relinquish control over the "free cash." Hence, to exploit opportunistic benefits, firms with large cash reserves would be more likely to propose a merger and less likely to solicit a merger bid. We define *cash ratio* as the ratio of cash and marketable securities to total assets.

In the pursuit of opportunistic benefits, we also explore the possibility that firm managers may be motivated to propose multiple mergers to build empires. Indeed, research has found that individual firms with a history of mergers are more likely to propose and receive additional merger bids (Schipper and Thompson (1983), Maletesta and Thompson (1985), Asquith et al. (1983), Loderer and Martin (1990), Holmes and

Schmit (1995), Fuller et al. (2002), and Ismail (2005)). Accordingly, we track the merger record of the sample firms to construct a variable, *previous mergers*, that counts the number of times a firm proposes or receives a merger bid in the prior two years including the given quarter. A higher value for previous mergers could be used to predict merger candidacy.

According to Gort (1969), mergers cluster in time as a result of both time-specific and industry-specific economic cycles. Thus, firm managers may be motivated to merge simply to partake in the merger wave and not necessarily to build shareholder value. We define *merger intensity* as the ratio of the number of firms in an industry that made or received a merger bid in the given quarter to the number of firms in the industry at the beginning of the given quarter, cumulated for the prior two years. We again define industry by using the two-digit SIC code as listed in the CRSP-COMPUSTAT database. We calculate merger intensity for every industry and each quarter in our sample. The industry SIC code for each firm in the sample is then matched to the appropriate industry's merger intensity. A higher value for merger intensity would be used to predict merger candidacy.

#### **4. c. Variables that measure management's motives to generate shareholder value *and* generate opportunistic benefits**

Myers and Majluf (1984) show that mispricing in share prices may alter investment decisions of the mispriced firm's management. Managers, as decision makers, have private information about the firm. Two opposing views investigate whether managers utilize their information advantage to serve shareholders or to protect opportunistic benefits. On the one hand, managers, who believe their stock is overvalued, may try to generate long run value for pre-merger shareholders at the expense of post-merger shareholders (Hansen (1987), Schleifer and Vishny (2003), and Rhodes-Kropf and Viswanathan (2004)). Uncertainty about private values enables managers to hide their true goals. Information asymmetry models (such as Rhoades-Kropf and Viswanathan (2004)) find that for a target firm's management to agree to a merger bid proposed by an overvalued bidder, they must be fooled into thinking that the bidder firm is less overvalued than it is. On the other hand, overvaluation may intensify incentive conflicts between the firm's managers and shareholders. That is, managers may be tempted to destroy shareholder value using mergers financed with overvalued equity in an attempt to protect opportunistic benefits at the expense of both pre- and post-merger shareholders (Jensen (2005)).

We use two variables, *price run-up* and *information asymmetry*, to measure management's motives to exploit its information advantage when markets misprice the value of a firm. We define *price run-up* as the change in a firm's stock price in the two years prior to a given quarter. Stock price data are taken from the CRSP-COMPUSTAT database. *Information asymmetry* is a dummy variable that measures both overvaluation and opaqueness in share prices. This variable takes a value one if a firm's stock price is overvalued (measured as a market-to-book value [equals (the closing price of the firm's common stock x the number of common shares outstanding)/the book value of stockholder's equity at the end of each quarter as listed in CRSP-COMPUSTAT database] that is greater than the industry median) *and* opaque (the firm's share turnover (as defined above) is lower than its industry median), and zero otherwise. Rhodes-Kropf and Viswanathan (2004) find that overvalued and opaque firms are more likely to make merger bids to exploit the overvaluation in their shares. High price run-up and high information asymmetry provides bidder firm management with an environment that allows for this.

#### 4. d. Results of merger candidacy models

We run 97 probit regressions on the proxies for merger motives to estimate investor anticipations about bidder candidacy (equation 1). To estimate parallel investor anticipations of becoming a target (equation 2), we run another set of 97 probit regressions. Based on SDC announcement dates for the merging firm sample, a firm is identified as a bidder firm in a given quarter if it proposes at least one merger bid in the next financial statement release quarter, a firm is identified as a target firm if it receives at least one merger bid in the next quarter, and a firm is identified as a nonmerging firm in a given quarter if it neither proposes nor receives a merger bid in the next quarter. In both bidder and target regressions, the sample covers data from the third quarter of 1979 to the fourth quarter of 2004. With two exceptions, the regressions are quarterly.<sup>8</sup> Observations from the third quarter of 1979 to the third quarter of 1980 and observations from the third to fourth quarters of 2004 are pooled into two cross-sections, respectively, because the number of bidders or targets in these quarters is fewer than 10. This leaves us with 97 probit regressions examined over the 102-quarter sample period. Thus, following equations 1 and 2, we run the following:

$$M_j = (\text{sales shock})_j \times \gamma_j^{(\text{sales shock})} + (\text{square of sales shock})_j \times \gamma_j^{(\text{square of sales shock})} + (\text{size})_j \times \gamma_j^{(\text{size})} + (\text{change in}$$

$$\begin{aligned}
& \text{size})_j \times \gamma_j^{(\text{change in size})} + (\text{sales growth})_j \times \gamma_j^{(\text{sales growth})} + (\text{concentration ratio})_j \times \gamma_j^{(\text{concentration ratio})} + (\text{resource-} \\
& \text{growth-mismatch})_j \times \gamma_j^{(\text{resource growth-mismatch})} + (\text{ROA})_j \times \gamma_j^{(\text{ROA})} + (\text{share turnover})_j \times \gamma_j^{(\text{share turnover})} + (\text{cash ratio})_j \times \\
& \gamma_j^{(\text{cash ratio})} + (\text{previous mergers})_j \times \gamma_j^{(\text{previous mergers})} + (\text{merger intensity})_j \times \gamma_j^{(\text{merger intensity})} + (\text{price run-up})_j \times \\
& \gamma_j^{(\text{price run-up})} + (\text{information asymmetry})_j \times \gamma_j^{(\text{information asymmetry})} + \varepsilon_j
\end{aligned} \tag{7}$$

for  $j = \text{bidder, target firms}$

We estimate equation (7) first for bidder firms (Table 2) and then for target firms (Table 3). In Table 2, based on SDC announcement dates for the merging firm sample, a firm is identified as a bidder firm in a given quarter if it proposes at least one merger in the next financial statement release quarter. Thus, the dummy indicator is set equal to 1 if the firm proposes a bid in the next quarter and 0 otherwise. In Table 3, a firm is identified as a target firm in a given quarter if it receives at least one merger bid in the next financial statement release quarter. Thus, the dummy indicator is set equal to 1 if the firm receives a bid in the next quarter and 0 otherwise. In both tables, Panel A reports the mean, standard deviation, 25<sup>th</sup>, 50<sup>th</sup>, and 75<sup>th</sup> percentile values of the marginal coefficient estimates. Marginal probabilities are estimated at the median values for the continuous variables and at zero for the information asymmetry and resource-growth-mismatch dummy variables. The estimates are the derivatives of the probability to propose and receive a merger bid with respect to a particular exogenous variable. Panel B reports the goodness-of-fit diagnostics.

The last column in Tables 2 and 3 reports the t-statistic for the test of the null hypothesis of no predictability in bidder and target merger candidacy, which would be confirmed only if all regression slopes differ insignificantly from zero. Tables 2 and 3 indicate that a mix of motives prompts management to propose and receive merger bids. From Table 2, variables that represent bidder management's motives to generate shareholder value (high sales shock ( $t = 2.97$ ) [however, the coefficient on sales shock squared is negative ( $t = -3.75$ ) suggesting that this relation is not linear, i.e., the larger the sales shock, the less likely it is that a firm proposes a merger bid], large asset size ( $t=2.89$ ), high ROA ( $t = 6.65$ ), low sales growth ( $t = -5.19$ ), and low share turnover ( $t = -3.30$ )), to generate opportunistic benefits (high cash ratio ( $t = 4.58$ ) and high previous mergers ( $t = 17.68$ )), and to do both (high price run-up ( $t = 7.65$ ) and high information asymmetry ( $t = 1.98$ )) predict bidder candidacy.

From Table 3, proxies that represent target firm management's motives to generate shareholder value (high sales shock ( $t = 2.56$ ) [sales shock squared,  $t = -2.80$ ], high ROA ( $t = 5.08$ ), high share turnover ( $t = 1.80$ ), small asset size ( $t = -10.48$ ), small asset ( $t = -7.79$ ) and sales ( $t = -4.34$ ) growth, and low concentration ratio ( $t = -2.19$ )), to generate opportunistic benefits (high previous mergers ( $t = 12.99$ ), high merger intensity ( $t = 3.17$ ), and low cash ratio ( $t = -3.71$ )), and to do both (low information asymmetry ( $t = -4.59$ )) predict target candidacy. The most significant predictor of both bidder and target candidacy is previous mergers. Thus, results indicate that markets can predict bidder and target candidacy.

Tables 4 and 5 further investigate the predictive power of the bidder and target candidacy models, respectively. Panel A in Tables 4 and 5 reports summary statistics on the probability that a firm is identified as a bidder in the bidder and nonbidder (target and nonmerging firms) subsamples and on the probability that a firm is identified as a target firm in the target and nontarget (bidder and nonmerging firms) subsamples, respectively. Panel B in both tables reports summary statistics on the  $X^2$  statistic of the likelihood-ratio test and pseudo  $R^2$ .

In our sample, the fraction of firms that propose at least one bid in any quarter over the 97 quarters is 1.68 percent and the fraction of firms receiving a merger bid is 0.85 percent. Panel A in Tables 4 and 5 reports that the average probability of being identified as a bidding firm is 20.29 percent for bidders and 1.27 percent for nonbidders, and the average probability of being identified as a target firm is 8.25 percent for targets and 0.76 percent for nontargets, respectively. Thus, the candidacy models correctly estimate that bidders are more likely to propose bids than nonbidders, and that targets are more likely to receive bids than nontargets. Further, candidacy models correctly identify bidders more often than they do targets.

Panel B of Table 4 reports the average  $R^2$  in the cross-sectional regressions as 38.31 percent (the range over the 97 probit regressions is 24.82 percent to 78.51 percent). The null hypothesis that the model has no explanatory power is rejected in all 97 regressions. Panel B of Table 5 reports that the average  $R^2$  is 30.04 percent (ranging from 16.17 percent to 67.97 percent). In all but 11 quarters, the  $R^2$  in the bidder model is higher than it is in the target model. Thus, investors do not seem to do as good a job in predicting target candidates as they do in predicting bidder candidates.

## **5. Stock market responses to merger announcements**

Next we examine whether predictability in merger candidacy affects stock price responses to merger announcements. Specifically, we estimate different specifications of regression equations 5 (for bidder firms) and 6 (for target firms). In all specifications, dependent variable is the 7-day CAR.<sup>9</sup> Abnormal returns are calculated as the difference between observed and “normal” returns. We use the market-model to estimate “normal returns” for the merging firms.<sup>10</sup> In these regressions, we control for information that is released at the merger announcement such as features of the contract (e.g., all-equity, deal value, and relative size), the economic fit between merger partners (e.g., same industry and same state), and the relative bargaining power of the merger partners (e.g., bidder public, anti-takeover defense, unwelcoming attitude, and target bankrupt). These variables are discussed below and are summarized in Table 6. Descriptive statistics for these regression variables are reported Appendix B to the paper. Table 7 reports regression results for bidder firms and Table 8 reports results for target firms. The regressions differ in the combination of control variables included. The sample of deals analyzed includes 5,404 bidders and 2,706 targets with nonmissing data. In 190 of these deals, either the bidder or the target made or received more than one bid on the announcement date. We exclude these 190 deals from the sample since it is not possible to uniquely attribute the abnormal returns observed around the announcement to a specific deal.

### **5. a. Regressions of bidder cumulative abnormal returns**

Table 7 reports regression results of the 7-day CAR for bidder firms at a merger announcement. The first four regressions include Heckman’s lambda and variables that control for the method of financing the merger, that proxy for the economic fit, and that examine bargaining power of bidders versus targets involved in the merger. The fifth regression includes all explanatory variables except for Heckman’s lambda so as to benchmark the results against a single-equation model.

Heckman’s lambda allows us to measure how investor anticipations influence stock market responses to merger announcements. The greater the surprise in a merger announcement, the greater is the information revealed about unanticipated merger motives and the larger is Heckman’s lambda. Hence, Heckman’s lambda is intuitively a measure of the extent to which a merger announcement surprises the market.

The coefficient on Heckman's lambda is positive and statistically significant in all regressions in Table 7 (t-statistics range from 2.51 to 3.37). Thus, the more surprised the market is about a merger deal (larger Heckman's lambda), the greater is the impact of the announcement on bidder stock prices. Furthermore, Heckman's lambda is economically significant. For a one standard deviation increase in Heckman's lambda, bidder returns increase by 47 to 54 basis points.

We cannot pull apart the distinct pieces of information that a merger announcement reveals about management's motive to merge. However, the positive coefficient on Heckman's lambda indicates that investors judge the mergers to be to the net benefit of the bidder firm shareholders. That is, for the stock price response to be positive the surprise in the merger announcement must be more about the shareholder value generated by the merger and less about opportunistic benefits management is trying to capture through the merger.

The *all-equity* dummy variable identifies the method of payment used in a merger. We set this variable equal to one if the merger is financed only with equity of the bidder firm and zero otherwise.<sup>11</sup> Myers and Majluf's (1986) pecking-order hypothesis states that markets assess a firm as overvalued when equity is used to finance investment projects. Accordingly, we expect and find that all-equity financed mergers result in lower abnormal returns to bidder shareholders. In all regressions, the coefficient is negative and in the first two regressions it is significant at better than the 5 percent level ( $t = -2.35$  and  $-2.38$ , respectively). Thus, equity financed mergers may be motivated by bidder firm manager's attempt to take advantage of their firm's overvalued stock.

Asquith et al. (1983) document that the larger the size of a target firm relative to the bidder firm in a merger, the greater are bidder and target cumulative returns at a merger announcement. Further, Moeller et al. (2005) find that mergers whose values exceed \$1 billion erode bidder shareholder value by \$7.38 per \$100 invested. Accordingly, we use two variables, *deal value* and *relative size*, to represent the absolute and relative size of the mergers. We define *deal value* as the announced value of a merger in billions of dollars and *relative size* as the ratio of the deal value to the market value of a bidder's (or target in Table 8) common stock at the quarter end prior to a merger announcement.<sup>12</sup> For bidder firms, the coefficient on deal value is negative and significant in all regressions. As in Moeller et al., the larger the *absolute* size of the deal, the greater is the

erosion in bidder shareholder value at a merger announcement. Confirming Asquith et al., the larger the target *relative* to the bidder, the greater the positive impact of the announcement: the coefficients on *relative size* are positive and significant in all regressions.

Economic fit between bidder and target firms determines how much total shareholder value a merger might generate. Two variables are examined: whether merging firms operate in the same industry and whether they are located in the same state. *Same-industry* is a dummy variable equal to one if the merging firms are in the same industry (using two-digit SIC codes) and zero otherwise. Similar to Campa and Kedia (2002) and Villalonga (2004), this variable measures the extent to which the merger is focus-increasing and focus-decreasing (or diversifying) and, therefore, the extent to which assets-in-place of the stand alone firms complement and/or substitute for each other. Geographic proximity may affect the economic fit of the merging firms in two ways. First, firms that are closely situated may have similar corporate cultures, which in turn may affect the total shareholder value that a merger generates (Chakrabart (2005)). Second, local deals may work to the advantage of bidder shareholders because proximity may mean that bidder management has superior information about the target than it would if the target firm was located further away (Kedia et al. (2005)). We define *same-state* as a dummy variable equal to one if the main operations of bidder and target firms are in the same state and zero otherwise. Table 7 reports that neither of these variables are significant in explaining bidder announcement period CARs. Thus, economic fit does not appear to influence bidder returns.

At a merger announcement, once the merger partners are known, the relative bargaining power of bidder and target firms is revealed. Relative bargaining power determines how the total value associated with a merger is shared between bidder and target firm shareholders. We use four variables to measure the relative bargaining power of bidders and targets: whether the bidder or target firms are public, whether the target management initially resists the merger, whether the target is in bankruptcy proceedings, and whether the target has anti-takeover defenses in place.

Ownership structure (public versus private firm) is a factor that affects the bargaining power of the bidder and target firms in a merger and thus, the stock price responses to a merger announcement. Specifically, ownership structures of bidder and target firms affect the liquidity of shares and access to capital markets. Thus, public bidders (or targets) secure more value for their shareholders because their bargaining power

relative to private firms is higher. Indeed, Bradley and Sundaram (2004) find that bidder returns are lower when the target is a public firm. We define *bidder (target) public* as a dummy variable equal to one if the bidder (target in Table 8) firm is publicly traded and zero otherwise. We find, however, that *bidder public* is insignificant in determining the merger announcement returns.

When the target CEO gives an initial negative recommendation about the merger to the target firm's board the bargaining power of the target is strengthened since the bidder would likely have to increase its bid to overcome the initial resistance (Jennings and Mazzeo (1993)). Anti-takeover defenses strengthen target management's ability to resist takeovers and to increase the bargaining power of target management (Ambrose and Megginson (1992)). Finally, target bargaining power varies inversely with the need of target shareholders to sell the firm. The extreme case is shareholders of bankrupt (target) firms that are in dire need of help. Thus, bankruptcy proceedings would weaken the target's bargaining power. *Unwelcoming attitude*, *anti-takeover defenses*, and *target bankrupt* are dummy variables that control for differences in the reception of merger proposals, for the presence of anti-takeover defenses, and for the need to sell when in bankruptcy, respectively.<sup>13</sup> Only *unwelcome attitude* is significant in Table 7. Thus, like Jennings and Mazzeo (1993), we find that when a target firm's management is initially negative towards a merger, bidder firm CARs are smaller.

The last regression in Table 7 benchmarks the results of a single-equation model by including all regressors except for Heckman's lambda. Comparing regressions 4 (with Heckman's lambda) and 5 (without Heckman's lambda), the  $R^2$  in regression 5 is lower than that in regression 4. This finding supports the hypothesis that anticipations about bidder candidacy contribute to our understanding of stock price responses to merger announcements. A single-equation model is not as powerful in explaining stock price responses as the two-stage model. However, the small adjustments in the sizes of other significant slope coefficients tell us that the information Heckman's lambda captures is largely orthogonal to that imbedded in the other regressors. Ignoring the endogeneity in anticipations and market responses leads to an omitted variable bias, rather than a simultaneous equations bias.

## **5. b. Regressions of target cumulative abnormal returns**

Table 8 reports regression results of the 7-day CAR for target firms at the merger announcement. The setup for Table 8 (for target firms) is identical to that for Table 7 (for bidder firms). The results for the control variables in Table 8 are similar to those in Table 7 for bidders with three exceptions: i) deal value is insignificant for target firms; ii) unwelcome attitude is insignificant for target returns, and iii) target bankrupt has a negative affect on target returns.

More importantly, in all regressions in Table 8, the coefficients of Heckman's lambda are positive but insignificant. For a one standard deviation change in Heckman's lambda, target returns change by 48 to 61 basis points. The low significance on the coefficients for target firm lambdas and the relatively low predictive power in the target candidacy models suggest that investors can not anticipate target candidacy as well as they do bidder candidacy.

### **5. c. Investor anticipations of merger candidacy and CARs**

A crucial assumption in merger announcement event studies is that investors learn merger-related information in a short window of time. However, we find that there is anticipation of bidder candidacy. As a result, some merger-related information is stale at the time of announcements. Further, we find that there is less anticipation of target candidacy. Thus, the information that merger announcements reveal about targets is less stale. As a consequence of the difference in the freshness of information revealed at a merger announcement, it is not surprising that previous research has found that target firm CARs are larger in magnitude than bidder CARs. Without controlling for differences in predictability of merger candidacy, it is incorrect to conclude that target shareholders capture the majority of the value gains that mergers generate.

Our findings indicate that, at least to some extent, the asymmetry in investor anticipations about bidder and target candidacy drives the disparity in bidder and target announcement period abnormal returns. To further investigate the disparity between bidder and target CARs, we classify bidder and target firms into 10 categories according to the predicted probability of proposing and receiving a merger bid, obtained from regression equation 7. For example, CARs for bidder firms with a 40-50 percent predicted probability of proposing a merger are compared against CARs for target firms with a 40-50 percent predicted probability of receiving a merger proposal. The results are reported in Panel A of Table 9. The p-values listed in column 3 indicate that there is a significant difference in the mean CAR between bidder and target firms. However, the

higher the predicted probability the smaller is the difference in CARs. Panel B of Table 9 reports the average of differences in the 10 categories matching the predicted probability of merging and the difference in CARs across all mergers without matching the probability of merging. Panel B shows that when we control for investor anticipations in merger announcements, the difference in CARs is reduced by 4.26 percentage points. Thus, the evidence supports our hypothesis that to some extent the asymmetry in investor anticipations of merger parties causes disparity in bidder and target firm announcement period abnormal returns.

## **6. Conclusion**

This paper investigates the extent to which investors anticipate bidder and target merger candidacy and if investor anticipations about candidacy affect the distribution of value between bidder and target firm shareholders. Using a simultaneous-equations framework, we investigate if and how investor anticipation of merger candidacy affects abnormal returns that are measured around merger announcements. We find that investors can predict bidder firms more successfully than target firms. To investigate how value is distributed among bidder and target shareholders, we control for different degrees of predictability in bidder and target selection. Once we account for greater predictability in bidder firm candidacy, the difference between bidder and target firm seven-day cumulative abnormal returns around a merger announcement decreases significantly. Thus, the evidence supports the hypothesis that to some extent the asymmetry in investor anticipations of merger parties causes disparity in bidder and target firm announcement period abnormal returns.

Our models of candidacy can only partially estimate investor anticipations. It is too costly if not impossible for us to proxy for the universe of information publicly available prior to a merger announcement. The inability to evaluate the universe of relevant information means that we are underestimating market anticipations. To the extent that we underestimate investor anticipations, our findings about the decline in the disparity between bidder and target CARs is only a lower bound for the true difference.

## Footnotes

<sup>1</sup> In their surveys of merger studies, Jensen and Ruback (1983), Jarrell et al. (1988), and Andrade et al. (2001) describe the use of different event windows to measure the benefits that accrue to bidder and target firm shareholders.

<sup>2</sup> The SDC merger database starts in January 1977. The first sample point that meets our filter criteria is on July 1, 1979.

<sup>3</sup> The “menumain” data item in the SDC database classifies merger transactions into 12 categories: disclosed value, undisclosed value, leveraged buyouts, tender offers, spinoffs, recapitalizations, self-tenders, exchange offers, repurchases, SP, acquisition of remaining interest, and privatization. Based on SDC categories, we include only disclosed value, undisclosed value, leverage buyouts, and tender offers in our analysis. Then, the “formc” data item in the SDC database classifies merger deals into 10 categories: merger, acquisition, acquisition of majority interest, acquisition of partial interest, acquisition of remaining interest, acquisition of assets, acquisition of certain assets, recapitalization, buyback, and exchange offer. Based on SDC categories, we include only merger, acquisition, and acquisition of majority interest in our analysis.

<sup>4</sup> Only 12 of the 4,999 bidders in the sample with data on all variables are not publicly traded, while only 78 of the 2,484 targets in the sample with data on all variables are not publicly traded.

<sup>5</sup> A firm may propose or solicit more than one bid in any one quarter. However, since we need to uniquely identify a firm as a bidder, target or nonmerging firm in each quarter, we drop observations in which we can not uniquely identify as a bidder, target, or nonmerging firm quarter (73 observations).

<sup>6</sup> Some of the nonmerging firms change the release dates of their financial statements. As a result, around the change in the release date, these firms have two sets of data (one set for the previous fiscal year date and one set for the new fiscal year date) in the same quarter. In these cases (1194 observations), we drop the double-counted firm-quarters.

<sup>7</sup> Industry firms include all firms with the same two-digit SIC code from our sample. If there are fewer than five firms in an industry, the one-digit SIC code is used.

<sup>8</sup> We also run probit regressions that use annual data to predict candidacy. The results remain qualitatively the same.

<sup>9</sup> We also examine alternative event-windows such as 3-day, 15-day, and 29-day to calculate abnormal returns. The results remain qualitatively unchanged.

<sup>10</sup> Market-model estimation starts 256 days prior to the merger announcement and ends 30 days prior to the announcement. We require that each firm have at least 30 observations for the market-model estimation. We use EVENTUS to calculate cumulative abnormal returns by summing daily abnormal returns over the seven-day event window.

<sup>11</sup> The method of financing the merger is taken from the SDC database.

<sup>12</sup> Deal values are from the SDC database. Market value of common stock is the number of shares of common stock outstanding times the closing price of common stock and are taken from the CRSP-COMPUSTAT database.

<sup>13</sup> Information on these variables were obtained from the SDC database.

**Table 1 – Description of variables used to predict bidder and target firm merger candidacy**

This table describes the variables used to predict bidder and target firm merger candidacy. The sample covers 102 quarters from the third quarter of 1979 to the fourth quarter of 2004. All data are measured quarterly. Based on SDC announcement dates for the merging firm sample, a firm is identified as a bidder firm in a given quarter if it proposes at least one merger in the next financial statement release quarter, a firm is identified as a target firm if it receives at least one merger bid in the next quarter, and a firm is identified as a nonmerging firm in a given quarter if it neither proposes nor receives a merger bid in the next quarter.

<b>Variable</b>	<b>Definition</b>
<b>Sales shock</b>	The absolute value of the difference between the two-year median industry sales growth and the two-year median sales growth for all firms in the sample.
<b>Sales shock squared</b>	Square of sales shock
<b>Size</b>	The log of total assets.
<b>Change in size</b>	The percentage change in the book value of assets of the firm in the eight quarters prior to the current quarter.
<b>Sales growth</b>	The change in the firm's net sales over the previous eight quarters.
<b>Concentration ratio</b>	The ratio of sales of the largest four firms (in terms of sales) to total industry sales.
<b>Resource-growth-mismatch</b>	A dummy variable equal to one if i) sales growth for a firm in the last two years is less than the industry median and long-term debt ratio is greater than the industry median, or ii) if sales growth in the last two years is greater than the industry median and long-term debt ratio is less than the industry median, and zero otherwise.
<b>Return on assets (ROA)</b>	The ratio of net income before extraordinary (or nonrecurring) items to total assets.
<b>Share turnover</b>	Ratio of the number of shares of stock traded for the firm to the total shares outstanding.
<b>Cash ratio</b>	Ratio of cash and marketable securities to total assets.
<b>Previous mergers</b>	Counts the number of times a firm receives or solicits a merger bid in the prior two years including the given quarter.
<b>Merger intensity</b>	The ratio of the number of firms in an industry that made or received a merger bid in the given quarter to the number of firms in the industry at the beginning of the given quarter, cumulated for the prior two years.
<b>Price run-up</b>	Percentage change in a firm's stock price in the two years prior to a given quarter.
<b>Information asymmetry</b>	Dummy variable equal to one if the market-to-book ratio is higher than the industry median <i>and</i> share turnover is lower than to the industry median and zero otherwise.

**Table 2 – Probit model of bidder candidacy**

This table reports results of 97 cross-sectional probit regressions on bidder firms. Based on SDC announcement dates for the merging firm sample, a firm is identified as a bidder firm in a given quarter if it proposes at least one merger in the next financial statement release quarter. The dummy is set equal to 1 if the firm proposes a bid in the next quarter, and 0 otherwise. Panel A reports the mean, standard deviation, 25<sup>th</sup>, 50<sup>th</sup>, and 75<sup>th</sup> percentile values of the marginal coefficient estimates. Marginal probabilities are estimated at the median values for the continuous variables and at zero for the high information-asymmetry and resource-growth mismatch indicator variables. Last column in Panel A reports the t-statistic for the test of the null hypothesis that the mean of the coefficient is equal to 0. Panel B reports pseudo R<sup>2</sup>. Marginal probability estimates and pseudo R<sup>2</sup> are in percent.

	Mean	Standard Deviation	25 <sup>th</sup> percentile	50 <sup>th</sup> percentile	75 <sup>th</sup> percentile	t-statistic
<b>Panel A – Summary statistics for marginal-probability estimates</b>						
<b>Sales shock</b>	1.01	3.34	-0.57	0.22	1.99	2.97
<b>Sales shock squared</b>	-6.94	18.25	-8.54	-0.67	0.79	-3.75
<b>Size</b>	0.01	0.05	-0.01	0.01	0.04	2.89
<b>Change in size</b>	-0.09	0.17	-0.19	-0.06	0.01	-5.19
<b>Sales growth</b>	0.01	0.13	-0.04	0.01	0.08	0.69
<b>Concentration ratio</b>	-0.03	0.47	-0.23	-0.02	0.21	-0.59
<b>Resource-growth-mismatch</b>	0.01	0.14	-0.08	0.00	0.08	0.63
<b>ROA</b>	2.46	3.65	0.31	1.72	2.96	6.65
<b>Share turnover</b>	-0.17	0.51	-0.25	-0.08	0.11	-3.30
<b>Cash ratio</b>	0.29	0.63	0.01	0.30	0.56	4.58
<b>Previous mergers</b>	0.83	0.46	0.49	0.80	1.13	17.68
<b>Merger intensity</b>	0.08	0.88	-0.44	0.02	0.63	0.86
<b>Price run-up</b>	0.07	0.09	0.01	0.05	0.10	7.65
<b>Information asymmetry</b>	0.04	0.18	-0.06	0.01	0.13	1.98
<b>Panel B – Goodness-of-fit diagnostics</b>						
<b>Pseudo R<sup>2</sup></b>	38.31	8.22	33.97	36.57	40.66	

**Table 3 – Probit model of target candidacy**

This table reports results of 97 cross-sectional probit regressions on target firms. Based on SDC announcement dates for the merging firm sample, a firm is identified as a target firm in a given quarter if it receives at least one merger bid in the next financial statement release quarter. The dummy is set equal to 1 if the firm receives a bid in the next quarter, and 0 otherwise. Panel A reports the mean, standard deviation, 25<sup>th</sup>, 50<sup>th</sup>, and 75<sup>th</sup> percentile values of the marginal coefficient estimates. Marginal probabilities are estimated at the median values for the continuous variables and at zero for the high information-asymmetry and resource-growth mismatch indicator variables. Last column in Panel A reports the t-statistic for the test of the null hypothesis that the mean of the coefficient is equal to 0. Panel B reports pseudo R<sup>2</sup>. Marginal probability estimates and pseudo R<sup>2</sup> are in percent.

	<b>Mean</b>	<b>Standard Deviation</b>	<b>25<sup>th</sup> percentile</b>	<b>50<sup>th</sup> percentile</b>	<b>75<sup>th</sup> percentile</b>	<b>t-statistic</b>
<b>Panel A – Summary statistics for marginal coefficient estimates</b>						
<b>Sales shock</b>	0.93	3.56	-0.34	0.41	1.63	2.56
<b>Sales shock squared</b>	-4.92	17.30	-4.76	-0.58	0.86	-2.80
<b>Size</b>	-0.06	0.06	-0.09	-0.05	-0.02	-10.48
<b>Change in size</b>	-0.27	0.34	-0.37	-0.16	-0.04	-7.79
<b>Sales growth</b>	-0.06	0.14	-0.10	-0.02	0.01	-4.34
<b>Concentration ratio</b>	-0.12	0.52	-0.28	-0.07	0.15	-2.19
<b>Resource-growth-mismatch</b>	0.01	0.15	-0.05	0.02	0.08	0.82
<b>ROA</b>	0.99	1.91	-0.20	0.28	1.75	5.08
<b>Share turnover</b>	0.08	0.42	-0.05	0.05	0.26	1.80
<b>Cash ratio</b>	-0.33	0.87	-0.55	-0.06	0.08	-3.71
<b>Previous mergers</b>	0.51	0.39	0.21	0.42	0.72	12.99
<b>Merger intensity</b>	0.34	1.07	-0.23	0.10	0.67	3.17
<b>Price run-up</b>	-0.01	0.11	-0.04	0.00	0.04	-0.88
<b>Information asymmetry</b>	-0.08	0.17	-0.13	-0.04	0.00	-4.59
<b>Panel B – Goodness-of-fit diagnostics</b>						
<b>Pseudo R<sup>2</sup></b>	30.04	9.15	23.19	27.70	34.83	

**Table 4 – Goodness-of-fit diagnostics for models of bidder candidacy**

Panel A reports the mean, standard deviation, minimum, 25<sup>th</sup>, 50<sup>th</sup>, 75<sup>th</sup> percentile, and maximum values of the probability that a firm is identified as a bidder in the bidder and nonbidder (target and nonmerging firms) subsamples as estimated by the bidder candidacy models. Panel B reports the mean, standard deviation, minimum, 25<sup>th</sup>, 50<sup>th</sup>, 75<sup>th</sup> percentile, and maximum values for the X<sup>2</sup> statistic of the likelihood-ratio test and pseudo R<sup>2</sup>. Predicted probabilities and Pseudo R<sup>2</sup> are in percent.

	Mean	Standard Deviation	Minimum	25 <sup>th</sup> percentile	50 <sup>th</sup> percentile	75 <sup>th</sup> percentile	Maximum	N
<b>Panel A – Distribution of probability of bidding by bidders and nonbidders</b>								
<b>Nonbidder firms</b>	1.27	4.98	0.00	0.12	0.30	0.64	100.00	310,720
<b>Bidder firms</b>	20.29	24.39	0.08	4.69	8.52	26.56	100.00	5,207
<b>Panel B – Goodness-of fit-diagnostics</b>								
<b>Pseudo R<sup>2</sup></b>	38.31	8.22	24.82	33.97	36.57	40.66	78.51	97
<b>X<sup>2</sup> statistic</b>	198.41	68.48	61.50	147.48	186.40	252.04	363.96	97

**Table 5 – Goodness-of-fit diagnostics for models of target candidacy**

Panel A reports the mean, standard deviation, minimum, 25<sup>th</sup>, 50<sup>th</sup>, 75<sup>th</sup> percentile, and maximum values of the probability that a firm is identified as a target in the target and nontarget (bidder and nonmerging firms) subsamples as estimated by the target candidacy models. Panel B reports the mean, standard deviation, minimum, 25<sup>th</sup>, 50<sup>th</sup>, 75<sup>th</sup> percentile, and maximum values for the X<sup>2</sup> statistic of the likelihood-ratio test and pseudo R<sup>2</sup>. Predicted probabilities and Pseudo R<sup>2</sup> are in percent.

	Mean	Standard Deviation	Minimum	25 <sup>th</sup> percentile	50 <sup>th</sup> percentile	75 <sup>th</sup> percentile	Maximum	N
<b>Panel A – Distribution of probability of bidding by targets and nontargets</b>								
<b>Nontarget firms</b>	0.76	3.11	0.00	0.04	0.17	0.55	99.91	310,827
<b>Target firms</b>	8.25	11.72	0.11	2.45	4.56	8.83	99.97	2,641
<b>Panel B – Goodness-of fit-diagnostics</b>								
<b>Pseudo R<sup>2</sup></b>	30.04	9.15	16.17	23.19	27.70	34.83	67.97	97
<b>X<sup>2</sup> statistic</b>	86.49	33.88	33.48	60.09	80.31	107.99	179.58	97

**Table 6 - Description of variables used to explain merger announcement cumulative abnormal returns**

This table describes the variables used to examine whether predictability in merger candidacy affects stock price responses to merger announcements. The sample covers 102 quarters from the third quarter of 1979 to the fourth quarter of 2004. Based on SDC announcement dates for the merging firm sample, a firm is identified as a bidder firm in a given quarter if it proposes at least one merger in the next financial statement release quarter and a firm is identified as a target firm if it receives at least one merger bid in the next quarter.

<b>Variable</b>	<b>Definition</b>
<b>All-equity indicator</b>	Dummy variable equal to one if the merger is financed only with equity of the bidder firm and zero otherwise.
<b>Deal value</b>	The announced value of merger, in billions of dollars.
<b>Relative value</b>	The ratio of the value of the merger to the market value of the bidder's (target's) common stock at the quarter end prior to the merger announcement.
<b>Same industry</b>	Dummy variable equal to one if the merging firms are in the same industry and zero otherwise.
<b>Same state</b>	Dummy variable equal to one if the main operations of bidder and target firms are in the same state and zero otherwise.
<b>Bidder/Target public</b>	Dummy variable equal to one if the bidder (target) firm is publicly traded and zero otherwise.
<b>Anti-takeover defense</b>	Dummy variable equal to one if the target has anti-takeover defenses and zero otherwise.
<b>Unwelcoming attitude</b>	Dummy variable equal to one if the target firm management's initial recommendation is negative or the target firm did not solicit the bid and zero otherwise.
<b>Target bankrupt</b>	Dummy variable equal to one if the target firm is in bankruptcy proceedings at the time of the merger announcement and zero otherwise.

**Table 7 - Regressions of bidder CARs**

This table reports results of regressions examining whether predictability in merger candidacy affects bidder stock price responses to merger announcements. Based on SDC announcement dates for the merging firm sample, a firm is identified as a bidder firm in a given quarter if it proposes at least one merger in the next financial statement release quarter. The dependent variable is the 7-day bidder cumulative abnormal returns. t-statistics are reported in brackets. Coefficient estimates and R<sup>2</sup> are in percent.

	<b>Regression 1</b>	<b>Regression 2</b>	<b>Regression 3</b>	<b>Regression 4</b>	<b>Regression 5</b>
<b>Heckman's lambda</b>	0.86 [3.36]***	0.87 [3.37]***	0.76 [2.51]**	0.76 [2.53]**	
<b>All-equity indicator</b>	-0.94 [-2.35]**	-0.95 [-2.38]**	-0.71 [-1.67]*	-0.75 [-1.74]*	-0.83 [-1.94]*
<b>Deal value</b>			-0.26 [-3.81]***	-0.26 [-3.78]***	-0.26 [-3.88]***
<b>Relative size</b>			0.37 [2.49]**	0.37 [2.51]**	0.38 [2.56]**
<b>Same industry</b>		-0.37 [-1.02]		-0.07 [-0.18]	-0.05 [-0.13]
<b>Same state</b>		0.34 [0.89]		0.44 [0.99]	0.46 [1.05]
<b>Bidder public</b>		2.27 [0.70]		3.49 [1.03]	3.15 [0.93]
<b>Anti-takeover defense</b>			1.40 [0.66]	1.40 [0.66]	1.12 [0.53]
<b>Unwelcoming attitude</b>			-2.05 [-2.07]**	-2.04 [-2.06]**	-2.09 [-2.11]**
<b>Target Bankrupt</b>			1.37 [0.62]	1.4 [0.63]	1.34 [0.60]
<b>Constant</b>	3.02 [0.47]	0.73 [0.10]	2.17 [0.27]	-1.42 [-0.17]	-0.38 [-0.04]
<b>Observations</b>	4,999	4,999	3,683	3,683	3,683
<b>R<sup>2</sup></b>	2.59	2.64	3.85	3.90	3.73

\* significant at 10%.

\*\* significant at 5%.

\*\*\* significant at 1%.

**Table 8 - Regressions of target CARs**

This table reports results of regressions examining whether predictability in merger candidacy affects target stock price responses to merger announcements. Based on SDC announcement dates for the merging firm sample, a firm is identified as a target firm in a given quarter if it proposes at least one merger in the next financial statement release quarter. The dependent variable is the 7-day bidder cumulative abnormal returns. t-statistics are reported in brackets. Coefficient estimates and R<sup>2</sup> are in percent.

	<b>Regression 1</b>	<b>Regression 2</b>	<b>Regression 3</b>	<b>Regression 4</b>	<b>Regression 5</b>
<b>Heckman's lambda</b>	1.72 [1.43]	1.69 [1.40]	1.53 [1.24]	1.53 [1.24]	
<b>All-equity indicator</b>	-7.11 [-5.51]***	-7.03 [-5.43]***	-7.89 [-6.15]***	-7.89 [-6.12]***	-7.81 [-6.07]***
<b>Deal value</b>			-0.13 [-1.26]	-0.13 [-1.26]	-0.12 [-1.20]
<b>Relative size</b>			1.67 [7.04]***	1.70 [7.09]***	1.69 [7.07]***
<b>Same industry</b>		0.33 [-0.28]		-0.1 [-0.09]	-0.14 [-0.12]
<b>Same state</b>		-0.9 [-0.69]		0.05 [0.04]	0.00 [0.00]
<b>Target public</b>		-1.45 [-0.41]		3.20 [0.89]	3.19 [0.89]
<b>Anti-takeover defense</b>			4.38 [1.22]	4.44 [1.23]	4.71 [1.31]
<b>Unwelcoming attitude</b>			1.47 [0.78]	1.52 [0.80]	1.37 [0.72]
<b>Target Bankrupt</b>			-12.55 [-1.77]*	-12.84 [-1.81]*	-13.56 [-1.92]*
<b>Constant</b>	10.3 [0.39]	11.47 [0.43]	-2.06 [-0.08]	-4.56 [-0.18]	-2.68 [-0.10]
<b>Observations</b>	2,484	2,484	2,282	2,282	2,282
<b>R<sup>2</sup></b>	7.64	7.67	10.7	10.73	10.67

\* significant at 10%.

\*\* significant at 5%.

\*\*\* significant at 1%.

**Table 9 - The difference in merger announcement CARs for equally anticipated bidders and targets**

In this table, we classify bidder and target firms into 10 categories according to the predicted probability of proposing and receiving bids. Panel A reports differences in bidder and target firm 7-day CARs, the p-value for the t-test of the null hypothesis that the mean of bidder and target CARs are equal, and the number of bidders and targets in each category. Panel B reports the average difference CARs across the 10 categories. The first row in Panel B reports the average of differences in the 10 categories and the number of bidders and targets. The second row in Panel B reports the difference in CARs across all deals and the number of bidders and targets.

<b>Panel A – Comparison of CARs for equally-anticipated bidders and targets</b>				
<b>Predicted probability</b>	<b>Difference in CARs (%)</b>	<b>p-value</b>	<b>Number of bidders</b>	<b>Number of targets</b>
<b>0-10%</b>	21.14	0.00	2,682	1,948
<b>10-20%</b>	21.03	0.00	681	324
<b>20-30%</b>	18.26	0.00	482	107
<b>30-40%</b>	12.78	0.00	317	37
<b>40-50%</b>	16.65	0.00	175	26
<b>50-60%</b>	9.47	0.00	141	23
<b>60-70%</b>	31.26	0.00	116	12
<b>70-80%</b>	15.96	0.05	110	14
<b>80-90%</b>	8.44	0.54	111	3
<b>90-100%</b>	11.87	0.01	199	6

  

<b>Panel B – Difference in bidder and target CARs averaged across all categories and all deals</b>			
	<b>Difference in CARs (%)</b>	<b>Number of bidders</b>	<b>Number of targets</b>
<b>Average of 10 categories</b>	16.68		
<b>All deals</b>	20.94	5,014	2,500

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## Appendix A – Descriptive statistics of variables used to predict bidder and target firm merger candidacy

This table lists descriptive statistics for the variables used to predict bidder and target firm merger candidacy and management's motives for a merger. The sample covers 110 quarters from the third quarter of 1977 to the fourth quarter of 2004. Based on SDC announcement dates for the merging firm sample, a firm is identified as a bidder firm in a given quarter if it proposes at least one bid in the next financial statement release quarter (Panel A), a firm is identified as a target firm if it receives at least one bid in the next quarter (Panel B), and a firm is identified as a nonmerging firm in a given quarter if it neither proposes nor receives a bid in the next quarter (Panel C). Panel D reports statistics for the full sample.

	Mean	Median	Standard deviation	Minimum	Maximum
<b>Panel A – Bidders</b>					
Sales shock (%)	9.02	6.55	9.73	0.00	159.78
Sales shock squared (%)	1.76	0.43	7.28	0.00	255.29
Size (millions of \$s)	3,726	406	15,769	1	431,141
Change in size (%)	51.49	27.95	74.53	-63.52	407.76
Sales growth (%)	54.44	28.27	93.02	-94.84	914.21
Concentration ratio (%)	42.68	38.97	15.57	10.32	99.71
Resource-growth-mismatch	0.47	0.00	0.50	0.00	1.00
ROA (%)	0.87	1.45	4.17	-47.81	8.33
Share turnover (%)	30.59	20.27	29.59	0.75	164.07
Cash ratio (%)	13.70	6.68	16.34	0.00	77.54
Previous mergers	1.61	1.00	1.07	1.00	13.00
Merger intensity (%)	24.24	22.81	11.84	0.46	119.05
Price run-up (%)	31.43	11.50	87.45	-92.34	606.20
Information asymmetry	0.21	0.00	0.41	0.00	1.00
<b>Panel B – Targets</b>					
Sales shock (%)	9.86	6.69	11.68	0.01	159.78
Sales shock squared (%)	2.34	0.45	10.79	0.00	255.29
Size (millions of \$s)	1,025	123	4,419	1	89,179
Change in size (%)	23.47	11.67	55.32	-63.18	404.25
Sales growth (%)	30.13	14.99	74.33	-88.70	831.01
Concentration ratio (%)	42.64	39.35	15.39	10.32	98.46
Resource-growth-mismatch	0.50	1.00	0.50	0.00	1.00
ROA (%)	-0.59	0.77	5.55	-47.47	8.32
Share turnover (%)	27.47	19.57	26.53	0.76	162.33
Cash ratio (%)	12.66	5.05	16.45	0.00	78.40
Previous mergers	1.26	1.00	0.57	1.00	6.00
Merger intensity (%)	24.21	22.36	12.30	1.12	63.42
Price run-up (%)	11.89	-3.45	81.32	-93.10	611.11
Information asymmetry	0.15	0.00	.35	0.00	1.00

<b>Panel C – Nonmerging firms</b>					
<b>Sales shock (%)</b>	8.71	6.32	9.56	0.00	159.78
<b>Sales shock squared (%)</b>	1.67	0.40	7.06	0.00	255.29
<b>Size (millions of \$s)</b>	1,475	136	9,015	0	750,330
<b>Change in size (%)</b>	28.68	15.45	58.26	-63.72	410.25
<b>Sales growth (%)</b>	32.26	16.50	79.37	-95.45	927.65
<b>Concentration ratio (%)</b>	43.93	40.35	16.82	10.32	100.00
<b>Resource-growth-mismatch</b>	0.50	0.00	0.50	0.00	1.00
<b>ROA (%)</b>	-0.15	0.92	5.05	-47.83	8.35
<b>Share turnover (%)</b>	22.30	13.93	24.60	0.74	164.18
<b>Cash ratio (%)</b>	11.65	4.93	15.40	0.00	78.45
<b>Previous mergers</b>	0.13	0.00	0.42	0.00	10.00
<b>Merger intensity (%)</b>	18.50	16.53	11.11	0.00	119.05
<b>Price run-up (%)</b>	14.39	-2.10	82.13	-93.12	618.70
<b>Information asymmetry</b>	0.20	0.00	0.40	0	1.00
<b>Panel D - All firms</b>					
<b>Sales shock (%)</b>	8.72	6.33	9.58	0.00	159.78
<b>Sales shock squared (%)</b>	1.68	0.40	7.10	0.00	255.29
<b>Size (millions of \$s)</b>	1,508	139	9,143	0	750,330
<b>Change in size (%)</b>	29.01	15.59	58.61	-63.72	410.25
<b>Sales growth (%)</b>	32.60	16.65	79.62	-95.45	927.65
<b>Concentration ratio (%)</b>	43.90	40.33	16.79	10.32	100.00
<b>Resource-growth-mismatch</b>	0.49	0	0.50	0	1.00
<b>ROA (%)</b>	-0.13	0.93	5.04	-47.83	8.35
<b>Share turnover (%)</b>	22.48	14.06	24.73	0.74	164.18
<b>Cash ratio (%)</b>	11.69	4.95	15.43	0.00	78.45
<b>Previous mergers</b>	0.16	0.00	0.49	0.00	13.00
<b>Merger intensity (%)</b>	18.64	16.67	11.16	0.00	119.05
<b>Price run-up (%)</b>	14.65	-1.85	82.24	-93.12	618.70
<b>Information asymmetry</b>	0.20	0.00	0.40	0.00	1.00

## Appendix B – Description of variables used to explain merger announcement cumulative abnormal returns

This table lists descriptive statistics for the variables used to explain merger announcement cumulative abnormal returns. The sample covers 110 quarters from the third quarter of 1977 to the fourth quarter of 2004. Based on SDC announcement dates for the merging firm sample, a firm is identified as a bidder firm in a given quarter if it proposes at least one bid in the next financial statement release quarter (Panel A) and firm is identified as a target firm if it receives at least one bid in the next quarter (Panel B). Panel C reports statistics for the bidders and targets together.

	Mean	Median	Standard deviation	Minimum	Maximum
<b>Panel A – Bidders</b>					
All equity	.2261	0	0.42	0	1
Anti-takeover defense	.0074	0	0.09	0	1
Unwelcoming attitude	.0339	0	0.18	0	1
Target bankrupt	.0091	0	0.10	0	1
Same industry	.3114	0	0.46	0	1
Same state	.2320	0	0.42	0	1
Public dummy	.9971	1	0.05	0	1
Deal value (billions of \$)	0.53	0.05	2.89	0.00	89.17
Relative value (%)	39.90	11.06	1.29	0.00	3435.45
<b>Panel B – Targets</b>					
All equity	.2562	0	0.44	0	1
Anti-takeover defense	.0281	0	0.17	0	1
Unwelcoming attitude	.1133	0	0.32	0	1
Target bankrupt	.0079	0	0.09	0	1
Same industry	.3436	0	0.47	0	1
Same state	.2239	0	0.42	0	1
Public dummy	.9696	1	0.17	0	1
Deal value (in billions)	109.76	0.14	5.31	0.00	164.75
Relative value (%)	183.59	1.54	2.35	0.00	86.77
<b>Panel C - All firms</b>					
All equity	23.62	0	0.42	0	1
Anti-takeover defense	1.44	0	0.12	0	1
Unwelcoming attitude	6.06	0	0.24	0	1
Target bankrupt	0.87	0	0.09	0	1
Same industry	32.22	0	0.47	0	1
Same state	22.93	0	0.42	0	1
Public dummy	98.79	1	0.11	0	1
Deal value (in billions)	75.23	0.08	4.02	0.00	164.75
Relative value (%)	95.46	0.47	1.91	0.00	86.77