

Tobin's Q and the Gains from Takeovers

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ABSTRACT

This paper analyzes the relation between takeover gains and the q ratios of targets and bidders for a sample of 704 mergers and tender offers over the period 1972-1987. Target, bidder, and total returns are larger when targets have low q ratios and bidders have high q ratios. The relation is strengthened after controlling for the characteristics of the offer and the contest. This evidence confirms the results of the work by Lang, Stulz, and Walkling and shows that their findings also hold for mergers and after controlling for other determinants of takeover gains.

IN A RECENT PAPER, Lang, Stulz, and Walkling (LSW) (1989) document that the abnormal returns in tender offers are related to the Tobin's q ratios of the targets and the bidders. In particular, they find that target, bidder, and total returns are higher when takeover targets have high q ratios and bidders have low q ratios where one is used as a cutoff point to separate high q firms from low q firms. In fact, bidders with high q ratios have significant positive abnormal returns when they engage in a takeover, while bidders with low q ratios have significant negative abnormal returns. The best takeovers, in terms of value creation, are those where a high q firm takes over a low q firm. The opposite scenario holds for the worst case takeovers—low q firms taking over high q firms. If q is interpreted as a measure of managerial performance, these findings imply that better performing firms also make better acquisitions and that more value can be created from taking over poorly performing companies.

While the results of LSW are insightful, they leave a number of questions unanswered. Their sample consists only of tender offers. Several studies have documented that the returns to targets in mergers are smaller than those in tender offers (see Jensen and Ruback (1983) and Huang and Walkling (1987)). It would therefore be useful to see whether the LSW (1989) results hold for a larger sample which includes both mergers and tender offers.

Previous research has also shown that the characteristics of the takeover (hostile versus friendly and single versus multiple bidder), the form of payment (cash versus securities), the time period (before 1968, 1968-1980, 1981, and later), and the relative size of target and bidder are important determinants of the magnitude of takeover gains and their distribution

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between targets and bidders.¹ If any of these variables are correlated with the q ratios of the companies engaged in the takeover, we may find that the LSW (1989) results are just a by-product of this correlation. On the other hand, if LSW's results still hold after the inclusion of the control variables, a much stronger case can be made for their interpretation of the results.

Another question relates to the classification of q ratios into high and low categories based on a cut-off of 'one'. LSW's (1989) motivation for this cut-off is partially based on the fact that under certain circumstances firms with q ratios below one have marginal projects with negative net present values [see also Lang and Litzenberger (1989)]. However, q is also industry specific and one may argue that managers should not be held responsible for adverse shocks to their industries. As such, the industry average may be a useful alternative cut-off point to separate high q firms from low q firms.

This paper addresses these questions. The returns of 704 targets and 384 bidders involved in 704 complete takeovers (mergers and tender offers) over the period 1972-1987 are examined. In cross-sectional regressions, relative measures of q can explain target, bidder, and total abnormal returns generated in the takeover. The significance of the relation between q and takeover gains is actually enhanced, after controlling for the characteristics of the offer and the contest. The abnormal returns of targets and bidders are larger when targets have low q ratios and bidders have high q ratios. Returns are also related to the form of payment, the number of bidders, the reaction of target management, the time period of the takeover, and the relative size of targets and bidders.

Overall, these findings confirm LSW's results and illustrate that they are not a spurious by-product of the correlation between the q ratios of targets and bidders and the characteristics of the takeover. This study also shows that the relation between Tobin's q and the takeover gains is not limited to tender offers.

The remainder of this paper is organized as follows. Section I discusses the data collection procedure and summary statistics on takeover gains. Section II presents the cross-sectional regressions of abnormal returns, and Section III concludes.

I. Data Collection and Abnormal Returns

A. Data Collection

The initial sample of targets of successful takeovers is compiled from the daily CRSP Tape. The initial screening purges firms in industries subject to government regulation during all or part of the sample period. This classifi-

¹ Travlos (1987) and Asquith, Bruner, and Mullins (1987) analyze the impact of the form of payment on abnormal returns; Bradley, Desai, and Kim (1988) examine the impact of bidder competition on abnormal gains and document lower returns to bidders after 1980; Huang and Walkling (1987) and Jarrell and Poulsen (1989) analyze the impact of several offer and bid characteristics (the form of payment, the reaction of target management, and the relative size of target and bidder) on abnormal returns.

cation includes transportation and communication companies (1-digit SIC code 4), financial companies (SIC code 6), and public administration companies (SIC code 9). Three additional data requirements are imposed: (i) balance sheet information for a period of at least 4 years prior to the delisting has to be available on the 1987 Compustat Industrial Research Tape; (ii) the takeover offer has to be announced in the *Wall Street Journal* (*WSJ*); and (iii) daily stock returns have to be available on the CRSP Tapes for the 200-day period starting 210 days before the initial takeover announcement. Balance sheet information is required to compute the Tobin's q ratios; the announcement date and daily returns data are required to estimate the market model and to compute abnormal returns. Q ratios are computed using the Lindenbergh and Ross (1981) algorithm and the specific assumptions of Hall, Cummins, Laderman, and Mundy (1988).

The final sample consists of 704 complete takeovers. Additional information is gathered from the *WSJ* to identify the characteristics of the offer and the contest that may influence abnormal returns: (i) the form of payment, (ii) the number of bidders, and (iii) the reaction of target management (hostile/friendly). The *Mergers and Acquisitions* publication is used to obtain or verify the form of payment. Target management's initial reaction to the offer is used to classify the takeover into the hostile or friendly category. Thus, takeovers by white knights are considered hostile. Morck, Shleifer, and Vishny (1988) use a similar classification procedure. Unless a hostile reaction is explicitly stated, the takeover is assumed to be friendly.

The name of the winning bidder is obtained from the *WSJ*, and data requirements, similar to those for target firms, are also imposed on the bidders. The resulting sample of successful bidders contains 384 observations.

Table I presents the distribution of the sample by year of takeover. There is no apparent trend in the number of takeovers except for the upward shift in 1977. Table II stratifies the sample according to management reaction, form of payment, and number of bidders in the takeover contest. Most takeovers are friendly (82%), they involve a single bidder (71%), and cash is the dominant form of payment (58%). In 16 instances, the form of payment could not be determined.

B. Abnormal Returns

Market model parameters are estimated for targets and bidders using continuously compounded returns over a 200-day period, starting 210 trading days before the initial takeover announcement. The value weighted CRSP index is used as the market proxy. Abnormal returns are cumulated from the day before the initial announcement until the date of stockholder approval or the delisting date, whichever comes first. For target firms, the announcement date is defined as the first day, within the 2-year period prior to the delisting, on which a potential bidder expresses an interest in acquiring the company. Total abnormal returns are computed as the weighted average abnormal return of targets and bidders. The respective market values of the equity of

Table I
Frequency Distribution of Targets and Bidders by Year of Takeover

The original sample of takeovers is obtained from the CRSP Tapes. Firms in industries with SIC Codes 4 (communication and transportation companies and utilities), 6 (financial companies), and 9 (public administration companies) are eliminated from the sample. Firms are required to have Compustat information for 4 years prior to the takeover and sufficient information on CRSP Tapes to compute market model parameters. Takeovers not announced in the Wall Street Journal are also eliminated. Year of takeover refers to the year in which the takeover is completed.

| Year of takeover | Targets | Bidders |
|------------------|---------|---------|
| 1972 | 14 | 10 |
| 1973 | 19 | 14 |
| 1974 | 22 | 14 |
| 1975 | 12 | 9 |
| 1976 | 28 | 18 |
| 1977 | 55 | 37 |
| 1978 | 61 | 29 |
| 1979 | 82 | 48 |
| 1980 | 45 | 30 |
| 1981 | 66 | 31 |
| 1982 | 57 | 30 |
| 1983 | 39 | 20 |
| 1984 | 60 | 30 |
| 1985 | 62 | 28 |
| 1986 | 55 | 24 |
| 1987 | 27 | 12 |
| Total | 704 | 384 |

targets and bidders 11 days before the initial announcement are used as weights. However, the value of the target firm's equity is reduced by the market value of the target's shares held by the bidder prior to the announcement day.

Table III presents the returns to targets, bidders, and their weighted average for the overall sample and for several subsamples. Panel A shows the results for the complete sample. Consistent with several other studies, target returns are positive and significant. Bidder returns, on the other hand, are negative, with a mean of -1.07% , and total returns are positive, with a mean of 3.66% . The total returns are smaller than the returns in tender offers reported by Bradley, Desai, and Kim (1988) (8%) and LSW (1989) (11.3%). However, they are very close to the 3.77% reported by Kaplan and Weisbach (1990) who examine 282 acquisitions (mergers and tender offers) over the 1971-1982 period.

Panel B of Table III shows that the losses to bidding firms are, on average, 4% larger in hostile takeovers than in friendly takeovers. On the other hand,

Table II

Stratification of the Takeover Sample

The sample consists of 704 takeovers over the period 1972-1987. The original sample of takeovers is obtained from the CRSP Tapes. Firms in industries with SIC Codes 4 (communication and transportation companies and utilities), 6 (financial companies), and 9 (public administration companies) are eliminated from the sample. Firms are required to have Compustat information for 4 years prior to the takeover and sufficient information on CRSP Tapes to compute market model parameters. Takeovers not announced in the *Wall Street Journal* are eliminated. An offer is considered hostile if the *Wall Street Journal* indicates that the management of the target firm does not support the initial offer. The form of payment is obtained from the *Wall Street Journal* and *Mergers and Acquisitions*.

| Panel A: target management reaction | | |
|-------------------------------------|-----|-------|
| Friendly targets | 579 | 82.2% |
| Hostile targets | 125 | 17.8% |
| Panel B: form of payment | | |
| Cash payment | 408 | 58.0% |
| Securities payment | 180 | 25.6% |
| Mixed payment | 100 | 14.2% |
| Unknown payment | 16 | 2.3% |
| Panel C: number of bidders | | |
| Single bidder | 500 | 71.0% |
| Multiple bidders | 204 | 29.0% |

target firms gain 10% more when the takeover is hostile. Total returns are not affected by the classification.

Consistent with previous research, Panel C of Table III reports that both targets and bidder have larger abnormal returns in all-cash takeovers. In fact, total returns are 10% larger in cash takeover than in pure securities takeovers. Another interesting finding is that total returns are actually negative in an exchange of securities.

Panel D shows that the returns to target companies increase when more than one bidder makes an offer for the firm. Bidder returns are smaller in multiple bidder contests, and total returns are larger.

Finally, Panel E confirms Bradley, Desai, and Kim's (1988) evidence that the returns to bidding firms have declined substantially since 1981. Target and total returns are stable throughout both periods.

II. Tobin's Q and Takeover Abnormal Returns

This section presents the cross-sectional regressions of the abnormal returns of targets, bidders, and their weighted average. Initially, only measures of

Table III
Target, Bidder, and Total Abnormal Returns

Abnormal returns for targets and bidders are computed as the cumulative market model prediction error from the announcement date of the takeover until the effective date or the delisting date, whichever comes first. Total abnormal returns are computed as the weighted average of target and bidder returns, where the weight is the market value of equity 11 days before the announcement. The shares of the target firm held by the bidder prior to the announcement are not counted in the computation of the market value of the target firm. The sample consists of 704 complete takeovers over the period 1972-1987. A takeover is defined as hostile if the *WSJ* indicates that the management of the target firm does not support the initial offer. All other takeovers are classified as friendly. The form of payment is obtained from the *WSJ* and *Mergers and Acquisitions*. The sum of the observations in the cash, securities and mixed payment categories does not add up to the total for all takeovers because the form of payment could not be determined for 16 takeovers. The *p*-value of the test that mean returns equal zero is in parentheses.

| Category | Target returns | <i>N</i> | Bidder returns | <i>N</i> | Total returns | <i>N</i> |
|--|----------------|----------|----------------|----------|---------------|----------|
| Panel A: All takeovers | | | | | | |
| All takeovers | 23.64 (0.00) | 704 | -1.07 (0.05) | 384 | 3.66 (0.00) | 384 |
| Panel B: Classified by target firm reaction | | | | | | |
| Friendly targets | 21.89 (0.00) | 577 | -0.16 (0.17) | 307 | 3.29 (0.00) | 307 |
| Hostile targets | 31.77 (0.00) | 125 | -4.71 (0.11) | 77 | 5.08 (0.06) | 77 |
| Panel C: Classified by form of payment | | | | | | |
| Cash payment | 26.67 (0.00) | 408 | 3.44 (0.00) | 172 | 8.41 (0.00) | 172 |
| Securities exchange | 20.47 (0.00) | 180 | -5.86 (0.00) | 142 | -3.03 (0.11) | 142 |
| Mixed payment | 21.05 (0.00) | 100 | -3.74 (0.01) | 66 | 5.64 (0.01) | 66 |
| Panel D: Classified by number of bidders | | | | | | |
| Single bidder | 20.83 (0.00) | 500 | -0.35 (0.12) | 280 | 2.12 (0.14) | 280 |
| Multiple bidders | 30.53 (0.00) | 204 | -2.97 (0.21) | 104 | 7.60 (0.00) | 104 |
| Panel E: Classified by time period | | | | | | |
| Prior to 1981 | 24.55 (0.00) | 338 | 0.49 (0.40) | 230 | 4.11 (0.00) | 230 |
| From 1981 on | 22.80 (0.00) | 366 | -3.35 (0.04) | 155 | 3.00 (0.09) | 154 |

the *q* ratios of both companies are included in the regression model. In the second stage, additional control variables are introduced to assess their impact on the abnormal returns and the significance of the *q* ratios. To classify firms in the high *q*/low *q* categories, the *q* ratio of a company is compared to both an absolute standard and a relative standard. Specifically, *q* ratios are considered high if they are larger than one or larger than the company's industry average.² The *q* ratios are computed in the year prior to the initial announcement of the takeover attempt.

² Several alternative classification procedures have also been tested, including cut-offs at one, the industry average, and the industry median. In general, the results are similar to the specification reported in the remainder of the paper, although the explanatory power of the alternative models is lower.

The following two regression models are estimated for target, bidder, and total returns:

$$\text{CAR} = a + b_1 (\text{target } q \text{ dummy}) + b_2 (\text{bidder } q \text{ dummy}) \quad (1)$$

and

$$\begin{aligned} \text{CAR} = a + b_1 (\text{target } q \text{ dummy}) + b_2 (\text{bidder } q \text{ dummy}) \\ + b_3 (\text{relative size}) + b_4 (\text{cash payment}) \\ + b_5 (\text{multiple bidders}) + b_6 (\text{after 1980}) \\ + b_7 (\text{hostile}) \end{aligned} \quad (2)$$

where CAR is the cumulative abnormal return from the takeover announcement until the resolution or the delisting, whichever comes first; the q dummy variable is equal to one if the company's q ratio is larger than one or larger than the firm's industry average and zero otherwise; relative size is the logarithm of the ratio of the market value of the equity of the target firm and the bidding firm, computed 11 days before the announcement of the takeover; the other variables are indicator variables, equal to one if the condition in parentheses is fulfilled and zero otherwise.

Panel A of Table IV contains the results of the OLS regression of equation (1). Column (1) lists the results for target firms. In the base case, when both the target and the bidder have a low q ratio, targets gain 32.70% on average. These returns are reduced by 13% if the target firm has a high q ratio. This result is consistent with the view that less value can be created by taking over a well-managed firm. The q ratio of the bidder is not significant in this regression. Column (2) contains the results of the regression of bidder returns. Returns are positively related to the bidder's q and negatively related to the target's q . However, both regression coefficients are insignificant. Total returns are documented in column (3). When the bidding firm and the target firm have low q ratios, total returns are 5.16%, on average. However, if the target firm has a high q ratio, total returns are almost 6% lower, resulting in a negative total return. Again, the coefficient of the bidding firm's q ratio is not significant.

Overall, the evidence indicates that the magnitude of the target firm's q ratio is an important determinant of takeover gains, but the bidder's q ratio fails to enter the regressions significantly. The explanatory power of the regression models is low. However, a number of important control variables have been omitted from the model, and, therefore, the model may be misspecified.

Control variables are added to the regressions in Panel B of Table IV. Since the form of payment is not available in four of the cases examined in Panel A, the sample size is reduced to 380 takeovers. Column (1) contains the regression results for target firms. The magnitude and significance of the coefficient on the target company's q ratio (-0.1221) is virtually unchanged from Panel A. The q ratio of the bidding firm enters the regression posi-

Table IV
Cross-Sectional Regressions of Target, Bidder, and Total
Abnormal Returns on Measures of Tobin's Q and
Characteristics of the Offer and the Contest

Abnormal returns for targets and bidders are computed as the cumulative market model prediction errors from the announcement date of the takeover until the effective date or the delisting date, whichever comes first. Total abnormal returns are computed as the weighted average of target and bidder returns, where the weight is the market value of equity 11 days before the announcement. The target shares held by the bidder are not counted in the computation of the market value of the target firm. The sample consists of 704 complete takeovers over the period 1972-1987. The regression model is estimated for 384 takeovers that have sufficient target and bidder information. Four observations with no information on the form of payment have been eliminated from Panel B. The regression models are estimated using OLS. Description of the independent variables: TARGET Q IS LARGE is an indicator variable equal to one if the target's q ratio is larger than one or larger than its industry average. BIDDER Q IS LARGE is an indicator variable equal to one if the bidder's q ratio is larger than one or larger than its industry average. RELATIVE SIZE is computed as the logarithm of the ratio of the market values of target and bidder 11 days prior to the initial announcement. CASH PAYMENT is an indicator variable equal to one if the payment is made completely in cash. The form of payment is obtained from the *WSJ* or *Mergers and Acquisitions*. MULTIPLE BIDDERS is an indicator variable equal to one if more than one bidder enters the contest. AFTER 1980 is an indicator variable equal to one if the observation was made after 1980. HOSTILE TAKEOVER is an indicator variable equal to one if the takeover is hostile. A takeover is defined as hostile if the *WSJ* indicates that the management of the target firm does not support the initial offer.

Panel A: Regressions without control variables

| | (1) Target returns | (2) Bidder returns | (3) Total returns |
|-------------------|----------------------------|-----------------------|----------------------|
| INTERCEPT | 0.3270 (0.00) ^a | -0.0179 (0.00) | 0.0516 (0.02) |
| TARGET Q IS LARGE | -0.1323 (0.00) | -0.0418 (0.14) | -0.0591 (0.02) |
| BIDDER Q IS LARGE | -0.0163 (0.70) | 0.0367 (0.20) | 0.0188 (0.45) |
| F-VALUE | 5.47 (0.00) | 1.71 (0.18) | 2.92 (0.06) |
| R ² | 0.03 | 0.01 | 0.02 |
| N | 384 | 384 | 384 |

Panel B: Regressions with control variables

| | (1) Target returns | (2) Bidder returns | (3) Total returns |
|-------------------|-----------------------|-----------------------|----------------------|
| INTERCEPT | 0.2019 (0.00) | -0.0194 (0.54) | 0.0949 (0.00) |
| TARGET Q IS LARGE | -0.1221 (0.00) | -0.0444 (0.08) | -0.0519 (0.03) |
| BIDDER Q IS LARGE | 0.0171 (0.66) | 0.0636 (0.01) | 0.0484 (0.04) |
| RELATIVE SIZE | -0.0107 (0.42) | 0.0122 (0.17) | 0.0456 (0.00) |
| CASH PAYMENT | 0.0601 (0.13) | 0.1111 (0.00) | 0.0972 (0.00) |
| MULTIPLE BIDDERS | 0.1658 (0.00) | 0.0036 (0.91) | 0.0541 (0.07) |
| AFTER 1980 | 0.0134 (0.74) | -0.0760 (0.00) | -0.0542 (0.02) |
| HOSTILE TAKEOVER | 0.0208 (0.70) | -0.0786 (0.03) | -0.0722 (0.03) |
| F-VALUE | 5.07 (0.00) | 5.15 (0.00) | 9.00 (0.00) |
| R ² | 0.10 | 0.11 | 0.17 |
| N | 380 | 380 | 380 |

^aP-values in parentheses.

tively, but it remains insignificant. The regression model also shows that target abnormal returns are 17% higher on average when more than one bidder enters the contest. The other indicator variables in the equation have the expected signs, but they lack significance at conventional levels.

The q ratios of targets and bidders are both important in explaining bidder returns, as documented in column (2) of Panel B. The abnormal returns of bidders are 6.36% higher when they have high q ratios, and their returns increase another 4.44% when the target firm has a low q ratio. Thus, the combined effect of both q ratios can be larger than 10%. If q is interpreted as a measure of managerial performance, this evidence supports the notion that more value can be created from taking over poorly managed firms. Moreover, the benefits of the takeover are larger when the bidder is also well-managed. The bidder regressions contain some other interesting findings: (i) consistent with Bradley, Desai, and Kim (1988) and Morck, Shleifer, and Vishny (1990), the abnormal returns to bidding firms have declined substantially since 1981; (ii) cash takeovers increase bidder abnormal returns by 11%; and (iii) hostile takeovers reduce bidder gains by almost 8%. Hostile takeovers may reduce the gain to the bidding firm because the premium is larger or because takeover defenses have made the target firm less valuable. The latter view is consistent with the evidence provided by Pound (1988).

Column (3) of Panel B in Table IV shows the regression model for total returns. The q ratios of the target and the bidding firm both enter the model significantly. The total wealth gains increase by 4.84% if the bidding firm has a high q ratio and by another 5.19% when the target firm has a low q ratio. Again, the combined effect of both q ratios can be larger than 10%. The coefficients on the control variables show that total takeover benefits have declined more than 5% since 1981 and that resistance from target management has a negative impact on takeover gains. Bradley, Desai, and Kim (1988) report an insignificant decline in total gains of 1.8% since 1981. Also, more value is created when the target firm is large relative to the bidder, which confirms the evidence of Jarrell and Poulsen (1989). The regression models can explain about 10% of the cross-sectional variation in the abnormal returns of targets and bidders and 17% of the portfolio returns.³

To examine the sensitivity of these results to the length of the period over which returns are cumulated, two alternative event-windows are specified. First, the event-window is extended by 40 trading days prior to the initial announcement. This takes into account any price run-ups that may be due to information leakage. Essentially, the regression results of Table IV are not affected by this procedure.⁴ In another sensitivity test, bidder returns are computed over the 2-day event window, covering the day before and the day

³ The explanatory power of the model is relatively low. However, this is not unusual for regression models where market model residuals are used as independent variables.

⁴ The significance levels on the q ratio indicator variables are within 2% of the levels in Table IV. The magnitude and significance of the control variables are also similar, and the cash dummy variable in the target firm regressions becomes significant at the 10% level.

of the *WSJ* announcement. This procedure increases the signal to noise ratio for bidding firms, in particular when they are much larger than their targets. On the other hand, some of the details of the offer, such as the form of payment or the reaction of target management may not be available until after the initial announcement [see Asquith, Bruner, and Mullins (1987)]. The q ratios of targets and bidders remain significant in the regressions that include the control variables. Moreover, the coefficient on the multiple bidder dummy is negative and significant at the 1% level, which indicates that the market reacts negatively to takeovers that may escalate into bidding wars.

The regression model with control variables is also estimated for takeovers where only target firm data is available. As such, the q ratio of the bidder and the relative size of targets and bidders are excluded from the set of explanatory variables. This procedure increases the sample size to 688. The coefficient on the target firm's q ratio in this regression is -0.0570 , which is significant at the 5% level. This coefficient is lower than the coefficient for the sample with complete information, but the result confirms the earlier finding that takeover targets with large q ratios gain less in the takeover.

III. Conclusion

This paper analyzes the relation between takeover gains and the q ratios of targets and bidders for a sample of 704 mergers and tender offers over the period 1972-1987. If q is interpreted as a measure of managerial performance, the results indicate that target, bidder, and total takeover returns are larger if the target is performing poorly, and the bidder is performing well. These results are not due to a spurious correlation between Tobin's q and the characteristics of the offer or the takeover. In fact, the inclusion of control variables in the regression enhances the results. This finding confirms the results of the work by Lang, Stulz, and Walkling (1989) and indicates that their findings also hold for mergers and after controlling for other determinants of takeover gains.

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