SYNERGISTIC GAINS FROM CORPORATE ACQUISITIONS AND THEIR DIVISION BETWEEN THE STOCKHOLDERS OF TARGET AND ACQUIRING FIRMS*

Michael BRADLEY

University of Michigan, Ann Arbor, MI 48109, USA

Anand DESAI

University of Florida, Gainesville, FL 32611, USA

E. Han KIM

University of Michigan, Ann Arbor, MI 48109 USA

This paper documents that a successful tender offer increases the combined value of the target and acquiring firms by an average of 7.4%. We also provide a theoretical analysis of the process of competition for control of the target and empirical evidence that competition among bidding firms increases the returns to targets and decreases the returns to acquirers, that the supply of target shares is positively sloped, and that changes in the legal/institutional environment of tender offers have had no impact on the total (percentage) synergistic gains created but have significantly affected their division between the stockholders of the target and acquiring firms.

1. Introduction

There is empirical evidence that corporate acquisitions effected through tender offers are wealth-increasing transactions for the stockholders of both the target and acquiring firms [Dodd and Ruback (1977) and Bradley (1980)]. Moreover, Bradley, Desai, and Kim (1983) show that these gains are not due to the market's reassessment of previously undervalued securities. They docu-

ment that the positive revaluation of the target's shares is permanent only if the offer is successful, i.e., only if the resources of the two firms are combined. This evidence is consistent with the synergy theory of tender offers, which posits that the acquisition of control over the target enables the acquirer to redeploy the combined assets of the two firms toward higher-valued uses.

None of the above studies, however, documents the magnitude of the synergistic gains that result from successful acquisitions achieved through tender offers. Indeed, whether or not suc· · acquisitions result in synergistic gains is still a contentious issue in the literature. For example, Roll (1986) has proposed the 'Hubris Hypothesis', which posits that the gains to target shareholders represent wealth transfers from acquiring firms' shareholders and not necessarily synergistic gains. To test this hypothesis, it is necessary to measure synergistic gains using matched pairs of target and acquiring firms. None of the earlier studies impose this requirement on their samples.

In this paper, we estimate the magnitude of the synergistic gains, using the revaluation of the combined wealth of target-firm and acquiring-firm shareholders as a basis. We also examine the factors that determine the division of these gains between the stockholders of the two firms and document how the division and the total gains created have changed with the changing environment of the tender offer process.

This paper is organized as follows. In section 2 we estimate the synergistic gains created by successful tender offers. In section 3 we analyze how these gains are divided between the stockholders of the target and acquiring firms. Section 3 also summarizes our analysis of competition among bidding firms, which is presented more fully in the appendix. We present our empirical results on competition and the division of gains in section 4. A summary and concluding remarks are presented in section 5.

2. Synergistic gains

2.1. Definition of synergy

We assume that a tender offer is an attempt by the bidding firm to exploit a profit opportunity created by a change in economic conditions. This change may be the result of an exogenous change in supply and/or demand, technological innovations, or purposeful investments by the bidding firm. The value created by the combination may result from more efficient management, economies of scale, improved production techniques, the combination of complementary resources, the redeployment of assets to more profitable uses, the exploitation of market power, or any number of value-creating mechanisms that fall under the general rubric of corporate synergy. We define the total synergistic gain from a successful tender offer as the sum of the change in the wealth of the stockholders of the target and acquiring firms:

$$\Delta \Pi = \Delta W_{\mathrm{T}} + \Delta W_{\mathrm{A}}, \tag{1}$$

where

$\Delta \Pi$ = total synergistic gain,
ΔW_T = change in target-firm shareholders' wealth, and
ΔW_A = change in acquiring-firm stockholders' wealth.

This definition assumes that corporate acquisitions effected through inter-firm tender offers have no effect on the wealth of the senior claimants (e.g., bondholders and other creditors) of the firms involved. Kim and McConnell (1977) and Asquith and Kim (1982) provide evidence that is consistent with this assumption for a sample of firms involved in corporate mergers.

2.2. Sample description

Our study is based on a sample of successful tender offer contests occurring over the period 1963–1984. We identify the beginning of a tender offer contest with the announcement of a bid for a given target. If there is only one bid, the contest ends when the offer is executed. The average duration between the announcement and the execution of a tender offer is three to four weeks. If additional bids are made by the same or another firm while the initial bid is outstanding, our definition of the contest is extended through the execution of the last bid made. The duration of a contest is also extended if a subsequent bid is made within 14 trading days of the expiration of a previous bid.

The primary data base consists of 921 interfirm tender offers, reflecting contests for 721 target firms between October 1958 and December 1984.[1] From this data base we select our sample according to the following criteria: (1) The winning bidder in each contest purchased at least some of the outstanding target shares, (2) the acquisition took place after 1963, and (3) the shares of *both* the target and acquiring firms were traded on the New York Stock Exchange (NYSE) or the American Stock Exchange (AMEX) at the time of the acquisition. The first criterion is imposed because our definition of synergistic gains applies only to successful tender offers.[2] The last two criteria enable us to use the CRSP (Center for Research in Security Prices) daily stock return data to calculate the total synergistic gain from an acquisition.

These selection criteria reduce our initial sample of 721 tender offer contests to 236. Summary statistics for the percentage of target shares held, sought, and

[1]Tender offers through 1977 were identified with the help of the data bases compiled by Bradley (1980) and Dodd and Ruback (1977). Relevant information for all offers was collected and/or verified with citations in the *Wall Street Journal* (index and newspaper).

[2]Rather than imposing some arbitrary cut-off point for the definition of a successful tender offer, we include in our sample all offers in which the bidding firm bought any number of target shares. The smallest percentage of shares purchased is 2.0. Although this may appear small, one should recognize that the control of a corporation lies along a continuum from none for those who own no shares to complete for those who own 100% of the firm's voting shares. From this perspective, the acquisition of even 2.0% may significantly alter the power of voting coalitions and affect the operations of the firm.

Table 1

Descriptive statistics of the percentage of target shares held, sought, and purchased by the
acquiring firms in 236 successful tender offer contests effected over the period 1963–1984.[a]

	Percent of target shares[b]		
	Held	Sought	Purchased
Mean	9.8	66.2	60.4
Standard deviation	18.2	32.2	30.2
Median	0	67.2	62.8
Minimum	0	5.4	2.0
Maximum	75.0	100.0	100.0

[a]We define a successful tender offer as one in which the bidding firm buys some (however few)
of the target shares pursuant to the terms of the bid.
[b]The denominator of all these percentages is the total number of shares outstanding.

purchased in the 236 successful tender offers are reported in table 1. Of the
236 acquiring firms, 155 held no target shares prior to the offer. The 236
acquiring firms sought, on average, 66.2% of the target shares. The mean as
well as the median fraction of target shares ultimately purchased in our total
sample is in excess of 50%. Thus the 'typical' acquiring firm in our sample held
no target shares prior to the offer but held a majority of the outstanding target
shares upon successful execution of the offer.

2.3. Methodology

Our estimates of the gains created by tender offers are based on market
model prediction errors. Under the assumption of multivariate normality, the
abnormal return (prediction error) to firm i on day t can be written as

$$AR_{it} = R_{it} - \hat{\alpha}_i - \hat{\beta}_i R_{mt},$$ (2)

where

AR_{it} = abnormal return to firm i on day t,
R_{it} = realized return to firm i on day t,
$\hat{\alpha}_i, \hat{\beta}_i$ = market model parameter estimates, and
R_{mt} = return to the equally-weighted CRSP market portfolio on day t.

The market model parameter estimates for each target firm are obtained
using a maximum of 240 trading days of daily returns data beginning 300 days
before the announcement of the first tender offer bid in the contest. Estimates

for the acquiring firms are obtained using 240 trading days of returns data beginning 300 days before the first bid made for the target by this firm.[3]

For each of the 472 firms in our sample, we cumulate the daily abnormal return over a contest-specific interval to obtain the cumulative abnormal return (*CAR*). The *CAR* is computed from five trading days before the announcement of the first bid through five days after the announcement of the ultimately successful bid. We begin to cumulate the *CAR* five days before the announcement of the initial bid in order to capture any anticipatory price behavior (leakage of information) that may occur before the actual public announcement.

Ideally, we would like to extend our *CAR* window until the day just before the offer is executed. Reliable execution dates are not available, however, for most of the offers in our sample. The postannouncement interval of five trading days is consistent with the requirement in the 1968 Williams Amendment that tendered shares can be withdrawn within seven calendar days (five trading days). The seven-calendar-day withdrawal period was extended to 15 business days in 1970, and starting in 1978 the regulation required that all tender offers remain open for 20 business days.

We do not extend the *CAR* window through the execution of the offer because this would cause a downward bias in the measured returns to target shareholders. This downward bias stems from the necessary condition for a successful tender offer that the offer price, P_T, be greater than the expected postexecution price of the remaining target shares, P_E. (See the appendix.) The premium $(P_T - P_E)$ can be likened to a dividend paid to tendering

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[3]In a recent paper Loderer and Mauer (1986) argue that the market model parameter estimates for acquiring firms will be biased if the estimation period is confined to the period just before the acquisition. Specifically, they argue that the estimate of the constant α will be biased upward because many acquiring firms initiate acquisition programs – indeed, investment programs in general – following a period of earnings growth. This overstimate of α for acquiring firms will result in a negative bias in the market model residuals (prediction errors) after the acquisition. Clearly, whether using preoffer data biases the estimate of the constant is an empirical issue.

To examine this issue, we estimated the market model parameters for the acquiring firms twice: first, using preoffer data as described above, and second, using 240 days beginning 20 days following the execution of the offer. The mean of the preoffer α's is -0.01% ($\sigma = 0.13\%$) and the mean of the postoffer α's is -0.02% ($\sigma = 0.13\%$). Although the mean of the preoffer α's is larger (a less negative number) than the mean of the postoffer α's, neither estimate is significantly different from zero or significantly different from the other. Moreover, if the preoffer α's are systematically greater than the postoffer α's, a linear regression of preoffer α's on the postoffer α's should yield either a slope coefficient greater than one and/or a positive constant. Contrary to this prediction, a simple linear regression yields the following results:

$$\text{Pre } \alpha_i = -0.00012 + 0.126 \text{ Post } \alpha_i, \qquad R^2 = 0.015.$$
$$(t = -1.4) \ (t = 1.9)$$

With these results and because our typical estimation period for cumulative abnormal returns is only 11 days, we feel that our results will not be significantly biased by using the preoffer α's. We should note that the Loderer and Mauer analysis is based on monthly data whereas ours is based on daily data. Perhaps the misestimation of the α of acquiring firms is important (significant) only when monthly data are used.

stockholders. As such, the target shares will trade 'cum-dividend' after the announcement until just before the execution and 'ex-dividend' after the execution. The 'cum-dividend' return is the relevant measure of the gain to target stockholders.

Ending the *CAR* window before the execution of the offer subjects our estimates to two potential biases. On the one hand, there is still a positive probability of failure after the end of the *CAR* window, and hence, our estimate of returns might be downward biased. On the other hand, to the extent that the market assigns a positive probability that the outstanding offer will be topped by a higher-valued bid, the measure will be an overestimate. We feel that the choice of five trading days after the announcement of the ultimately successful offer as the end of the window represents a reasonable tradeoff between these possible sources of bias.[4]

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[4]We recognize that our *CAR* statistic is but one measure of the increase in the wealth of target stockholders. An alternative measure has been proposed by Jensen (1985) and Comment and Jarrell (1987). These authors employ what has become known as the blended premium (*BP*), which is defined as

$$BP = [(F)(P_T - P_0) + (1 - F)(P_E - P_0)]/P_0,$$

where F is the fraction of target shares purchased at P_T and P_0 is the pre-offer market price of the target shares.

As mentioned above, the necessary data for some of the variables in this equation are not available. However, for the 52 tender offers in our sample that were effected over the period 1981–1984, we were able to obtain all the necessary data from Robert Comment and Gregg Jarrell. For each of the offers in this subsample, we calculate a blended premium, using the closing price six days prior to the public announcement of the offer as a measure of P_0.

The mean *BP* for these 52 firms is 43.03%. In comparison, our *CAR* measure for this portfolio of firms is 35.34% (see table 2). A simple linear regression of *CAR* on *BP* yields the following results:

Model:	$CAR = \gamma_0 + \gamma_1$ (*BP*)
Coefficient:	0.018 0.779
Standard error:	0.019 0.037
R^2 and F-statistic:	0.902 442.3

Although the estimate of the constant (γ_0) in this regression is insignificantly different from zero, the estimate of the slope coefficient (γ_1) is significantly less than 1.0. Thus, both the regression results and the difference in means indicate that our *CAR* measure is systematically less than *BP* by roughly 7.7%.

There are a number of reasons why we would expect *CAR* to be systematically less than *BP*. As discussed above, there still may be a positive probability that the outstanding offer will be unsuccessful even five days after the announcement of the ultimately successful offer, which is the end of our *CAR* window. If this were the reason for the discrepancy, however, we would expect to see the *CAR* to single-bidder targets rise after our cutoff date. No such increase is observed (see table 3 and fig. 2). Moreover, there are at least two computational reasons why *CAR* is systematically less than *BP*, and these explanations can easily account for the 7.7% difference.

First, *CAR* is, by design, net of market movements. The average duration of the offers in this sample is 22 trading days or one trading month. The average monthly return to the CRSP equally-weighted market portfolio between 1981 and 1984 is roughly 1.7%. Since the average Beta of the firms in this sample is 0.996, 1.7% of the 7.7% difference between *BP* and *CAR* can be attributed to general market movements.

A second reason for the disparity between *CAR* and *BP* is that the former is a sum of (abnormal) returns whereas the latter is essentially a continuously compounded return. Given that

Our CAR algorithm generates an 11-day window for all but 15 tender offers in which there is only one bidder. For tender offer contests in which there is more than one bidder, the window for targets varies, with a mean of 43 trading days and a standard deviation of 52 trading days.

Using these variable-window CARs, we estimate the dollar gain to the target and acquiring firms in each tender offer contest i as

$$\Delta \hat{W}_{Ti} = W_{Ti} \cdot CART_i, \qquad \Delta \hat{W}_{Ai} = W_{Ai} \cdot CARA_i, \tag{3}$$

where

W_{Ti} = market value of the target equity as of the end of six trading days prior to the first announcement for the target, minus the value of the target shares held by the acquirer,

$CART_i$ = cumulative abnormal return to the target firm from five trading days before the announcement of the first bid through five trading days after the announcement of the ultimately successful bid,

W_{Ai} = market value of the acquiring firm as of the end of six days prior to the first announcement made by the acquiring firm,

$CARA_i$ = cumulative abnormal return to the acquiring firm from five trading days before the announcement of the first offer made by this firm through five trading days after the announcement of the ultimately successful bid.

Conceptually, an empirical measure of the total percentage synergistic gains created by the ith tender offer would be a weighted average of $CART$ and $CARA$. Since $CART$ and $CARA$ are based on different event windows, however, they are not directly comparable. Moreover, we have no information on the statistical properties of such a weighted average.

To circumvent these statistical problems, our estimate of the total percentage synergistic gains is based on the CAR to a value-weighted *portfolio* of the ith target and the ith acquiring firm, where the weights used are W_{Ti} and W_{Ai} as defined above. Market model parameter estimates for each of the 236 value-weighted portfolios are obtained using 240 trading days of portfolio returns beginning 300 days before the first tender offer bid in the contest. The

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the returns to the targets are predominantly positive over the tender offer period, it follows that the sum of the daily (abnormal) returns will be strictly less than a continuously compounded return. For example, the sum of 2% per day for 22 days is 44%, whereas the continuously compounded return of 2% for 22 days is 55%.

In sum, our CAR measure is less than the BP measure used by Jensen and by Comment and Jarrell. However, it is not at all clear which is superior. One obvious advantage of the CAR statistic is that it has known statistical properties and therefore can be used in hypothesis testing.

combined percentage synergistic gain created by a successful tender offer, $CARC_i$, is measured by cumulating the abnormal returns to this portfolio from five trading days before the announcement of the first bid through five days after the announcement of the ultimately successful bid. Using this percentage measure, we estimate the total dollar synergistic gain, $\Delta\hat{\Pi}_i$, as

$$\Delta\hat{\Pi}_i = \Pi_i \cdot CARC_i, \tag{4}$$

where

$$\Pi_i = W_{Ti} + W_{Ai}.$$

2.4. Estimate of synergistic gains

Table 2 reports our measures of the synergistic gains created by tender offers, as well as the changes in the wealth of the stockholders of the target and acquiring firms. The data in the last column of the top panel of table 2 (labeled *Combined*) show that the combined value of the target and acquiring firms increased, on average, by 7.43%, with 75% of the combined revaluations being positive. Our estimate of this percentage synergistic gain is statistically greater than zero ($z = 19.95$).[5]

The mean total dollar gain created by the acquisitions in our sample is $117 million (expressed in December 1984 dollars). Since the distribution of our

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[5]This z-statistic is computed following Patell's (1976) eq. (11). Specifically, we compute the standardized abnormal return to the ith portfolio on day t, SAR_{it}, defined as

$$SAR_{it} = AR_{it} \left/ \left[\sigma_i \left(1 + \frac{1}{T_i} + \frac{(R_{mt} - \bar{R}_m)^2}{\sum\limits_{\tau} (R_{m\tau} - \bar{R}_m)^2} \right)^{1/2} \right] \right. ,$$

where

σ_i = standard deviation of the residuals in the market model estimation period,
T_i = number of days in the estimation period, and
R_m = mean return to the market portfolio over the estimation period.

The SAR_{it} is then used to obtain the standardized CAR_i over K_i event days:

$$SCAR_i = \left[\sum_{t=1}^{K_i} SAR_{it} \right] \left/ \sqrt{K_i} \right. .$$

Finally, the z-statistic for the portfolio of N_p firms in the sample is computed as

$$z = \sum_{i=1}^{N_p} SCAR_i \left/ \left[\sum_{i=1}^{N_p} ((T_i - 2)/(T_i - 4)) \right]^{1/2} \right. .$$

Table 2

Mean percentage and dollar synergistic gains to 236 successful tender offer contests effected between 1963 and 1984 for combined, target, and acquiring firms. All dollar figures are stated in millions of 1984 dollars.[a]

	Subperiod			Total
	7/63–6/68	7/68–12/80	1/81–12/84	7/63–12/84
No. of contests	51	133	52	236
Combined				
% CARC	7.78[b]	7.08[b]	8.00[b]	7.43[b]
$\Delta\hat{\Pi}$	91.08	87.45	218.51	117.11
% Positive	78	74	73	75
Targets				
% CART	18.92[b]	35.29[b]	35.34[b]	31.77[b]
$\Delta\hat{W}_T$	70.71	71.59	233.53	107.08
% Positive	94	98	90	95
Acquirers				
% CARA	4.09[b]	1.30	−2.93[b]	0.97[b]
$\Delta\hat{W}_A$	24.96	31.80	−27.28	17.30
% Positive	59	48	35	47

[a] $\Delta\hat{W}_T = W_T * CART$; $\Delta\hat{W}_A = W_A * CARA$; and $\Delta\hat{\Pi} = (W_T + W_A) * CARC$; where W_T = preoffer market value of target equity, excluding shares held by the acquirer; W_A = preoffer market value of equity of acquiring firm; $CART$ = cumulative abnormal return from five days before the first offer to five days after the last offer made for this target; $CARA$ = cumulative abnormal return from five days before the first offer to five days after the last offer made by this bidding firm; $CARC$ = cumulative abnormal return to the value-weighted portfolio of the target and the acquiring firm, measured over the same interval as $CART$.

[b] Significantly different from zero at the 0.01 level.

dollar measure $\Delta\hat{\Pi}$ is extremely leptokurtic and skewed to the right (the skewness and kurtosis coefficients are 6.70 and 62.38, respectively), we conduct the nonparametric Wilcoxon Signed Rank test to test if the median $\Delta\hat{\Pi}$ of $26.9 million for the total sample is statistically greater than zero. This test yields a z-statistic of 9.30, which is significant at the 1% level.

Table 2 also reports data for three subperiods: 1963–1968, 1968–1980, and 1981–1984. Although this division is somewhat arbitrary, there have been some dramatic changes in the tender offer process during the 22-year period under study, and these three subperiods correspond roughly to the three distinct regimes that have existed in the legal and institutional environment of tender offers since 1963.

The first period (1963–1968) is important because before 1968, cash tender offers were free of government regulation. They were considered private transactions between the acquiring firm and the stockholders of the target

firm. In July 1968 Congress passed the Williams Amendment, which brought the tender offer within the purview of the Securities and Exchange Commission (SEC). In the same year, Virginia enacted the first state antitakeover statute; by 1978, 36 states had enacted their own takeover regulations. By isolating the offers that occurred in the unregulated period, we can examine the effects of government regulation on the magnitude and division of the synergistic gains from tender offers.

The last period (1981–1984) is distinguished by three factors that have drastically changed the environment in which tender offers take place. First is the avowed laissez-faire attitude of the Reagan Administration toward corporate takeovers in general.[6] Second is the development of sophisticated tactics to repel takeovers (poison pills, targeted share repurchases, lock-up provisions, and supermajority and fair-price amendments). The third factor is the advent of investment banking firms that specialize in raising funds to finance corporate takeovers. We are interested in how these recent developments in the market for corporate control have affected the gains created by tender offers.

The data in the top panel of table 2 indicate that the percentage synergistic gains created by tender offers have remained remarkably constant, between 7% and 8%, over the three subperiods. The dollar gains, however, have increased dramatically from the first two subperiods to the third; expressed in December 1984 dollars, the average synergistic gain has grown from $91 million and $87 million in the first two subperiods to $219 million in the 1981–1984 subperiod.

This increase in the dollar synergistic gains, but not in the percentage synergistic gains, is due to the increase in the size of target firms. The mean preoffer market value of targets increased from $379 million in the first period to $550 million in the last period, while the average size of acquiring firms actually dropped from $1,624 million to $1,477 million.

The increase in the size of the target firms in the third period may be due to the laissez-faire attitude of the Reagan Administration and innovative financing methods of investment banking firms. Also, the popularity of two-tier offers has reduced the cash outlays required of bidding firms.[7] These developments in the takeover arena have made it easier for bidding firms to seek control of larger targets.

In the next section we identify the factors that determine how the synergy gains created by tender offers are divided between the stockholders of the target and acquiring firms. The data presented in the last two panels of table 2 allow us to draw some preliminary conclusions on this issue.

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[6]See the Economic Report of the President, 1985, especially ch. 6.

[7]In the typical two-tier offer, the bidding firm makes a cash offer for a fraction of the target shares (usually 51% or more) and agrees to purchase the remainder if the offer is successful. Often, the remaining shares are purchased by an exchange of securities. Thus, the cash outlay for the shares purchased through a fractional tender offer is less than the outlay necessary for an any-or-all cash offer.

The overwhelming conclusion is that target stockholders capture the majority of the gains from tender offers. Ninety-five percent of the targets in the total sample experienced a positive abnormal return. The average abnormal return is 32% and the ratio of the mean dollar gain to targets to the mean dollar total gain ($\Delta \hat{W}_T / \Delta \hat{\Pi}$) is 91%. In contrast, the average abnormal return to acquiring firms is 0.97%, only 47% of the observations are positive, and the ratio of the mean dollar gain to the mean total gain ($\Delta \hat{W}_A / \Delta \hat{\Pi}$) is 15%. Whether measured as rates of return or dollar gains, the lion's share of the gains from tender offers is captured by target shareholders.

The data in table 2 also indicate that the returns to acquiring firms have decreased over time, whereas the returns to targets have increased. The mean abnormal return to acquiring firms is 4.09% ($z = 5.88$) in the first period and -2.93% ($z = -2.79$) in the last. In contrast, the mean abnormal return to targets has increased from 18.92% ($z = 26.2$) to 35.34% ($z = 26.2$).

In sum, the data in table 2 compel the following conclusions:

(1) Successful tender offers generate significant synergistic gains and lead to a more efficient allocation of corporate resources.[8]

(2) The stockholders of both target and acquiring firms realize significant positive abnormal returns. However, most of the gains are captured by the stockholders of target firms.

(3) Both the rate of return and dollar gains to target stockholders have increased over time, whereas the returns to the stockholders of acquiring firms have decreased. In fact, in the most recent subperiod, acquiring firms actually suffered a significant abnormal loss.

3. A model of the division of the gains from interfirm tender offers

In the previous section we documented that corporate acquisitions made through tender offers generate significantly positive synergistic gains. In this section we attempt to identify the factors that determine the division of the synergistic gains between the stockholders of the target and acquiring firms. We begin by reviewing the important legal and institutional aspects of this capital market transaction. We then summarize and extend our analysis of the tender offer process, which is presented in the appendix. This summary and extension provide a framework within which we develop implications regarding the division of the gains from tender offers.

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[8]We recognize that, theoretically, the gains from tender offers may stem from the creation of market power and not necessarily from increased allocative efficiency. However, the work of Eckbo (1983, 1985) and Stillman (1983) indicates that corporate acquisitions have no measurable effect on the degree of market power in the economy.

3.1. Regulation of tender offers

As discussed earlier, interfirm cash tender offers were not regulated by federal securities law until July 1968 when Congress passed the Williams Amendment and brought cash tender offers within the purview of the SEC.[9] Provisions of the Williams Amendment require bidding firms to provide detailed information about how the tender offer will be financed and what changes in the operations of the target will be made if the offer is successful. The regulations also specify a minimum number of days that a tender offer must remain open and a minimum number of days before the target shares can be purchased. Target stockholders who have tendered their shares to one bidding firm are allowed to withdraw their shares if a higher-valued offer is made by another firm before the required number of days for the initial offer has elapsed. Furthermore, if an outstanding offer is revised upward, then all target stockholders, even those who tendered their shares at the previous terms, must receive the higher price.

The 'disclosure and delay' requirements of federal regulations make the tender offer process similar to an open auction for the target shares. The regulations force bidding firms to reveal information about the target company and delay the offer long enough so that other potential bidding firms can discover this information. Moreover, the delay and withdrawal provisions of the regulations allow target stockholders to take advantage of competing offers similar to that which occurs in open auction markets. The delay requirements permit further production of information that may generate higher-valued bids, and the withdrawal privilege allows target stockholders to recontract and tender their shares to the firm that makes the highest-valued offer.[10]

3.2. Assumptions

To be consistent with the institutional setting of the tender offer process, we assume that competition for the target shares is effected through a tatônnement process. We also assume that there are no transactions costs in bidding, that target shareholders are wealth maximizers, and that managers of bidding firms seek to maximize their shareholders' wealth.

From the evidence presented in section 2, we view a tender offer as an attempt by the bidding firm to gain control of the target resources and to

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[9] Stock tender offers (exchange offers) are regulated under the original Securities and Exchange Act of 1933 because the transaction typically involves the issuance of new stock.

[10] Fifty-one (22%) of the offers in our sample were effected prior to the passage of the Williams Amendment and were thus free of its constraints. However, voluntary practices and/or the rules of the NYSE or AMEX during the 1960s produced offers not unlike those in the post-Williams era. Thus, in most of the pre-Williams offers in our sample the bidding firm was identified, target stockholders were given at least one week to tender their shares, and oversubscribed offers were effected on a pro-rata basis.

allocate the combined resources of the two firms to higher-valued uses. We assume that to generate synergistic gains the bidding firm must secure control, which requires acquisition of at least N_C of the N_0 target shares outstanding.[11] We do not analyze the determinants of N_C. Rather, we assume that N_C is target-specific. We can, however, speculate on several factors that would affect its magnitude. The most obvious include the number of target shares outstanding, the concentration of these shares among the target stockholders, the predisposition of the target stockholders toward the takeover, and provisions in the firm's charter about the number of shares (votes) required to make fundamental changes in the firm's operations.

3.3. The tender offer process

In the appendix we present an analysis of the tender offer process within the context of the above assumptions and institutional and legal setting. We demonstrate that competition among rival management teams, including the managers of the target firm, ensures that the total value of the successful offer must be greater than or equal to the next-highest-valued allocation of the target resources.[12] Thus, given competition by target managers, the minimum value of the offer is bounded by the total preoffer market value of the target shares.

Our analysis implies a certain structure for the bidding process. In the appendix we show that a successful tender offer must be front-end loaded, i.e.,

$$P_T > P_E, \tag{5}$$

where

$$P_T = \text{front-end price, and}$$

$$P_E = \text{back-end price.}[13]$$

We also show that the winning bid in a tender offer contest will be the bid that maximizes the difference between P_T and P_E. By this criterion, bidding

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[11] It cannot be the case that the bidding firm can simply 'package' its value-creating ideas and sell them to the target firm. If this were possible, the bidding firm would never bother with the costly process of acquiring the target shares through a public tender offer. The control assumption is consistent with the finding of Bradley, Desai, and Kim (1983) that the permanent positive revaluation of target shares requires a successful acquisition of the target shares by the bidding firm.

[12] In this respect our notion of competition in the market for corporate control parallels that of Ruback (1983).

[13] If the bidding firm makes a partial offer without specifying the back-end price, we define P_E as the market's expectation of the postacquisition price of the target shares not purchased.

firms have an incentive to minimize P_E, regardless of their valuation of the target firm. In the appendix, we argue that the minimum P_E will be determined by statutes and legal standards. Thus, rival bidders will compete for control of the target by setting the back-end price to the minimum 'allowable' level and bidding for a controlling interest with their front-end price.

There is empirical evidence to support this view of the bidding process. As predicted by our analysis, the vast majority of successful tender offers are front-end loaded. Of the 52 tender offer contests for which we have estimates of P_T and P_E (see footnote 4), 32 satisfy the condition $P_T > P_E$. In 19 cases the two prices are (nominally) equivalent. Only in two instances is $P_T < P_E$; in one case the back-end price is \$.25 higher and in the other it is \$1.00 more. Note that the estimate of P_E is the (ex-post) market price of unpurchased target shares two days after the execution of the front-end offer. Thus, nominally equivalent front- and back-end prices do not vitiate our prediction that successful tender offers must be front-end loaded. The time value of money between the execution of the front and back ends makes the present value of P_E less than P_T. Moreover, general market movements between these two dates could account for the two aberrant cases where our measure of P_E is greater than P_T.[14]

Also, there is evidence that of the three parameters of a tender offer, rival bidding firms typically compete with each other on the front-end price, P_T, rather than on the back-end price, P_{E}, or the fraction of target shares sought, F. In our sample of 236 tender offer contests, we can identify a total of 408 bids: 236 initial bids and 172 revised bids. Of these 172 revised bids, 127 (74%) involved an increase only in P_T. Four bids involved an increase in the fraction of shares sought, F, alone and 28 bids involved an increase in both P_T and F. In the remaining 13 bids, the changes in P_T and F were in the opposite directions.

Our analysis of the tender offer process in the appendix is based on two unrealistic assumptions: (1) there are no tax consequences from tendering and (2) target stockholders have homogeneous beliefs about the outcome of the offer and about the postexecution market price of the target shares not purchased. These assumptions imply that all target stockholders have the same reservation price and hence the supply of target shares is perfectly elastic.

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[14]In section 4.1 we provide further evidence that successful tender offers are front-end loaded. Data reported in that section show that the CAR to the targets of single-bidder tender offers begins to decline 18 days after the announcement of the ultimately successful bid. This period roughly coincides with the average duration of the tender offers in our sample. We interpret this price decline as the ex-dividend effect discussed above. The ex-dividend effect will result in a price decline of the target shares on the execution date only if $P_T > P_E$. Bradley (1980) and Comment and Jarrell (1987) also provide evidence that the average front-end price in successful tender offers is significantly greater than the average back-end price.
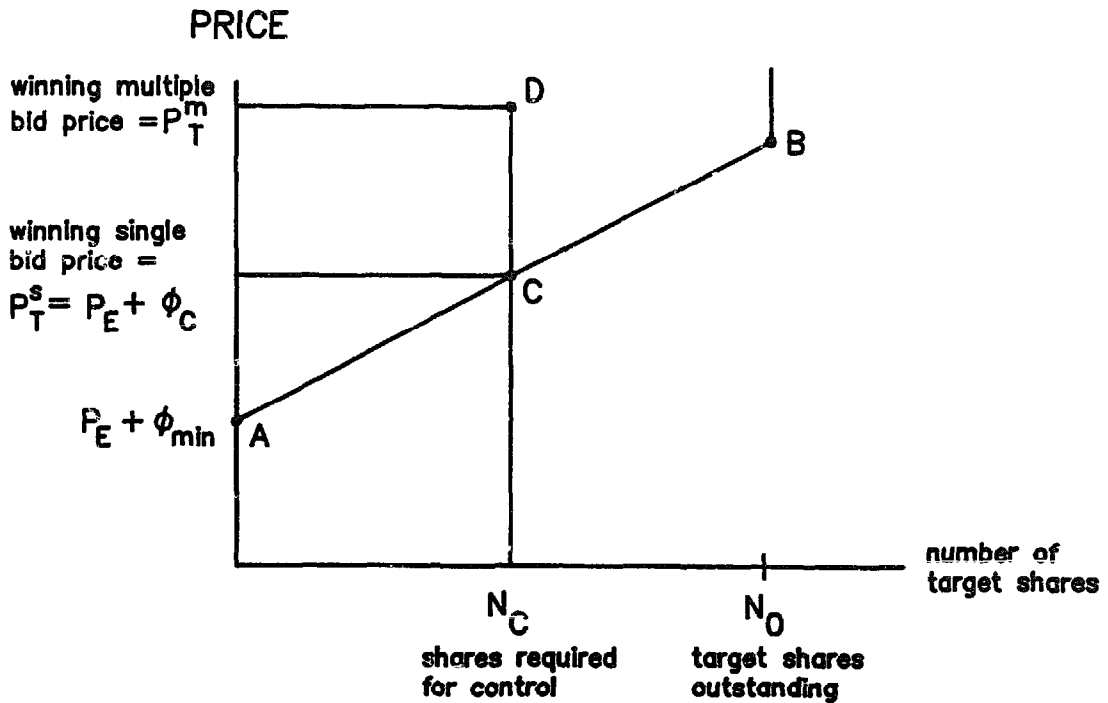
PRICE

winning multiple
bid price $= P_T^m$

$\qquad \qquad \qquad \qquad$ D

$\qquad \qquad \qquad \qquad \qquad \qquad \qquad$ B

winning single
bid price $=$

$P_T^s = P_E + \phi_C$

$\qquad \qquad \qquad \qquad \qquad$ C

$P_E + \phi_{min}$ $\quad$ A

$\qquad \qquad \qquad \qquad \qquad \qquad \qquad \qquad \qquad$ number of
$\qquad \qquad \qquad \qquad \qquad \qquad \qquad \qquad \qquad$ target shares

$\qquad$ N_C $\qquad \qquad \qquad$ N_O

$\qquad$ shares required $\qquad$ target shares
$\qquad$ for control $\qquad \qquad$ outstanding

Fig. 1. The postannouncement supply of target shares with heterogeneous capital-gains tax positions and/or expectations about future takeover bids.
P_E = back-end price of the outstanding offer, ϕ_i = premium demanded by the owner of the ith share, P_T^s = winning price in a single-bidder acquisition = the minimum price to elicit N_C shares, P_T^m = winning price in a multiple-bidder acquisition, ABC = postannouncement supply of target shares.

Relaxing these two assumptions requires us to modify inequality (5) as follows: The owner of the ith target share will not tender unless

$$P_T > P_E + \phi_i, \qquad \qquad \qquad (6)$$

where ϕ_i is the premium demanded by the owner of the ith share above P_E. The premium ϕ_i varies across target shareholders and represents differences in capital-gains tax positions and in expectations regarding the possibility of future acquisition activity. When tendering shares results in a realization of taxable gains, the shareholder loses an option to defer the capital-gains tax to a future date [Rosenfeld (1982)]. With heterogeneous capital-gains tax positions among target shareholders, the option will have a different value for different shareholders; hence, the premium ϕ_i will vary across target shareholders.

Another component of ϕ_i stems from differing expectations about the outcome of an outstanding offer and the probability of receiving future takeover bids. For example, all market participants may not agree that the

outstanding offer represents the highest-valued bid that will be made. Some target stockholders may believe there is a positive probability that a higher-valued bidder might materialize after they tender their shares and the outstanding offer is executed.[15] From this perspective, ϕ_i may be thought of as the premium individual i must be paid to give up the (expected) benefit from a subsequent, higher-valued takeover bid.

Given the vector ϕ_i, the supply of target shares will be upward sloping as represented by the line ACB in fig. 1. We also assume that all bidders know the minimum price required to elicit N_C shares but do not know each other's maximum offer price. The minimum price required to elicit N_C target shares is denoted in fig. 1 by $P_E + \phi_C$, where ϕ_C is the premium demanded by the owner of the N_C-th share. This reservation price of the marginal tendering shareholder determines the minimum synergistic gain (MSG) that a bidding firm must be able to generate to win control of the target firm and still make a profit.

When only one firm can create synergistic gains in excess of MSG, that firm will bid $P_T^s = P_E + \phi_C$ and win control of the target. (See point C in fig. 1.) If at least one more firm can generate synergistic gains in excess of MSG, an auction will ensue. As discussed above, rival bidding firms will compete by raising P_T. Thus, competition among bidding firms will move the target stockholders vertically off their supply curve (e.g., to point D in fig. 1) and, as a consequence, the offer will be oversubscribed.[16]

Because the successful offer price in a multiple-bidder contest, P_T^m, will be greater than the offer price in a successful single-bidder offer, i.e., $P_T^m > P_T^s$ (compare points D and C in fig. 1), the dollar gains to target stockholders will be greater in multiple-bidder contests than in single-bidder contests. Specifically, the dollar gains can be written as

$$\Delta W_T = (P_T - P_0)(N_C) + (P_E - P_0)(N_0 - N_C), \tag{7}$$

where P_0 is the preoffer market price of target shares. The first term on the right side of eq. (7), $(P_T - P_0)(N_C)$, represents the premium paid to target stockholders for the shares purchased on the front end. The second term, $(P_E - P_0)(N_0 - N_C)$, represents the premium paid for the remaining shares on the back end. Because $P_T^m > P_T^s$ and by the assumption that the other terms in eq. (7) are independent of the occurrence of a multiple-bidder contest, ΔW_T will be greater in a multiple-bidder contest than in a single-bidder offer.

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[15]Of course if a higher-valued bid materializes before the offer is executed, provisions in the Williams Amendment allow target stockholders to withdraw their shares from the lower bidder and tender them to the higher bidder.

[16]Consistent with this implication, the frequency of oversubscribed offers is greater in our multiple-bidder sample (90%) than in our single-bidder sample (67%).

This prediction in dollar terms will hold also in percentage terms if we make certain independence assumptions about the occurrence of a multiple-bidder contest and the preoffer values of the target and bidding firms. Specifically, assuming that the occurrence of a multiple-bidder contest is independent of the preoffer value of the target, W_T, it follows that the rate of return to target stockholders will be greater in multiple-bidder contests than in single-bidder contests. Moreover, assuming that $\Delta\Pi$, the total synergistic gains created by the combination, and W_A, the preoffer value of the acquiring firm, are independent of the occurrence of a multiple-bidder contest, it follows that the rate of return to acquirers will be greater in single-bidder contests than in multiple-bidder contests.

An alternative hypothesis is that multiple-bidder contests arise when the initial bid is 'too low' and that there is no difference between the premiums ultimately paid for targets in single- and multiple-bidder contests. According to this scenario, the gains to the targets of multiple-bidder contests would start out low on the announcement of the initial bid and rise to the level of the gains in single-bidder offers. The eventual gains to both targets and acquirers would be unaffected by the number of bidding firms.

Finally, an upward sloping supply of target shares implies a positive relation between the return to target stockholders and the fraction of shares purchased. Consider once again fig. 1. By our analysis, successful single-bidder acquisitions will take place along the (positively sloped) line ACB and the successful price in multiple-bidder acquisitions will always lie above this supply curve. Thus, the gain (return) to target stockholders will be positively related to the number (fraction) of target shares purchased.

4. Empirical evidence on the determinants of the division of the gains from tender offers

We begin our empirical analysis by examining the time series of cumulative abnormal returns (*CARs*) to the portfolios of 236 targets and 236 acquiring firms, classified by the observed level of competition among bidding firms. Although the time-series analysis provides insights into the intertemporal behavior of the returns from tender offers, it is unidimensional and hence does not allow us to examine the simultaneous effects of the factors identified by our analysis. Furthermore, when the first bid for the target shares is announced, the eventual outcome of the bid is uncertain. This uncertainty is resolved over time when either new information about the acquisition is revealed to the market or when competing, higher-valued bids for the target are announced. The period over which this uncertainty is resolved varies across the sample, and the *CARs* to the portfolios cannot account for these differences. Thus, we also conduct cross-sectional analyses using the variable window return measures defined in section 2.

4.1. Time-series analysis

The time series of CARs are computed for three portfolios of the target firms: 163 targets of single-bidder tender offers, 73 targets of multiple-bidder tender offer contests, and the total sample of 236 targets. Similarly, three CAR series are computed for the corresponding portfolios of the acquiring firms.

To be classified as a multiple-bidder contest, a tender offer contest must involve an identifiable second bidder – i.e., the firm's name is mentioned in the press and it must be actively seeking target shares by engaging in at least one of the following activities: (1) making a formal tender offer or a merger proposal, (2) negotiating a merger possibility with the target management, or (3) announcing its plans to make a bid. The activities of competing bidding firms were obtained from citations in the Wall Street Journal.[17]

For each portfolio p consisting of N_t firms on day t, the abnormal return for day t is defined as

$$AR_{pt} = (1/N_t) \sum_{i=1}^{N_t} AR_{it}. \tag{8}$$

The K-day CAR for each portfolio is defined as

$$CAR_{pK} = \sum_{t=-\tau}^{K-\tau-1} AR_{pt}, \tag{9}$$

where τ is the number of days before the relevant event day. To test the significance of this K-day cumulative abnormal return to the portfolio, we compute a standardized portfolio cumulative abnormal return, $SCAR_{pK}$, in a manner analogous to the $SCAR_i$ computation described in footnote 5. This $SCAR_{pK}$ has a t-distribution with 238 degrees of freedom.

The CAR series for the three portfolios of the target firms in our sample are presented in table 3 and plotted in fig. 2. The CAR series are cumulated from event day -20 through event day $+80$, where event day 0 is the day on which

[17]Classifying a tender offer as a single- or multiple-bidder contest based on the number of identifiable bidding firms becomes ambiguous when an initial bidding firm revises its bid and there is no identifiable competing bidder. On the one hand, the revision may have been triggered by the realization (on the part of the bidding firm) that the initial offer was too low to induce the target shareholders to tender their shares. On the other hand, it may have been a response to a competing offer by another firm or the anticipation thereof that we were unable to identify. Since it is impossible to distinguish between these two cases, the empirical tests were run twice. One set of results is based on a multiple/single-bidder classification (the number of firms bidding for the target); a second set of results is based on a multiple/single-bid classification scheme (the number of bids made for the target). Since the results are qualitatively indistinguishable, we report results based only on the multiple/single-bidder classification.

Table 3

Percentage abnormal returns (*AR*) and cumulative abnormal returns (*CAR*) to the portfolio of target firms involved in 236 tender offer contests, 163 single-bidder contests and 73 multiple-bidder contests between 1963 and 1984.

Event day	Single-bidder subsample				Multiple-bidder subsample				Total sample			
	NT^a	NP^b	AR	CAR	NT	NP	AR	CAR	NT	NP	AR	CAR
−20	163	72	−0.13	−0.13	71	33	0.11	0.11	234	105	−0.05	−0.05
⋮												
−15	163	87	0.19	0.38	71	30	−0.27	1.46	234	117	0.05	0.70
⋮												
−10	162	78	0.28	1.26	73	39	1.60	4.04	235	117	0.69	2.12
⋮												
−5	162	85	0.21	3.01	73	44	0.60	6.12	235	129	0.33	3.97
−4	160	83	1.09	4.10	73	40	0.92	7.04	233	123	1.03	5.01
−3	162	94	0.98	5.08	73	38	1.09	8.13	235	132	1.01	6.02
−2	159	103	1.57	6.64	73	44	1.46	9.59	232	147	1.53	7.56
−1	147	101	2.63	9.27	72	52	2.27	11.86	219	153	2.51	10.07
0	163	139	14.67	23.95	73	66	14.12	25.98	236	205	14.50	24.57
1	135	95	4.71	28.66	56	41	4.42	30.40	191	136	4.63	29.19
2	156	78	0.79	29.44	61	29	0.81	31.21	217	107	0.79	29.99
3	159	72	0.69	30.14	66	29	0.96	32.17	225	101	0.77	30.76
4	159	80	0.13	30.27	71	41	1.79	33.96	230	121	0.65	31.41
5	160	76	0.05	30.33	70	34	0.88	34.85	230	110	0.31	31.71
⋮												
10	162	79	−0.28	30.46	70	32	−0.07	37.82	232	111	−0.22	32.72
⋮												
15	160	76	−0.12	30.40	68	37	0.53	40.94	228	113	0.07	33.63
⋮												
20	152	71	−0.43	29.17	70	35	0.09	41.70	222	106	−0.27	33.02
⋮												
30	130	59	−0.24	27.84	69	33	−0.18	44.92	199	92	−0.22	33.19
⋮												
40	117	45	−0.25	26.65	63	30	0.09	46.12	180	75	−0.13	32.85
⋮												
50	108	50	0.25	25.80	59	27	−0.13	45.47	167	77	0.12	32.06
⋮												
60	97	41	−0.06	26.04	53	33	0.17	44.70	150	74	0.02	31.95
⋮												
70	89	41	−0.06	26.14	43	19	0.01	44.26	132	60	−0.04	31.87
⋮												
80	84	42	−0.35	24.65	41	24	0.46	45.50	125	66	−0.08	31.28

[a] NT = total number of firms.

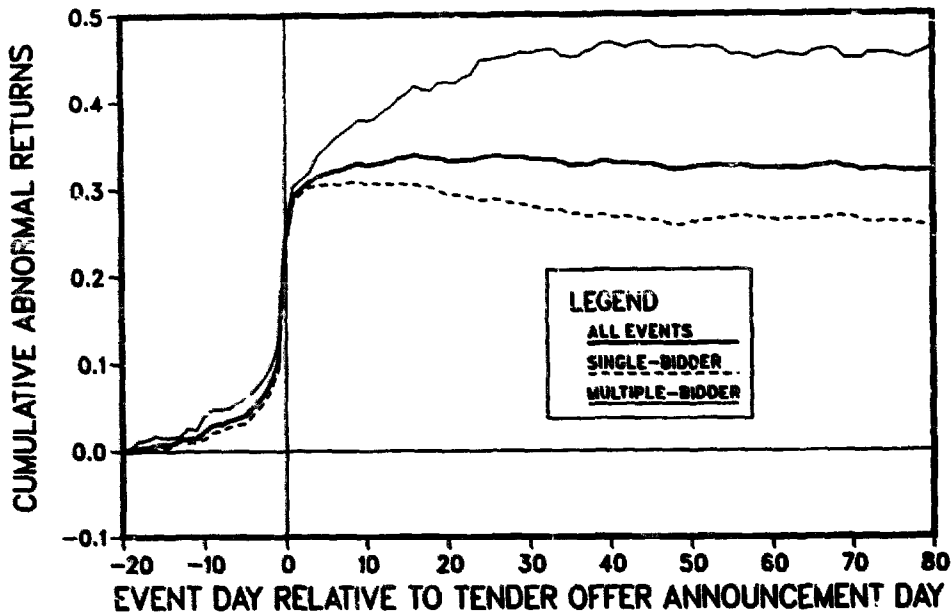[b] NP = number of firms with positive abnormal returns.

Fig. 2. Cumulative abnormal returns to the portfolio of target firms involved in 236 contests, 163 single-bidder contests and 73 multiple-bidder contests, 1963-1984. Event day relative to tender offer announcement day.

the announcement of the first offer for the target appeared in the *Wall Street Journal*.

The *CAR* for the portfolio of all 236 target firms from event day −5 through event day +5 is 28.07% with a *t*-statistic of 51.24, showing once again that an acquisition by tender offer is a wealth-increasing event for the stockholders of the target firm.

The *AR* and the *CAR* of the single-bidder subsample on day 0 (14.67% and 23.95%) are approximately equal to those of the multiple-bidder subsample (14.12% and 25.98%). Thus when a target receives an initial offer, the average value of this offer does not depend on whether it will be followed by other bids. Only when competing bids are actually announced do additional returns accrue to the targets of multiple-bidder contests. The additional returns are reflected in the gradual rise of the *CAR* series for the multiple-bidder sample. The difference in the *CAR* between the multiple-bidder and single-bidder subsamples reaches about 20% by day +40.[18] Clearly, target shareholders earn greater returns from multiple-bidder contests than from single-bidder offers.

These findings are not consistent with the alternative hypothesis that multiple-bidder contests arise because the initial bid was too low. Rather, they

[18]Some of this difference can be attributed to the postexecution drop in the price of the remaining target shares. Of the 163 single-bidder offers, 119 (or 73%) were executed within 40 trading days of the initial announcement. By contrast, only 32 of the 73 multiple-bidder offers (44%) were executed during this 40-day period. Since the time-series analysis cannot account for the differences in the duration of the tender offers in the sample, formal tests for the effect of competition on the returns to targets and acquirers must await the cross-sectional tests in the next section.

Table 4

Percentage abnormal returns (AR) and cumulative abnormal returns (CAR) to the portfolio of acquiring firms involved in 236 tender offer contests, 163 single-bidder contests and 73 multiple-bidder contests between 1963 and 1984.

Event day	Single-bidder subsample				Multiple-bidder subsample				Total sample			
	NT[a]	NP[b]	AR	CAR	NT	NP	AR	CAR	NT	NP	AR	CAR
−20	163	84	0.12	0.12	73	33	−0.07	−0.07	236	117	0.06	0.06
−15	163	74	−0.17	0.20	73	30	−0.22	−0.66	236	104	−0.19	−0.06
−10	163	85	0.25	0.66	73	36	0.14	−0.05	236	121	0.22	0.44
−5	163	79	0.12	1.05	73	32	−0.30	0.23	236	111	−0.01	0.80
−4	163	73	0.04	1.09	73	39	0.14	0.37	236	112	0.07	0.87
−3	163	92	0.50	1.59	73	38	0.34	0.71	236	130	0.45	1.32
−2	163	84	0.50	2.09	72	29	0.23	0.95	235	113	0.42	1.74
−1	163	86	0.19	2.29	72	28	−0.39	0.56	235	114	0.02	1.76
0	163	80	0.62	2.91	73	30	−0.65	−0.09	236	110	0.23	1.99
1	162	76	−0.16	2.75	71	34	−0.41	−0.51	233	110	−0.24	1.75
2	163	79	0.16	2.91	73	34	−0.33	−0.83	236	113	0.01	1.76
3	163	73	−0.24	2.67	73	35	−0.12	−0.96	236	108	−0.20	1.55
4	163	73	0.17	2.84	72	39	0.05	−0.91	235	112	0.13	1.69
5	163	66	−0.35	2.50	73	36	0.49	−0.43	236	102	−0.09	1.60
10	163	93	0.02	2.71	73	38	0.20	−1.13	236	131	0.08	1.53
15	163	77	0.31	3.33	73	33	0.15	−1.04	236	110	0.26	1.98
20	163	83	0.37	3.69	73	33	0.04	−0.17	236	116	0.27	2.51
30	163	72	−0.03	3.29	73	32	−0.35	0.56	236	104	−0.13	2.46
40	163	80	0.12	2.97	73	30	−0.21	0.64	236	110	0.02	2.26
50	163	77	−0.01	2.70	73	34	−0.08	0.42	236	111	−0.03	2.00
60	163	81	−0.08	2.73	73	37	−0.20	0.61	236	118	−0.12	2.09
70	163	80	−0.08	2.22	73	37	−0.11	−0.55	236	117	−0.09	1.37
80	163	73	−0.04	2.02	73	36	0.16	0.70	236	109	0.02	1.62

[a]NT = total number of firms.
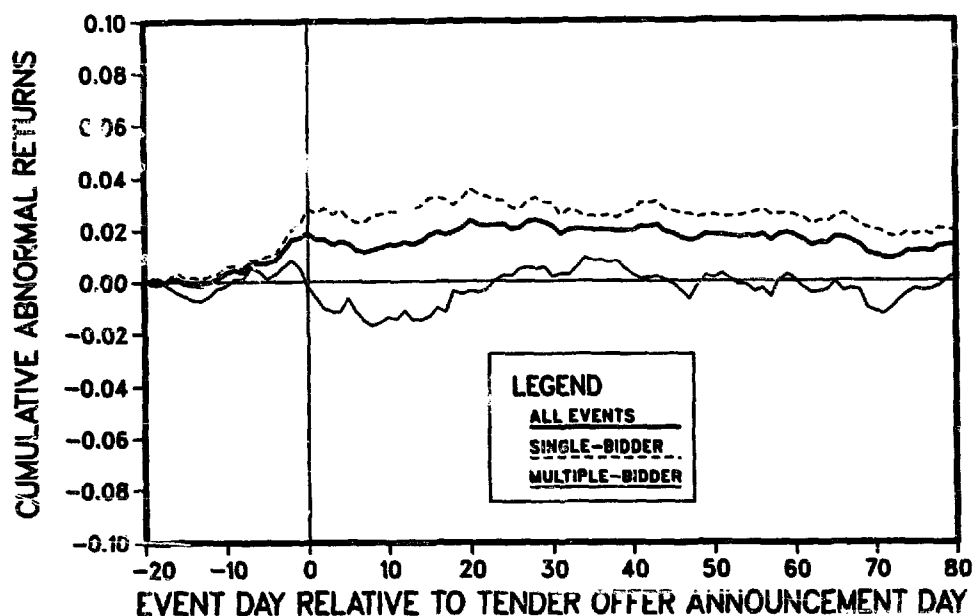[b]NP = number of firms with positive abnormal returns.

Fig. 3. Cumulative abnormal returns to the portfolios of acquiring firms involved in 236 contests, 163 single-bidder contests and 73 multiple-bidder contests, 1963–1984. Event day relative to tender offer announcement day.

suggest that the premiums paid to the target shareholders in multiple-bidder contests are, as implied by our model, above the supply curve of target shares.

The CAR series for the three portfolios of acquiring firms are presented in table 4 and plotted in fig. 3. Event day 0 is the day of the announcement of the first offer made by the acquiring firm. The CAR to the portfolio of all 236 acquiring firms from event day -5 through $+5$ is 0.79% with a t-statistic of 1.69. This is not significantly different from zero at the 5% level. However, the CAR from day -5 through day $+20$ is 1.70% ($t = 2.36$), which is significant at the 5% level. Thus, unlike for target firms, there is mixed evidence concerning the returns to acquiring firms.

Classifying the portfolios of acquiring firms by the level of competition reveals that the CAR from day -5 through day $+20$ to the single-bidder portfolio is 2.8% ($t = 2.94$), whereas the return to the multiple-bidder portfolio is $-0.70%$ ($t = -0.56$) over the same period. Thus, significant positive returns accrue to the stockholders of acquiring firms in single-bidder tender offers but not in multiple-bidder contests.

To examine the behavior of the CARs to the multiple-bidder portfolio more closely, we divide the sample into two groups: first-bidder, ultimately successful acquirers, and those acquirers who entered the contest after some other firm initiated the bidding process. Of the 73 acquirers in the multiple-bidder portfolio, 24 are first-bidder acquirers, and 49 are late-bidder acquirers. The CAR from day -5 to day $+1$ for the portfolio of first-bidder acquirers is

2.0%, whereas the *CAR* for the portfolio of late-bidder acquirers is -2.5% over the same interval. Apparently, the market's reaction to the first bid of first-bidder acquirers in multiple-bidder contests is similar to its reaction to bids made in single-bidder tender offers. Thus the negative *CAR* from day -5 to day $+1$ to the portfolio of acquirers in multiple-bidder contests is due primarily to the negative returns to late-bidder acquirers, more commonly known as white knights. In other words, our data indicate that the average white knight pays 'too much' for the target it acquires.

In sum, our time-series analysis indicates that the net effect of multiple-bidder contests is to increase the returns to target firms and decrease the returns to acquiring firms. The market's average reaction to the bid that initiates a tender offer contest does not depend on whether the bid eventually leads to a multiple-bidder contest. This is true for both target and bidding firms. Only when competing bids are actually made do we observe greater returns to target shareholders and a dissipation of the initial gains to the stockholders of bidding firms.

4.2. Cross-sectional analysis

In this section we use variable-window *CAR*s to examine the cross-sectional differences in the returns to the stockholders of target and acquiring firms. Specifically, we examine the effects of (1) changes in the tender offer environment, (2) competition, and (3) the fraction of target shares purchased on the rates of return to these stockholders. We also examine the effects of the above variables on the total value-weighted percentage synergistic gains.

Our cross-sectional regression model is given by eq. (10) and the variables are defined in table 5,

$$CAR = \gamma_0 + \gamma_1 T_1 + \gamma_2 T_2 + \gamma_3 M + \gamma_4 F. \tag{10}$$

The dummy variables T_1 and T_2 indicate the time period (environment) in which the tender offer is made. T_1 equals one if the offer is made between July 1, 1968 and December 1980, and zero otherwise. It is included to account for the effect of the passage of the Williams Amendment. T_2 equals one if the offer is made after December 1980, and zero otherwise. It is included to account for the changes in the acquisitions arena that have occurred in the 1980s.

The dummy variable M, which equals one if the offer is made in a multiple-bidder contest and zero otherwise, reflects the level of competition. We restrict our analysis of competition to a simple single/multiple-bidder classification instead of the number of bidders, because our multiple-bidder sample consists of 65 contests with two bidding firms and only 8 with more

Table 5

Weighted least-squares estimates of the effects of time-period, multiple-bidder contests, and fraction of shares purchased on the abnormal returns to the stockholders of the targets (*CART*), acquirers (*CARA*), and combined (*CARC*) involved in 236 successful tender offers between 1963 and 1984 (*t*-statistics in parentheses).[a]

Model: $CAR = \gamma_0 + \gamma_1 T_1 + \gamma_2 T_2 + \gamma_3 M + \gamma_4 F$.

Dependent Variable	$\hat{\gamma}_0$	$\hat{\gamma}_1$	$\hat{\gamma}_2$	$\hat{\gamma}_3$	$\hat{\gamma}_4$	*F*-statistic
CART	0.098 (3.89)	0.080 (3.22)	0.053 (1.40)	0.130 (4.23)	0.167 (4.26)	14.84[b]
CARA	0.035 (2.65)	−0.025 (−2.07)	−0.055 (−3.43)	−0.017 (−1.32)	0.005 (0.27)	4.20[c]
CARC	0.069 (4.60)	(−0.012) (−0.87)	−0.018 (−0.91)	0.024 (1.35)	0.006 (0.28)	0.66[d]

[a]*CART* = cumulative abnormal return to the target shares from five trading days before the announcement of the first bid through five trading days after the announcement of the ultimately successful bid; *CARA* = cumulative abnormal return to the acquiring firm from five trading days before the announcement of the first offer made by this firm through five trading days after the announcement of the ultimately successful bid; *CARC* = cumulative abnormal return to the value-weighted portfolio of the target and the acquiring firms from five trading days before the announcement of the first offer made for the target through five days after the announcement of the ultimately successful bid; T_1 = dummy variable that equals one if the offer is made between July 1, 1968 and December 1980, and zero otherwise; T_2 = dummy variable that equals one if the offer is made after December 1980, and zero otherwise; M = dummy variable that equals one if the offer is made in a multiple-bidder contest, and zero otherwise; F = fraction of target shares purchased in the offer by the successful bidder.
[b]Significant at the 0.01 level.
[c]Significant at the 0.05 level.
[d]Insignificantly different from zero.

than two bidding firms. Our analysis in section 3 indicates that the estimate of γ_3 will be positive for targets and negative for acquirers.

The final independent variable included in our regression model is F, the fraction of target shares purchased by the successful bidding firm. A positively sloping supply of target shares implies that the return to target stockholders will be positively related to F.[19]

Finally, to account for the possibility of heteroskedasticity in the data, all observations are divided by the standard error of the K_i-day *CAR*. This is equivalent to using weighted least squares to estimate the regression parameters, where the standard error of the firm's *CAR* is the relevant weight. This

[19]We perform all our cross-sectional tests using two definitions of F. In the first, the denominator is simply the total number of shares outstanding; in the second, we adjust the denominator by subtracting the number of shares held by the acquirer (prior to the offer) from the total number of shares outstanding. The results are virtually identical using these alternative measures. In the text we only report results based on the first definition.

standard error is computed as the square root of the sum of the variances of the prediction errors over the K_i days.[20]

4.2.1. Returns to target stockholders

The results of our regression analysis for the sample of target firms are reported in the first row of table 5. The estimates of γ_0 and γ_1 are both statistically greater than zero. These statistics imply that the average abnormal return to target stockholders is significantly positive ($\hat{\gamma}_0 = 9.8\%$, $t = 3.89$) and even more so after the passage of the Williams Amendment ($\hat{\gamma}_1 = 8.0\%$, $t = 3.22$).[21] The point estimate of γ_2 is also positive ($\hat{\gamma}_2 = 5.3\%$, $t = 1.40$) but is not significantly different from zero.[22]

The estimated coefficient of the single/multiple-bidder dummy variable is significantly greater than zero ($\hat{\gamma}_3 = 13.0\%$, $t = 4.23$). Consistent with the earlier results, the marginal impact of a multiple-bidder contest is to increase the return to the target stockholders.

The estimated coefficient on the fraction of target shares purchased, F, is significantly positive ($\hat{\gamma}_4 = 16.7\%$, $t = 4.26$). This is consistent with a positively sloping supply of target shares.

4.2.2. Returns to the stockholders of acquiring firms

The second row of table 5 reports the results of our cross-sectional regression analysis for acquiring firms.[23] The estimate of the constant is significantly

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[20]Specifically, the standard error of CAR is given by $(\Sigma_t^{K_i} \sigma_i^2 C_{it})^{1/2}$, where $C_{it} = (1 + 1/T + ((R_{mt} - \bar{R}_m)^2/\Sigma_\tau^T (R_{m\tau} - \bar{R}_m)^2))$, σ_i is the standard deviation of the residuals from the estimation period of T days, and R_m is the mean return on the market over the estimation period.

[21]This result is consistent with the findings of Jarrell and Bradley (1980). They find that the passage of the Williams Amendment is associated with an increase in the returns to targets and a decrease in the returns to acquirers.

[22]The lack of statistical significance of the estimate of γ_2 may be due to the positive relation between the second time-period dummy variable, T_2, and the multiple/single-bidder dummy variable, M. The simple correlation between these two independent variables is 0.18 ($P = 0.007$). Multicollinearity between two independent variables biases the t-statistics of the estimated coefficients toward zero.

[23]Earlier studies suggest that the average rate of return to *all* acquiring firms may not be an appropriate measure of the gains from tender offers because of the disparity between the values of the target and acquiring firms. The acquisition of a very small firm by a very large firm may have an imperceptible effect on the return to the acquiring firm regardless of the profitability of the acquisition. Consistent with this observation, Asquith, Bruner, and Mullins (1983) show that the measured returns to acquiring firms are positively related to a dummy variable that indicates whether the target is at least 10% of the value of the acquiring firm. Jarrell (1983) generalizes this finding and shows that the return to acquiring firms is a continuous positive function of the relative value of the target. Kim and McConnell (1977) and Asquith and Kim (1982) limit their analysis to acquisitions involving targets that are at least 10% of the value of their respective acquiring firms. Thus, the regressions for acquiring firms were run on two data sets: the entire 236-observation sample and a subsample in which the targets are at least 10% of the value of their acquirers. (There are 171 tender offer events in which the relative size of the target is 10% or more.) Because none of our empirical results are materially different for the reduced sample, we report only results for the total sample.

positive ($\hat{\gamma}_0 = 3.5\%$, $t = 2.65$) which indicates that the average return to acquiring firms in single-bidder tender offers effected before passage of the Williams Amendment was significantly positive. The estimates of γ_1 and γ_2 are both significantly negative ($\hat{\gamma}_1 = -2.5\%$, $t = -2.07$ and $\hat{\gamma}_2 = -5.5\%$, $t = -3.43$, respectively). Thus, bidding firms earn significantly lower returns in the post-Williams Amendment era. Moreover, the estimate of γ_2 is less than the estimate of γ_1, which is consistent with our earlier results in table 2 that the returns to acquiring firms have decreased over time and that in the most recent subperiod acquiring firms actually suffered a significant loss.

The point estimate of the coefficient on the single/multiple-bidder dummy variable ($\gamma_3 = -1.7\%$, $t = -1.32$) shows that the marginal impact of multiple-bidder contests is to reduce the returns to acquiring firms, but this estimate is not significantly different from zero.[24] Note that higher returns to targets from multiple-bidder contests do not translate into corresponding lower returns to acquiring firms unless the total synergistic gains are the same in multiple-bidder and single-bidder contests. We return to this issue in the next subsection.

Finally, we note without much elaboration that the return to acquiring firms is unrelated to F, the fraction of shares purchased; the estimate of γ_4 has a t-statistic of 0.27. By our analysis this relation (estimate) should be negative: all else constant, the greater F, the greater the returns to targets and the smaller the returns to acquirers. However, this implication is based on the assumption that the total synergy created and the preoffer values of the target and acquiring firms are all independent of F. Violation of any of these independence assumptions would negate the prediction of a negative relation between F and $CARA$. No attempt was made to pursue this issue further.

To provide a more intuitive presentation of the separate effects of regulation and competition on the returns to acquiring firms, we report the $CARA$ by time period and our multiple/single-bidder classification in table 6. The data show that acquiring firms gained most (4.62%, $z = 5.99$) in single-bidder contests effected during the unregulated period of 1963–1968; they lost the most (-5.10%, $z = -2.87$) in multiple-bidder contests effected in the most recent period (1981–1984).

Perhaps the most notable of the data reported in table 6 is that the 52 acquiring firms in the most recent period (1981–1984) realized a significant abnormal loss of -2.93% ($z = -2.79$). This period is associated with an increase in the extent and degree of Congressional regulations, the tolerance of Reagan Administration towards large-scale mergers, the advent of investment banking firms that specialize in raising funds to finance takeover battles, and the development of sophisticated defensive tactics. We believe that all of these

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[24]Once again we note that the multicollinearity between T_2 and M biases the t-statistics of the estimated coefficients of each toward zero. See footnote 22.

Table 6

Percent mean abnormal return to acquirers involved in 236 successful tender offers between 1963 and 1984, by time period and multiple/single-bidder classification (z-statistics in parentheses).

	Subperiod			Total
	7/63–6/68	7/68–12/80	1/81–12/84	7/63–12/84
Single	4.62[a]	1.74[b]	−1.08	2.00[a]
bidder	(5.99)	(2.04)	(−1.14)	(4.11)
	N = 42	N = 93	N = 28	N = 163
Multiple	1.62	0.27	−5.10[a]	−1.33
bidder	(1.05)	(0.22)	(−2.87)	(−1.44)
	N = 9	N = 40	N = 24	N = 73
Total	4.09[a]	1.30	−2.93[a]	0.97[a]
	(5.88)	(1.58)	(−2.79)	(2.61)
	N = 51	N = 133	N = 52	N = 236

[a]Significant at the 0.01 level.
[b]Significant at the 0.01 level.

factors have contributed to an increase in competition among bidding firms. Consistent with this conjecture, the data in the table indicate an increasing trend in the relative frequency of multiple-bidder contests over time; 18%, 30%, and 46%, in subperiods 1963–1968, 1968–1980, and 1981–1984, respectively. Obviously, an increase in competition among bidders does not explain negative returns to acquirers. However, if every successful bidder is pushed to its maximum valuation of the target, there is a greater probability that overvaluations will occur and the acquirer's shareholders will suffer a capital loss. This adverse effect was most severe during the period 1981–1984, when the shareholders on average lost 5.10% ($z = -2.87$) as a result of successful acquisitions in multiple-bidder contests.

In light of these results, we note our earlier finding [Bradley, Desai, and Kim (1983)] that the *un*successful bidders in multiple-bidder contests during the period 1963–1980 on average lost 8% of their preoffer value. In contrast, the data in table 6 show that the average gain to the successful bidders in multiple-bidder contests during the same period (1963–1980) is not significantly different from zero. Thus, it appears that once a firm finds itself in a bidding war, it is better to win than lose, even though in winning, the firm's stockholders may suffer a capital loss.

On the basis of our time-series analysis in section 4.1, we conjectured that the low returns to acquiring firms in multiple-bidder contests are driven by the negative returns to so-called white knights. The results of our cross-sectional analysis reinforce this conclusion. As reported in table 6, the mean *CARA* of the 73 successful bidders in our multiple-bidder sample is −1.33% ($z = -1.44$). The mean *CARA* to the 24 first-bidder acquirers is 0.81% ($z = 0.41$), whereas the mean *CARA* for the 49 late-bidder acquirers (white knights) is −2.38%

($z = -2.05$). Clearly, the evidence is consistent with our contention that white knights, on average, pay 'too much' for the targets they acquire.

4.2.3. Total percentage synergistic gains

The results of our cross-sectional regiession analysis for the relative synergistic gains ($CARC$) are presented in the third row of table 5. The data show that only the estimate of γ_0 is significantly different from zero. The estimate of the constant indicates that the average unregulated, single-bidder tender offer results in an increase in the combined values of the two firms.

The estimate of the coefficient on the multiple/single-bidder dummy variable is positive but the t-statistic is only 1.35. We interpret this as weak evidence that competition among bidding firms generates additional information that leads to a higher-valued allocation of the combined resources of the two firms.[25] Alternatively, it may be that the potential for large synergistic gains attracts multiple bidders. At any rate, the positive relation between our measure of synergistic gains and our multiple/single-bidder dummy variable partially explains the lack of a significant negative relation between the returns to acquiring firms and the multiple/single-bidder dummy variable.

Finally, neither of the estimated coefficients on the time dummy variables is significantly different from zero. This suggests that the effects of increased regulation, developments in the investment banking industry, and the use of defensive tactics have been a zero sum game. That is, the increased gains to the stockholders of target firms have come at the expense of the gains to the stockholders of acquired firms.

5. Summary and conclusions

This paper provides a theoretical and empirical analysis of interfirm tender offers. We analyze the mechanics of the tender offer process and demonstrate how this capital market transaction allocates corporate resources to their highest-valued use. Our empirical analysis documents the synergistic gains created by tender offers and how these gains are divided between the stockholders of the target and acquiring firms.

Our analysis of the tender offer process, which is presented in the appendix, demonstrates that a successful tender offer must be front-end loaded. More importantly, we show that two-tier, front-end loaded tender offers are not coercive and do not impede the (optimal) allocation of the target resources. Indeed, we argue that all successful offers, even partial and any and all offers,

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[25]The positive correlation between the time-period dummy variables (T_1 and T_2) and the multiple/single-bidder dummy variable (M) biases the t-statistics of the estimated coefficients toward zero.

are front-end loaded. We also argue that although there are three parameters of any tender offer, rival bidding firms compete on the front-end offer price rather than the back-end price or the fraction of shares sought. The data are consistent with both conjectures.

On the basis of this characterization of the tender offer process, we show that the bidding firm that can effect the highest-valued reallocation of the target resources can always fashion the highest-valued (winning) bid. We also show that target managers are always able to structure an intrafirm tender offer that can defeat a value-decreasing interfirm tender offer. Thus, the management team that can effect the highest-valued allocation of the target resources will acquire (maintain) control of the target.

Our empirical investigation is based on an exhaustive sample of successful tender offers effected between 1963 and 1984 in which both the target and acquiring firms were listed on either the NYSE or AMEX at the time of the acquisition. The average synergistic gain created by the 236 offers in our sample is $117 million (in December 1984 dollars), representing a 7.4% increase in the combined wealth of the stockholders of the target and acquiring firms. This finding is consistent with the synergy hypothesis advanced by Bradley, Desai, and Kim (1983) and inconsistent with Roll's (1986) 'Hubris Hypothesis'.

We find that target stockholders have captured the lion's share of the gains from tender offers, and their share of the gains has increased significantly since the passage of the Williams Amendment in 1968. Acquiring firms, on the other hand, realized a significant positive gain only during the unregulated period 1963–1968 and, in fact, suffered a significant loss during the most recent subperiod, 1981–1984. We also find that the total percentage synergistic gains from tender offers have remained remarkably constant over time. Thus, government regulations and other changes that have occurred in the tender offer environment have been a zero sum game: the increase in the gains to the target stockholders has come at the expense of the stockholders of acquiring firms.

Our empirical analysis confirms our contention that competition among bidding firms increases the returns to targets and decreases the returns to acquirers. However, competition is not a zero sum game: total synergistic gains are larger in multiple-bidder acquisitions. Thus, the targets of multiple-bidder contests realize greater gains not only at the expense of the shareholders of acquiring firms but also from the greater synergistic gains that accompany these transactions.

We find that competition among bidding ... ns reduces the average gain to acquirers to a level that is not significantly different from zero. This adverse effect of competition is most severe for late-bidder acquirers, more commonly known as white knights. On average, the white knights in our sample pay 'too much' for the targets they acquire.

Our data also show that the return to target firms is positively related to the fraction of target shares purchased. This is consistent with our contention that tax considerations and/or heterogeneous expectations among target shareholders generate a positively sloped supply of target shares.

In sum, our theoretical analysis implies that interfirm tender offers are efficient mechanisms to channel corporate resources to higher-valued uses. Our empirical results are consistent with this implication. We therefore see no justification for the continuing efforts by those in Washington to 'reform' the tender offer process.[26] Rather, we believe that public policy should be directed toward facilitating this capital market transaction.

Appendix: An analysis of the tender offer process[27]

The objective of this appendix is to demonstrate analytically the contentions made in section 3.3. To this end, we develop a stylized model of the tender offer process that is consistent with existing legal and institutional constraints.[28] We analyze the mechanics of the tender offer process and demonstrate how market forces arise to solve various problems posed by this capital market transaction. Specifically, we show (1) how bidding firms use front-end loaded offers to solve the free-rider problem and (2) how the potential for competing bids by target managers solves the prisoner's dilemma and ensures that successful tender offers will be value-increasing transactions for target stockholders. More important, we demonstrate how market forces ensure that the management team that can effect the highest-valued allocation of the target resources will acquire (maintain) control of the target. Although some of these issues have been discussed elsewhere in the literature, we do provide some new insights into the mechanics of the tender offer and the process of competition in the market for corporate control.

A.1. Tender offers and the free-rider problem

A.1.1. The problem

The free-rider problem associated with tender offers has been analyzed by several authors.[29] The issue can be illustrated by means of a simple numerical example. Consider an all-equity target firm with ten shares outstanding, each selling at $40: a $400 firm. Assume that if a potential acquiring firm were to

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[26]Lehn and Jones (1987) document that over the past three years, at least 74 bills have been introduced by more than 100 senators or congressmen to further regulate corporate takeovers.

[27]This appendix is a revised version of a model developed in Bradley and Kim (1984). In revising this portion of the paper, we have benefited greatly from helpful discussions with Elazar Berkovitch.

[28]For alternative modeling of tender offers, see Berkovitch and Khanna (1986), Fishman (1986), Khanna (1986), and Shleifer and Vishny (1986).

[29]See Bradley (1980) and Grossman and Hart (1980).

secure control of the target, it could reallocate the firm's resources in such a way that the market value of the target firm's assets would increase to $600. Thus the acquisition would generate a $200 synergistic gain.

Assume that in an attempt to exploit the available synergies, a potential acquirer makes the following offer. It will purchase five of the outstanding target shares (a controlling interest) at $50 per share (a 25% premium). If the offer is successful, the market price per share will rise to $60 ($= $600/10)$. If fewer than five shares are tendered, the offer will be withdrawn and the target's share price will fall back to the preoffer level of $40 per share.[30]

If we assume that the target stockholders behave as atomistic wealth maximizers, their optimal response to this offer is clear. They will hold on to their shares because the payoff will be greater if they wait until others tender their shares and the value of the target is increased by the takeover. As a consequence, no one will tender, even though by tendering they would all realize a substantial capital gain. This result is nothing more than a manifestation of the free-rider problem. The inability of target stockholders to write and enforce a contract that all will tender leads each separately not to tender. Each hopes that the others will tender so that the value of the target will be increased by the takeover, but none will tender for $50 if the postexecution market value of the target shares is (expected to be) $60. Those who do not tender will hope to free ride on those who do, but because all target stockholders will feel this way, no shares will be tendered.

A.1.2. The solution

The obvious solution to the free-rider problem is for the bidding firm to make a two-tier bid and front-end load the offer. Specifically, the bidding firm must set P_T, the offer price, greater than P_E, the (expected) postoffer price. In our example, the bidding firm could offer to buy five shares at $60 and stipulate that if five shares (a controlling block) were obtained, it would effect a takeout merger and redeem the remaining five shares for $50 a piece.

The dominating response for any target stockholder to this revised bid is to tender. By assumption, if the offer is unsuccessful, each stockholder's wealth will remain at its preoffer level. If the offer is successful and a target stockholder does not tender, however, he will forego the takeover premium, $P_T - P_E$. Since all target stockholders will evaluate the offer in the same manner, all will tender and the offer will be successful.

The implication of the foregoing analysis is clear. A necessary condition for a successful tender offer is that it be front-end loaded, i.e., $P_T > P_E$. By front-end loading the offer, the bidding firm provides an incentive for target stockholders to tender and thus solves the free-rider problem.

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[30]Bradley, Desai, and Kim (1983) document that the market price of the shares of a target of an unsuccessful tender offer falls back to the pretender offer level if the target is not taken over within the next five years.

A.2. The prisoner's dilemma and corporate raiders

A.2.1. The problem

Critics of the tender offer process often claim that front-end loaded offers are coercive in that target stockholders have no real choice but to tender under such terms. Further, critics argue that the coercive nature of front-end loaded, two-tier offers allows so-called corporate raiders to acquire the assets of a target for something less than their preoffer market value. To illustrate this point, we return to the numerical example in which the hypothetical target has 10 shares outstanding, each worth $40. Assume that a potential corporate raider makes the following two-tier bid. The raider will pay $50 per share (a 25% premium) for five target shares. Having obtained control of the target, it will then redeem the remaining target shares for $20 per share. If fewer than five shares are tendered, the offer will be withdrawn. In terms of our earlier notation, $P_T = 50 and $P_E = 20.

The 'corporate-raiding' aspect of the above offer lies in the fact that the bidding firm is attempting to buy a $400 firm for $350: $250 on the front end and $100 on the back end. Table 7 illustrates the payoff matrix faced by a target stockholder with two shares. The two possible responses are to hold or to tender. Without any loss in generality, we consider three possible aggregate market responses: fewer than five shares are tendered, in which case the offer will be withdrawn and the price of the target shares will fall to their preoffer level; exactly five shares are tendered and all are accepted by the bidding firm; and all outstanding shares are tendered and, following federal regulations, five shares are accepted on a pro-rata basis. The entries in table 7 reflect the changes from preoffer wealth of $80.

Reading the entries across the first row of table 7, if the stockholder does not tender and the offer is unsuccessful, his wealth will be unaffected. If the offer is successful, however, he will lose $40. Each of his two shares will be redeemed in the back end of the offer for $20.

If the stockholder tenders and the offer is unsuccessful, his wealth will be unaffected. If exactly five shares are tendered, the stockholder will receive $100: $50 for each share tendered. This will increase his wealth by $20. If all outstanding shares are tendered, the offer will be executed on a pro rata basis and the stockholder will receive $50 for one share (the front end) and $20 for the other (the back end). Thus, he will receive $70 for his two-share portfolio for a net loss of $10.

The entries in table 7 indicate that the dominant strategy is to tender: if the offer is successful, the shareholder's wealth will be greater; and if the offer is unsuccessful, his wealth will be no different. Thus, each target stockholder acting in his self-interest will tender all of his shares. As a result, the offer will be successful and the acquiring firm will have obtained a $400 firm for $350.

Table 7

Wealth changes for a target stockholder (owning two shares) contingent on aggregate stockholder response and his individual response. Rows indicate stockholder response; columns indicate aggregate stockholder response; and cells indicate change in wealth. *Assumptions*: Target is an all-equity firm with ten shares outstanding and stockholder owns two shares with a preoffer value of $40 each. Tender offer is for 50% of the target shares; offer (front-end) price is $50; (implicit) back-end price is $20; pro-rata execution.

| Individual shareholder response | Aggregate shareholder response | | |
| | Unsuccessful offer | Successful offer | |
	Fewer than five shares tendered	Five shares tendered	All other shares tendered
Hold	0	$ − 40	$ − 40
Tender	0	$ + 20	$ − 10

The preceding numerical example is general in its application. As long as $P_T > P_E$, target stockholders will find it in their interest to tender. Note that this tendering decision is independent of P_0, the preoffer market price of the target shares. Once a firm receives a takeover bid the behavior of the target stockholders is determined by the relation between P_T and P_E and is independent of P_0.

The potential for a corporate raider to acquire the target assets at less than their market value stems from the inability of the target stockholders to act collectively. The presumption is that it is prohibitively costly for the target stockholders to write and enforce a contract that guarantees that no one will tender and attempt to realize the 25% front-end premium.

A.2.2. Institutional / legal solutions to the Prisoner's Dilemma

Clearly, if target stockholders could act collectively or if arbitrageurs could secure a controlling block of the firm's shares, front-end loaded offers would pose no problem (dilemma). Under these circumstances, the target stockholders or market arbitrageurs would collectively analyze the entire value of each bid according to the equation

$$V = [F \times P_T] + [(1 - F) \times P_E],$$

where F is the fraction of target shares purchased on the front end. That is, they would evaluate each bid in terms of the fraction of shares purchased at the offer price and the fraction purchased (redeemed) at the back-end price. They would then tender collectively to the bidder who offered the highest-val-

ued total bid. Thus, collective action on the part of target stockholders or arbitrageurs could solve the prisoner's dilemma.

Another solution to the prisoner's dilemma stems from the legal/institutional constraints imposed on bidding firms in setting the back-end or takeout price, P_E. Note that corporate 'raiding' requires bidding firms to be able to set P_E below the preoffer price, P_0. The latitude afforded bidding firms in setting the back-end price (P_E) is governed by state statutes and charter provisions. Many states have fair-price *statutes* dictating that the back-end price cannot be lower than the front-end price. Fair-price *charter amendments* impose the same constraints on bidders.[31] Finally, target stockholders can seek an appraisal remedy from the courts if the back-end price is less than 'fair'. The appraisal remedy exists to prevent the exploitation of a minority by a majority of a firm's stockholders. For example, suppose that a bidding firm secures a majority of the firm's shares in the front end of a two-step tender offer. Appraisal statutes exist to insure that the majority will not 'cash out' the minority at an 'unfair' price. In sum, these legal and institutional arrangements impose a limit on the minimum P_E that the bidder can set, and thereby limit the extent to which corporate raiders can ply their trade.

A.2.3. A market solution to the prisoner's dilemma

Even when target stockholders cannot act collectively or they are not 'protected' by legal/institutional sanctions, there will be a market solution to

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[31]The constraints imposed by fair-price statutes and fair-price amendments do not vitiate our necessary condition for a successful tender offer that P_T be greater than P_E. Even when these legal and institutional constraints require the back-end price to be nominally equal to the front-end price, there are economic forces at work that make even these offers front-end loaded.

To begin with, fair-price provisions are relevant only in two-step takeovers. Thus, one way to negate their effects is for bidding firms to buy a controlling interest in the target at the stated offer price and never buy the remaining target shares. In other words, the bidding firm could secure a controlling interest in the target and run it as a subsidiary. As long as the bidding firm does not buy the remaining shares in a two-step takeover, fair-price provisions cannot guarantee that the back-end market price will be as great as the front-end offer price.

A second reason why fair-price provisions do not affect our necessary condition for a successful offer is the time value of money. If there is a significant delay between the first and the second steps of a two-step takeover, the value of the front end will be greater than the (present) value of the back end even if the dollar amounts of the two are the same.

Finally, transactions costs may make the front-end price more valuable than the back-end price even when the two are nominally the same. Typically, target stockholders who tender to the front end of a two-step offer do not pay brokerage fees. However, if a significant number of shares are purchased in the front end and, as a result, the major exchanges delist the firm's stock, target stockholders will have to incur transactions costs to have their shares redeemed at the back-end price.

In sum, although fair-price provisions constrain the degree to which bidding firms can effect a front-end loaded acquisition, these constraints do not negate our necessary condition for a successful offer. For many of these same reasons, even any-and-all offers, in which the bidding firm is willing to buy all target shares at a given price, are, for all intents and purposes, front-end loaded offers. For a further analysis of the constraints imposed on bidding firms in setting the back-end or takeout price, see Bradley and Rosenzweig (1986 a,b).

the prisoner's dilemma. Recall that in section A.2.1, the bid of the 'raider' was $50 each for five shares on the front end and $20 each for the remaining five shares on the back end; and that in the absence of an alternative bid, target stockholders were induced to tender their shares to this bidder.

Consider now a share repurchase (an intrafirm tender offer) with the following terms. The target managers will pay $60 each for all shares tendered up to five shares. If more than five shares are tendered, they will effect the offer on a pro-rata basis, and hence, the *implicit* back-end price of this offer is $20. The question now becomes; how will target stockholders respond to these two competing bids?

We employ the logic of game theory to deduce the 'optimal' response by target stockholders. Assume first that target stockholders believe that the 'raider' will be successful; i.e., the 'raider' will be successful in attracting at least five of the ten target shares. (Note that in our example we assume that the 'raider' will be able to secure control of the target with five shares. To be technically correct we should be talking about securing 51% of the outstanding target shares.) With these beliefs, target stockholders will also believe that the target management will purchase every share tendered at $60. Consequently, they will not tender to the raider; instead, they will tender to the target management. Clearly, this does not constitute a Nash equilibrium.

Assume now that target stockholders believe that the target managers will be successful in their share repurchase program. Under this set of beliefs, target stockholders will tender to the target managers and the repurchase program will in fact succeed. This is a Nash equilibrium – the beliefs of target stockholders are fulfilled.

Table 8 illustrates the response/outcome payoff matrix facing our two-share target stockholder in the wake of the bid by the 'raider' and the intrafirm tender offer. The entries in the table illustrate that tendering to the share repurchase is the dominant strategy. The obvious outcome of this game is that all target stockholders will tender their shares to the repurchase program and, as indicated in the table, aggregate stockholder wealth will be unchanged.

The importance of the preceding numeric example lies in its generality. Target managers are always able to structure an intrafirm tender offer that dominates the bid of a corporate raider who attempts to acquire the target at below its preoffer market value. The potential for such a dominating intrafirm tender offer solves the prisoner's dilemma.[32] As a result, value-decreasing bids will never be successful and therefore probably are never made.

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[32]Another defensive mechanism available to target management is to liquidate the firm and pay out the proceeds as a liquidating dividend. Thus, the firm's liquidation value represents the ultimate lower bound for the value of a successful raiding bid. Kim and Schatzberg (1987) examine a sample of firms that voluntarily liquidated and document that the shareholder wealth increased by an average of 34 percent.

Table 8

Wealth changes for a target stockholder (owning two shares) contingent on aggregate stockholder response and his individual response. Rows indicate stockholder response; columns indicate aggregate shareholder response; and cells indicate change in wealth. *Assumptions*: Target is an all-equity firm with ten shares outstanding and stockholder owns two shares with a preoffer value of $40 each. One tender offer outstanding: bidder offers to buy 50% of the target shares for $50 on the front end and $20 on the back end; a repurchase program outstanding: offer to repurchase up to 50% of the target shares for $60 (on the front end) with an implicit back-end price of $20; pro-rata execution.

| | Aggregate market response | | | | |
| | Repurchase successful | | Bidder successful | | |
Individual shareholder response	50% tendered	All other shares tendered	50% tendered	All other shares tendered	Neither offer successful
Hold	$ − 40	$ − 40	$ − 40	$ − 40	0
Tender to bidder	− 40	− 40	+ 20	− 10	0
Tender repurchase	+ 40	0	+ 40	+ 40	0

A.3. Tender offers with synergistic gains

The analysis presented in the preceding section implies that only value-increasing tender offers will be made. In this section we argue that if there is more than one firm that can effect a value-increasing allocation of the target resources, the firm that can effect the highest synergistic gain will win control of the target. To see this, consider two firms that are able to effect synergistic gains by combining with the target. Assume that bidder 1 can increase the value of the target to $500 and bidder 2 can increase its value to $600. As we will see, both firms will attempt to set as high a front-end price as possible and will try to minimize its back-end price. As discussed earlier, the minimum P_E that a bidding firm can set is determined by legal and institutional factors. Thus we assume that the minimum P_E is specific to the target – as opposed to the bidding firm. For expositional convenience, we assume that the minimum P_E that either bidder can set is the preoffer value of the target firm, which is $40 in our example. With a $40 back-end price, bidder 1 can offer $60 on the front end (for five shares) and bidder 2 can offer $80. The question now becomes: if both bidding firms make their respective maximum offers, how would target stockholders respond?

It is clear that there is no dominant strategy for target stockholders to pursue. There is no unique Nash equilibrium. If target stockholders believe that bidder 1 will win, the optimal strategy is to tender to bidder 1. However, if they believe bidder 2 will win, they will tender to bidder 2. In short, with front-end loaded tender offers it is always better to have tendered to the winning bidder. Thus, each target stockholder will tender to the bidding firm that he believes will win.

Given the above assumptions, bidder 2 (the one that can effect the highest-valued synergy) can make the following revised bid. It can make a firm commitment to purchase up to five (51%) of the target shares for $1 more than bidder 1's offer price ($61), regardless of the number of shares tendered to bidder 1. We now examine the possible equilibria of this revised game.

Assume that target stockholders believe that bidder 2 will win the contest. With this set of beliefs, target stockholders will tender to bidder 2 and bidder 2 will in fact win. This is a Nash equilibrium.

Now assume that target stockholders believe that bidder 1 will win the contest (secure 51% of the target shares). Under these circumstances target stockholders would eschew bidder 1's offer and tender to bidder 2's firm commitment to buy up to 51% of the shares at $61 per share. Since, by assumption, target stockholders believe that bidder 1 will receive at least 51%, they will also believe that bidder 2 will purchase every share tendered for $61 each. Thus, when target stockholders believe that bidder 1 will win, they will tender to bidder 2 instead. Consequently, this is not a Nash equilibrium. Thus, by the above analysis, the only set of beliefs that are consistent with the outcome of the 'game' is that bidder 2, the higher-valued bidder with the firm commitment offer, will win the tender offer contest.

Note that bidder 1 (the lower-valued bidder) will never make an offer with a front-end price greater than $60 a share, nor will it make an unconditional (firm-commitment) offer at $60 a share. Given a minimum back-end price of $40, the acquisition of five shares at greater than $60 a share will result in a value-decreasing transaction for its shareholders. (Recall that bidder 1 can effect only $100 in total synergistic gains.) Moreover, it will never offer a firm commitment at $60 a share, because bidder 1 knows that every share it purchases at $60 will be worth only $40 when bidder 2 inevitably gains control of the target.

The analysis of this appendix generates several important implications. First, in tender offer contests, the successful bidder will be the one that can effect the highest synergistic gains. Second, the total value of the winning offer must be at least equal to the next-highest-valued allocation of the target resources, which is bounded from below by the preoffer market value of the target shares. Thus, successful tender offers will be value-increasing transactions for the stockholders of target firms and will result in the optimal allocation of the target resources.

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