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GAINS FROM CORPORATE ACQUISITIONS AND THEIR DIVISION BETWEEN TARGET AND AQUIRING FIRMS

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Gains from Corporate Acquisitions and Their Division Between Target and Acquiring Firms*

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ABSTRACT

This paper documents the magnitude of the synergistic gains created by successful tender offers and provides theoretical and empirical insights into the determinants of the division of these gains between the stockholders of the target and acquiring firms. Our results indicate that the combined value of the target and acquiring firms increases by an average of 8% as a result of a successful tender offer. Moreover, this 8% revaluation has been virtually constant over the 23-year period under study. Both our model and empirical results show that increased competition among bidding firms increases the returns to targets and decreases the returns to acquirers. Our results also indicate that competition for a target increases the total value of the synergy created. Finally, we find that the returns to target stockholders in single-bidder acquisitions are greater, the greater the fraction of target shares purchased; whereas in multiple-bidder contests the returns to target stockholders are independent of the fraction purchased. These results are consistent with the implications of our model that the supply schedule of target shares is an increasing function of price and that competition among bidding firms forces the per share value of the winning bid to be greater than the reservation price of the marginal tendering stockholder.

I. INTRODUCTION

There is empirical evidence that corporate acquisitions effected via 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 document that the positive revaluation of the target's shares is permanent only if the offer is successful, i.e., only if the offer results in a combination of the resources of the two firms. This evidence is consistent with the synergy theory of tender offers, which posits that the acquisition of control over the target firm enables the acquiring firm to redeploy the assets of the two firms and effect a higher valued allocation of the combined resources.

However, none of the above studies documents the magnitude of synergistic gains that result from successful acquisitions via tender offers. Indeed, whether or not acquisitions via tender offers result in synergistic gains is still a contentious issue in the literature, both theoretically and empirically. For example, Roll (1986) has recently proposed the "hubris" hypothesis which states 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 empirical studies impose this requirement on their samples.

In this study, we estimate the magnitude of the synergistic gains created by tender offers. Our estimate is based on the revaluation of the combined wealth of the shareholders of the target and acquiring firms. Our sample consists of all matched pairs of NYSE and AMEX targets and acquirers involved in successful tender offers effected between 1962 and 1984. Using this sample

of 236 pairs, we find that the average total synergistic gain from a successful acquisition is $67 million. This represents an 8% average revaluation of the combined values of the two firms. Both of these estimates are statistically greater than zero.

We also examine the extent to which the magnitude of the synergistic gains from tender offers has changed over time. Specifically, we examine three sub-periods: 1962-1968; 1969-1980 and 1981-1984. The first period is important because prior to 1968 tender offers were completely free of government regulations. They were considered private transactions between the acquiring firm and the target stockholders. In 1968 (July) Congress passed the Williams Amendment which brought the tender offer within the purview of the SEC. Also, in the same year, Virginia enacted an "antitakeover" statute; by 1978, thirty-six states had followed suit and enacted their own takeover regulations. By isolating the offers that occurred in the unregulated period (1962-1968), 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.[1] Second is the development of sophisticated defensive takeover tactics (poison pills, targeted share repurchases, lock-up provisions, and super majority and fair price amendments). And third 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 magnitude (and division) of the gains created by tender offers.

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

This paper also investigates how the synergistic gains from tender offers are divided between the stockholders of the target and acquiring firms. We first develop a model of the tender offer process that is consistent with existing legal and institutional constraints. We then test the implications of the model by performing a cross-sectional analysis on a sample of matched pairs of successful targets and acquirers.

Our model implies that the division of the synergistic gains depends on whether there is one or more potential acquiring firms that can generate positive synergistic gains by combining with the target. In a tender offer contest involving only a single bidder, the return to the target shareholders is determined by the reservation price of the marginal tendering stockholder. With heterogeneous tax positions and expectations regarding the future value of the target shares, the premium demanded by the marginal tendering shareholder increases with the number of target shares purchased by the bidding firm. Consequently, the return to the target stockholders will be positively related to the fraction of target shares purchased.

In multiple-bidder contests the winning tender offer price is determined by competition among bidding firms. Competition ensures that the successful offer premium will reflect the synergistic gains that can be obtained by the combination of the target resources with the second-best user. This competition drives the successful offer price off the supply curve and above the premium demanded by the marginal tendering stockholder. Consequently, the return to the targets of multiplebidder contests will be greater than in single-bidder contests and unrelated to the number of target shares purchased.

Evidence on the difference between the returns to the stockholders of the targets of single- and multiple-bidder subsamples is presented as a time-series of the Cumulative Abnormal Returns to these two portfolios. We also present a similar series for the portfolios of acquiring firms.

The duration of each of the 236 tender offer contests analyzed in this study varies significantly. At the time of the announcement of the first bid for the target shares, there exists uncertainty about the eventual outcome of the bid. To incorporate the resolution of this uncertainty over time, our formal tests of the model are based on Cumulative Abnormal Returns calculated from five trading days before the announcement of the first offer through five trading days after the announcement of the ultimately successful offer. Based on these variable length returns measures, we test the model's implications using cross-sectional weighted least squares regression analysis.

The remainder of this paper is organized as follows: In Section II we estimate the synergistic gains created by tender offers. In Section III we develop our model of the tender offer process and discuss how the synergistic gains are divided between the stockholders of target and acquiring firms. Section IV provides the time-series and cross-sectional tests of the implications of our model. A summary and concluding remarks are presented in the final section.

II. SYNERGISTIC GAINS

A. 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 on the part of 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 synergies.

The total synergistic gain to a successful tender offer is defined as the sum of the change in the wealth of the target stockholders and the change in the wealth of the stockholders of the acquiring firm:

$$\Delta\Pi = \Delta W_T + \Delta W_A \tag{1}$$

where

$\Delta\Pi$ = the total synergistic gain,

ΔW_T = the change in the wealth of the target shareholders,

ΔW_A = the change in the wealth of the stockholders of the acquiring firm.

This definition of synergistic gains assumes that corporate acquisitions via interfirm 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 Acquith and Kim (1982) provide evidence that is consistent with this assumption for a sample of firms involved in corporate mergers.

B. Sample Description

Our study is based on a sample of successful tender offer contests effected over the period 1962 through 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 either is executed or expires. The average duration between the announcement and the execution or expiration of a tender offer is three to four weeks. If additional bids are made by the same or another bidding firm while the initial bid is outstanding, our definition of the tender offer contest is extended through the termination of the last bid made. The duration of a contest is extended if a subsequent bid is made within

14 trading days of the expiration of a previous bid. Thus, with multiple bids, the contest may last for two to three months.

The primary data base used in this study consists of 921 interfirm tender offers, reflecting contests for 721 separate target firms, over the period October 1958 to December 1984.[2] From this primary 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 1962, and (3) the shares of both the target and acquiring firms were traded on the NYSE or the AMEX at the time of the acquisition. The first criterion is imposed because our definition of synergistic gains applies only to successful tender offers. The last two criteria enable the use of the CRSP (Center for Research in Security Prices) daily stock return data to calculate the total synergistic gain from an acquisition.

The above selection criteria reduces our initial sample of 721 tender offer contests to 236. Fifty-one of these 236 offers were made prior to the passage of the Williams Act in July, 1968. Another 133 offers were made during the period August, 1968 to December, 1980. Finally, 52 offers were made between January, 1981 and December, 1984.

Summary statistics for the percentage of target shares held, sought, and purchased in the 236 tender offer contests are reported in Table 1. Of the 236 bidding firms in our sample, 155 held no target shares prior to the offer. The 236 bidding firms sought, on average, 66.2% of the target shares with 132 firms seeking to acquire complete control over the target via the offer. The mean as well as the median fraction of target shares ultimately purchased in our

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[2]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 were collected and/or verified with citations in The Wall Street Journal (index and newspaper).

Table 1

Descriptive Statistics of the Percent of Target Shares Held, Sought and Purchased for 236 Winning Bids Effected over the Period 1962-1984

	Percent of target shares		
	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	78.0	100.0	100.0

total sample is in excess of 50%. Thus the "typical" bidding 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.

C. Estimates of Total Synergistic Gains

Our estimate of the total synergistic gains created by tender offers is based on Market Model residuals. Under the assumption of multivariate normality, the abnormal return to firm i on day t can be written as:

$$AR_{i,t} = R_{i,t} - \hat{\alpha}_i - \hat{\beta}_i R_{m,t} \qquad (2)$$

where

$AR_{i,t}$ = the abnormal return to firm i on day t

$R_{i,t}$ = the return to firm i on day t

$\hat{\alpha}_i$, $\hat{\beta}_i$ = Market Model parameter estimates

$R_{m,t}$ = the 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 by using 240 trading days of returns data beginning 300 days before the first bid made for the target by this firm.

For each of the 472 firms in our sample, we cumulate the AR's over a contest-specific time interval to obtain the Cumulative Abnormal Return (CAR). For each firm, we compute the CAR statistic 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 contest-specific CAR five days before the announcement of the initial bid in order to capture any

anticipatory price behavior (leakage of information) that may occur prior to the actual public announcement (press day) of the bid. We calculate our CAR statistic through five days after the announcement of the ultimately successful bid to account for the resolution of the market's uncertainty concerning the outcome of the offer.[3]

Based on these variable-window CARs, we define the dollar gain to the target and acquiring firms in each tender offer contest i as:

$$\Delta W_{Ti} = W_{Ti} \cdot CART_i \qquad (3)$$

$$\Delta W_{Ai} = W_{Ai} \cdot CARA_i$$

where

W_{Ti} = the market value of the target equity as of the end of two months prior to the first announcement for the target.

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[3]The post-announcement interval of five days is consistent with the requirement of the 1968 Williams Amendment that tendered shares can be withdrawn within 7 calendar days (5 trading days). The 7 calendar-day withdrawal period was subsequently extended to 15 business days by the 1970 Amendments, and starting in 1978 the regulations require 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 post-execution 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 stockholders. As such, the target shares will trade "cum-dividend" during the period post-announcement through pre-execution and "ex-dividend" after the execution. Clearly, the "cum dividend" return is the relevant measure of the return to target stockholders.

However, to the extent that there may still be a positive probability of failure even after five trading days subsequent to the announcement of the ultimately successful offer, our estimate of returns will be downward biased. We feel that the choice of five trading days after the ultimately successful offer as the end of the window represents a reasonable tradeoff between the two possible sources of downward bias in measured returns.

For all but 15 single-bidder contests, this algorithm generates an eleven-day window. For multiple-bidder contests, the window for targets varies with a mean of 43.2 trading days and a standard deviation of 52 trading days.

$CART_i$ = the 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} = the market value of the acquiring firm as of the end of two months prior to the month of the first announcement made by the acquiring firm.

$CARA_i$ = the 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.

Our measure of the total dollar synergistic gain created by a successful tender offer contest, $\Delta\Pi_i$, is given by the sum of ΔW_{Ti} and ΔW_{Ai}. Based on this measure, we compute the value-weighted percentage synergistic gain created by a successful tender offer as:

$$\frac{\Delta\Pi}{\Pi}_i = \frac{W_{Ti}}{\Pi_i} \cdot CART_i + \frac{W_{Ai}}{\Pi_i} \cdot CARA_i, \qquad (4)$$

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

Table 2 presents descriptive statistics for the combined pre-offer value of the target and acquiring firms, the total dollar synergistic gains ($\Delta\Pi$) and the percentage synergistic gains ($\Delta\Pi/\Pi$) for the 236 successful tender offer contests in our sample. The statistics are presented for the total time period as well as for the three sub-periods: July 1962 to June 1968 (the pre-Williams Act period), July 1968 to December 1980 and January 1981 to December 1984.

The 236 tender offer contests effected over the entire period (July, 1962 to December, 1984) generated an average synergistic gain of $67 million. In 183 of these 236 contests (78%), these total dollar synergistic gains were positive, with a median gain of about $13 million. Since the distribution of $\Delta\Pi$ is non-normal,[4] we conduct the non-parametric Wilcoxon Signed Rank test to test the significance of the median $\Delta\Pi$. The test yields a z-statistic of

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[4]For the total sample of 236 tender offer contests, the coefficient of skewness for $\Delta\Pi$ is 8.79 and the kurtosis coefficient is 90.66.

Table 2

Descriptive Statistics for the Total Dollar and the Total Relative Synergistic Gains to the Firms Involved in 236 Successful Tender Offer Contests Effected between 1962 and 1984

	Total Pre-Offer Value (Π)[A]	Total Dollar Gains ($\Delta\Pi$)[B]	Total Relative Gains ($\Delta\Pi/\Pi$)
	July 1962 to December 1984, N = 236		
Mean	$1,142.99 M	$ 67.49 M	0.0766
Standard Deviation	2,818.74	318.50	0.1111
Median	346.78	12.84	0.0584
	July 1962 to June 1968, N = 51		
Mean	$ 447.94 M	$ 21.88 M	0.0751
Standard Deviation	729.89	40.96	0.0973
Median	269.40	13.43	0.0851
	July 1968 to December 1980, N = 133		
Mean	$1,079.56 M	$ 38.23 M	0.0780
Standard Deviation	3,234.30	172.12	0.1220
Median	344.81	9.85	0.0510
	January 1981 to December 1984, N = 52		
Mean	$1,986.89 M	$187.05 M	0.0704
Standard Deviation	2,791.75	608.44	0.0949
Median	1,002.48	31.10	0.0640

[A] $\Pi = W_T + W_A$

[B] $\Delta\Pi = \Delta W_T + \Delta W_A$

$\Delta W_T = CART \cdot W_T$

$\Delta W_A = CARA \cdot W_A$

where W_T = pre-offer market value of target equity.

W_A = pre-offer market value of equity of acquiring firm.

CART = cumulative abnormal return from 5 days before the first offer to 5 days after the last offer made for this target.

CARA = cumulative abnormal return from 5 days before the first offer to 5 days after the last offer made by this bidding firm.

7.8 which is statistically significant at the 1% level. Based on this evidence, we conclude that the tender offers in this study resulted in significant positive dollar synergistic gains.

Table 2 also shows that the total dollar synergistic gains have increased over time. The average synergistic gain created by tender offers has grown from $22 million in the 1962-1968 sub-period to $187 million in the 1980-1984 sub-period. The data in the first column of Table 2 suggest that this secular increase is due to the increase in the size of the firms involved in acquisitions by tender offer. The average combined pre-offer value of the target and acquiring firms in the first period is $448 million, and it is $1,987 million in the third period. The size of both target and acquiring firms has increased over time. The average pre-offer value of the target firms in the 1962-1968 sub-period is $102 million, while in the 1980-1984 sub-period the average value is $496 million. Similarly, the average value of the acquiring firm increased fivefold over the same periods from $365 million to about $1.5 billion.

The increase in the value of firms involved in tender offers may be due to several factors. First, the average value of firms has grown due to inflation and the general growth of the economy. Second, the laissez-faire attitude of the Reagan Administration toward corporate takeovers has encouraged large-scale combinations in the 1980's. Third, the advent of investment banking firms specializing in takeovers and their innovative financing methods have enabled bidding firms to raise large amounts of capital quickly. Finally, the popularity of two-tier offers has reduced the amount of cash outlay required on the part of the bidding firms.[5] These innovations have allowed potential acquiring firms to bid for control of larger targets.

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[5]In a two-tier offer, the bidding firm makes a cash offer for a fraction of the target shares (usually 51%) 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 via the fractional tender offer is less than the outlay necessary for an any-or-all offer. Consequently, bidding firms are able to acquire larger targets.

Our measure of the total percentage synergistic gains ($\Delta\Pi/\Pi$) allows us to control for the observed increase in firm values. Unlike the dollar measure, this measure is less skewed and conforms more closely to the normal distribution.[6] The second column of Table 2 reports descriptive statistics for this measure. In relative terms, the combined wealths of the stockholders of the 236 targets and the 236 acquiring firms increased by 7.7% on average, with a cross-sectional standard deviation of 11.1%. Assuming that the 236 observations of $\Delta\Pi/\Pi$ are drawn from the same normal distribution, this sample mean is statistically greater than zero at the 1% level ($z = 10.6$). However, each $\Delta\Pi/\Pi$ measure is based on the CARs of event-specific target and acquiring firms, cumulated over an event-specific time period, which varies considerably from observation to observation. Thus, the likelihood that the variance of $\Delta\Pi/\Pi$ is constant across our sample is extremely low.

To remedy the possible heteroskedasticity in our measure of the value-weighted percentage synergistic gains, we standardize each of the $\Delta\Pi/\Pi$ statistics by its own standard error. The standard error are estimated from the period one year prior to the announcement of the offer.[7] This one-year estimation period and our requirement that a minumum of four values of $\Delta\Pi/\Pi$

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[6]For the entire sample the coefficient of skewness for $\Delta\Pi/\Pi$ is 1.29 and the kurtosis coefficient is 3.85.

[7]To estimate the standard error of each $\Delta\Pi/\Pi$ for single-bidder contests (in which all but 15 have eleven-day windows for CART and CARA), we calculate a series of non-overlapping eleven-day CARs to a portfolio that is value-weighted by the pre-offer market values of the target and acquiring firms (W_T and W_A). The eleven-day value-weighted CARs are computed for the period two years prior to the announcement of the offer. We use the sample deviation of this eleven-day CAR series as an estimate of the standard error of $\Delta\Pi/\Pi$.

For multiple-bidder contests in which CART is computed over more days than CARA, the holding period for the CARs is determined by the (greater) number of days in the CART statistic. For example, if the CART is computed over 25 days and the CARA over 11, we compute a series of 25-day value-weighted CARs. Each CAR consists of the CAR of the target from day 1 through day 25 and the CAR of the acquirer from day 15 through day 25, each value-weighted by the firm's day 0 market value. Our estimate of the standard error of $\Delta\Pi/\Pi$ is given by the sample standard deviation of the series of these 25-day value weighted CARs.

be available for the standard error calculation result in the deletion of twelve tender offer contests. For the remaining 224 tender offer contests, the mean standardized $\Delta\Pi/\Pi$ is 1.67, which is significantly greater than zero at the .10 level for a one-tail test. Of the 224 tender offers, only 51 (22.8%) are negative and 173 (77.2%) are positive. Using an ordinary sign test, the null hypothesis that a positive sign and a negative sign of $\Delta\Pi/\Pi$ are equally likely can be rejected at the .001 level of significance ($z = 13.9$). Furthermore, only 6 (2.7%) of the standardized $\Delta\Pi/\Pi$ are less than -1.65 (the critical value at the 0.1 level), whereas 85 (37.9%) are greater than +1.65. Based on these statistics, we conclude that successful interfirm tender offers generate significantly positive synergistic gains.

In sum, our evidence shows that successful tender offers result in significant positive synergistic gains. This evidence is consistent with the synergy hypothesis advanced by Bradley, Desai and Kim (1983) and inconsistent with Roll's (1986) "hubris" hypothesis. Although the dollar measure of synergistic gains has increased over time, this increase is due to an increase in the values of the firms involved in the acquisitions. When we control for the change in firm value, we find that the percentage synergistic gains from tender offers have remained remarkably constant over the 1962-1984 time period. Apparently, the changes that have occurred in the takeover environment over time have had no impact on relative gains from successful tender offers.

III. A MODEL OF THE DIVISION OF THE GAINS FROM INTERFIRM TENDER OFFERS

In the previous section we documented the positive synergistic gains created by tender offers. In this section we attempt to identify the factors that determine the division of these synergistic gains between the stockholders of the target and acquiring firms. We begin by reviewing the important legal/institutional aspects of this capital market transaction.

A. Institutional Details

Prior to 1968, interfirm cash tender offers were not specifically regulated by federal securities law. Cash tender offers were viewed as private transactions involving already-issued shares and thus did not fall within the charter of the Securities and Exchange Commission (SEC).[8] In July of 1968 Congress passed the Williams Amendment to the Securities and Exchange Act of 1933 and in so doing specifically brought cash tender offers within the purview of the SEC.

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.[9] 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

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

[9]See footnote 2 for specific information on the minimum required number of days and how it has been extended over time since the Williams Amendment.

regulations allow target stockholders to take advantage of competing offers similar to those which occur in 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.

B. Assumptions and Definitions

To be consistent with the institutional setting of the tender offer process, we assume that competition for the target shares is effected through a tâtonnement process with full recontracting on the part of the target shareholders. Further, we assume that there are no transactions costs in bidding or tendering shares; that target shareholders are wealth-maximizers; and that managers of bidding firms seek to maximize shareholder wealth.

Based on the evidence presented in Section II, we view a tender offer as an attempt by the bidding firm to gain control of the target resources and effect a higher valued allocation of the combined resources of the two firms. We assume that to generate synergistic gains the bidding firm must secure control over the target resources,[10] which requires ownership of at least N_S (the number sought in the offer) of the N_0 shares outstanding.[11]

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[10]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.

[11]Although we do not model the determination of N_S, the number of target shares sought, several factors affect its magnitude. The most obvious factors include the number of target shares outstanding, the concentration of

(footnote #11 continues on next page)

C. Necessary Conditions for a Successful Tender Offer

In the appendix we develop a model of the tender offer process based on the above assumptions and institutional/legal setting. The model explicitly considers the possibility that corporate raiders may attempt to exploit the prisoner's dilemma that confronts atomistic target stockholders and secure control of the target resources for something less than their pre-offer value. Within the context of this model we develop an optimal bidding strategy and demonstrate that when bidding firms follow this strategy, competition among rival management teams, including the managers of the target firm, is sufficient to solve the prisoner's dilemma. Specifically, we show that the total value of the successful offer must be greater than or equal to the next highest valued allocation of the target resources--the lower bound of which is given by the total pre-offer market value of the target shares. In other words, the model implies that the management team (including the current target managers) who can effect the highest valued allocation of the target resources can always fashion the optimal (winning) bid for control of the target.

A second implication of our model is that in order to be successful, a tender offer must be "front-end loaded," i.e.,

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

where P_T = the per share tender offer price

(footnote #11 continued)

these shares among the target stockholders, and the provisions in the corporate charter of the target firm concerning control of the management, e.g., antitakeover amendments. A less obvious but equally important factor in determining N_S is the proposed change in the operations of the target firm. For example, if the proposed change involved liquidating the assets of the target firm, then presumably the bidding firm would have to acquire a relatively large fraction of the outstanding target shares.

P_E = the expected post tender-offer market price of the target shares.

Intuitively, this inequality states that target stockholders will not tender their shares for \$10 today if they believe that they will be worth \$20 tomorrow.

Inequality (5) is derived under two important assumptions: (1) there are no tax consequences to the tendering decision; and (2) target stockholders have homogenous beliefs about P_E, the post-offer value of the target shares. Relaxing these assumptions requires us to introduce an additional term into the above inequality. Thus, the owner of the i^{th} share of the target will not tender unless:

$$P_T > P_E + \phi_i \tag{6}$$

where ϕ_i = the premium demanded by the owner of the i^{th} share above P_E.

We retain the notion that P_E is the market's expected per share value of shares not tendered. It reflects the (average) market's assessment of the probability of a successful acquisition and of the value per remaining share of the target under the control of the management of the bidding firm. It also reflects the market's assessment of the possibility of other higher valued bids being made after the expiration of the outstanding offer.

The premium ϕ_i varies across target shareholders and represents differences in capital gains tax positions and in expectations regarding the future value of the firm. If tendering shares results in a realization of taxable gains, the shareholder loses an option to defer the capital gains tax to a future date. Thus, one important component of ϕ_i is the value of the option to defer capital gains tax. 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 the heterogeneous expectations regarding the future value of the firm. If a shareholder assesses a higher probability than the market that there will be another higher valued bid after the expiration of the offer, he will demand a higher price for his shares; that is, ignoring the tax consideration, his reservation price will be higher than the market's expected price P_E. In sum, the premium ϕ_i captures the effects of heterogeneous capital gains tax positions and differing expectations about the value of current and future bids. When we rank these premiums in ascending order ($\phi_1 \leq \phi_2 \leq \ldots \leq \phi_N$) they generate a positive schedule of reservation prices for the target shares.

Having obtained a positive schedule of reservation prices for target shares, we can define one of the necessary conditions for acquiring N_S shares of the target as follows:

$$P_T \geq P_E + \phi_{N_S} \equiv P_{R,N_S} \tag{7}$$

where ϕ_{N_S} is the premium demanded by the shareholder who owns the N_S^{th} share of the target firm, and P_{R,N_S} is the reservation price demanded by this shareholder. The rank ordering implies that the premium demanded by the marginal tendering shareholder increases with the number of target shares sought by the acquiring firm.

When N_S shares of the target firm are successfully purchased, i.e., $N_S = N_P$ where N_P is the number of shares purchased, the change in the wealth of the target shareholders can be defined as:

$$\Delta W_T = N_P \cdot P_T + (N_0 - N_P)P_E - N_0P_0 \geq 0^{12} \tag{8}$$

where P_0 is the market price per share of the target before the announcement

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[12]See the Appendix for a proof of the non-negativity condition.

of the offer such that N_0P_0 (= W_T) is the pre-announcement market value of the target's equity. Combining (7) with (8), the necessary condition in (8) can be written as:

$$\Delta W_T \geq \phi_{N_P} \cdot N_P + N_0(P_E - P_0) \equiv \Phi(N_P) \geq 0. \tag{9}$$

Expression (9) states that the minimum change in the wealth of the target shareholders when N_P shares are purchased consists of the premium (ϕ_{N_P}) paid for N_P shares and the post-execution premium ($P_E - P_0$) paid to all outstanding shares (N_0). This minimum change in target shareholder wealth is denoted by $\Phi(N_P)$, the right-hand side of (9). At this price, the marginal tendering stockholder will just be compensated for his premium, and all infra-marginal tendering shareholders ($\phi_i < \phi_{N_P}$) will earn a "surplus" of $\phi_{N_P} - \phi_i$ per share.

D. Empirical Implications

To draw testable implications from our model, we make an additional assumption that no firm will make a bid unless it can meet the reservation price of the marginal tendering shareholder. This assumption, along with the assumption that tender offers are effected through a tâtonnement process with costless bidding and costless recontracting, implies that all firms capable of generating synergistic gains in excess of $\Phi(N_P)$ will reveal themselves in the bidding process. This allows us to infer from the number of firms actually competing for the target shares whether or not there is more than one firm that can effect synergistic gains in excess of the reservation price.[13]

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[13]If strategic gaming on the part of bidding firms leads to pre-emptive bids, a potential bidder may choose not to enter the contest for the target shares [Khanna (1986) and Fishman (1986)]. This will result in some of the potential multiple-bidder contests being classified as single-bidder cases. However, such misclassifications simply will blur the distinction between single- and multiple-bidder contests and will bias the results against our empirical hypothesis.

If there is only one firm that can effect synergistic gains ($\Delta\Pi$) greater than $\Phi(N_P)$, this firm will acquire the target for something slightly greater than $\Phi(N_P)$.[14] Thus, in a single-bidder contest, the rate of return to the shareholders of the target firm is:

$$(\Delta W_T/W_T)^s = \Phi(N_P)/W_T, \tag{10}$$

which is an increasing function of N_P. Thus, the rate of return to the shareholders of the target firm in a successful single-bidder contest will be positively related to the fraction of the target shares purchased, $F_P = N_P/N_0$.

If there is more than one firm that can create synergistic gains greater than $\Phi(N_P)$, competition among the bidders will drive the value of the winning tender offer above $W_T + \Phi(N_P)$. Let $\Delta\Pi'$ be the synergistic gains that are attainable in the second-best allocation of the target resources. Then, the wealth of the target shareholders will increase at least by $\Delta\Pi'$, which is by definition greater than $\Phi(N_P)$.

Thus, the rate of return to the shareholders of the target firm in multiple-bidder contests is given by

$$(\Delta W_T/W_T)^m = \Delta\Pi'/W_T. \tag{11}$$

Since $\Delta\Pi' > \Phi(N_P)$, equations (10) and (11) together imply that

$$(\Delta W_T/W_T)^m > (\Delta W_T/W_T)^s. \tag{12}$$

That is, the rate of return to target stockholders will be greater in multiple-bidder contests than in single-bidder cases.

Further, (11) shows that the rate of return to the stockholders of targets in multiple-bidder contests depends solely upon $\Delta\Pi'/W_T$, the percentage

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[14]The assumption that managers of bidding firms seek to maximize shareholder wealth ensures that, under the stated conditions, no other firm will acquire the target.

synergistic gains attainable in the second-best allocation of the target resources. Since there is no reason for the value of the target resources in their second-best allocation to depend on the fraction of the target shares purchased by the best user, we hypothesize that the rate of return to the stockholders of targets of multiple-bidder contests will be unrelated to the fraction of target shares purchased.

In summary, our model predicts the following relations for the rate of return to the target shareholders:

	Single-Bidder Contest	Multiple-Bidder Contest
$\Delta W_T/W_T$	smaller	greater
$\partial(\Delta W_T/W_T) \,/\, \partial F_P$	+	0

To obtain the corollaries to the above hypotheses for the stockholders of acquiring firms, we substitute (1), (10), and (11) into the definition of the rate of return to acquiring stockholders:

$$(\Delta W_A/W_A) = (\Delta\Pi - \Delta W_T) \,/\, W_A$$

$$= \frac{1}{W_A} \cdot \begin{cases} \Delta\Pi^s - \Phi(N_P), & \text{if a single-bidder contest} \\ \Delta\Pi^m - \Delta\Pi', & \text{if a multiple-bidder contest} \end{cases} \tag{13}$$

where the superscripts s and m indicate whether the total synergistic gains result from a single-bidder or a multiple-bidder contest.

If we assume that $\Delta\Pi$ does not depend on whether the tender offer involves a single bidder or multiple bidders (i.e., $\Delta\Pi^s = \Delta\Pi^m$), equation (13) implies that the stockholders of acquiring firms realize a greater rate of return in single-bidder contests than in multiple-bidder contests. However, competition among bidding firms may generate additional information which in turn leads to a higher valued allocation of the combined resources. Thus, it is plausible that the total synergistic gains are greater in multiple-bidder contests than in single-bidder tender offers; that is, $\Delta\Pi^m > \Delta\Pi^s$. (We confirm this

conjecture in Section IV. B.3.) Consequently, equation (13) makes no prediction on the relation between the rate of return to acquiring shareholders and the single/ multiple-bidder classification.

Similarly, in order to draw implications from our model concerning the rate of return to acquiring shareholders and the fraction of target shares purchased, F_P, we must assume that $\Delta\Pi$ is independent of F_P and that ΔW_T, the dollar gain to the target stockholders, and F_P are positively related.[15] Since we are reluctant to make either of these assumptions a priori, we are unable to develop formal hypotheses concerning the rate of return to acquiring firms. Nevertheless, in Section IV we report the empirical relations between the rate of return to acquiring firms and our multiple/single-bidder classification and the fraction of target shares purchased.

IV. EMPIRICAL EVIDENCE ON THE DETERMINANTS OF THE DIVISION OF GAINS FROM TENDER OFFERS

In this section, we test the implications of our model concerning the rates of returns to the shareholders of target and acquiring firms. We begin our 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 for control of the target firm. While the time-series analysis provides insights about the temporal behavior of the returns from tender offers, it does not allow us to conduct robust tests of all of the implications of our model. At the time of the announcement of the first bid for the target shares, there exists uncertainty about the eventual outcome of

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[15] $\frac{\partial(\Delta W_A/W_A)}{\partial F_P} = \frac{1}{W_A}\left[\frac{\partial \Delta\Pi}{\partial F_P} - \frac{\partial \Delta W_T}{\partial F_P}\right] < 0$, if $\frac{\partial \Delta\Pi}{\partial F_P} = 0$ and $\frac{\partial \Delta W_T}{\partial F_P} > 0$.

the bid. 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, the implications of our model are tested using the variable window returns measures discussed in Section II.

A. 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 236 targets in the total sample.[16] Similarly, three CAR series are also computed for the corresponding portfolios of the acquiring firms.

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[16]Our sample of 236 tender offer contests contains 163 offers involving only one bidding firm. The remaining 73 contests involve two or more firms making bids for the same target. To be classified as a multiple-bidder contest, a second bidder must be identifiable--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.

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, bidding firm. 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, the revision 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.

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

$$AR_{pt} = (1/N_t) \sum_{i=1}^{N_t} AR_{it}. \tag{14}$$

The K-day CAR for each portfolio is defined as CAR_K, where

$$CAR_K = \sum_{t=-\tau}^{K-\tau-1} AR_{pt} \tag{15}$$

and τ is the number of days before the relevant event day. Assuming independence in the event time series of the residuals of the portfolio, the standard error of CAR_K is given by

$$\sigma(CAR_K) = \sigma(AR_p)\sqrt{K} \tag{16}$$

where $\sigma(AR_p)$ = the standard error of the daily abnormal return to portfolio p over the estimation period.[17]

The CAR series for the three portfolios of the target firms in our sample are presented in Table 3 and plotted in Figure 1. The CAR series are cumulated from event day -20 through event day +80, where event day 0 is the day on which 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 +10 is 29.1% with a t-statistic of 44.01. Clearly, an acquisition by tender offer is a wealth-increasing event for the stockholders of the target firm.

The AR and the CAR of the multiple-bidder subsample on day 0 (14.12% and 25.92%) are approximately equal to those of the single-bidder subsample (14.68%

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[17]This estimate of the standard error of the CARs assumes independence in the event time series of the residuals of the portfolios.

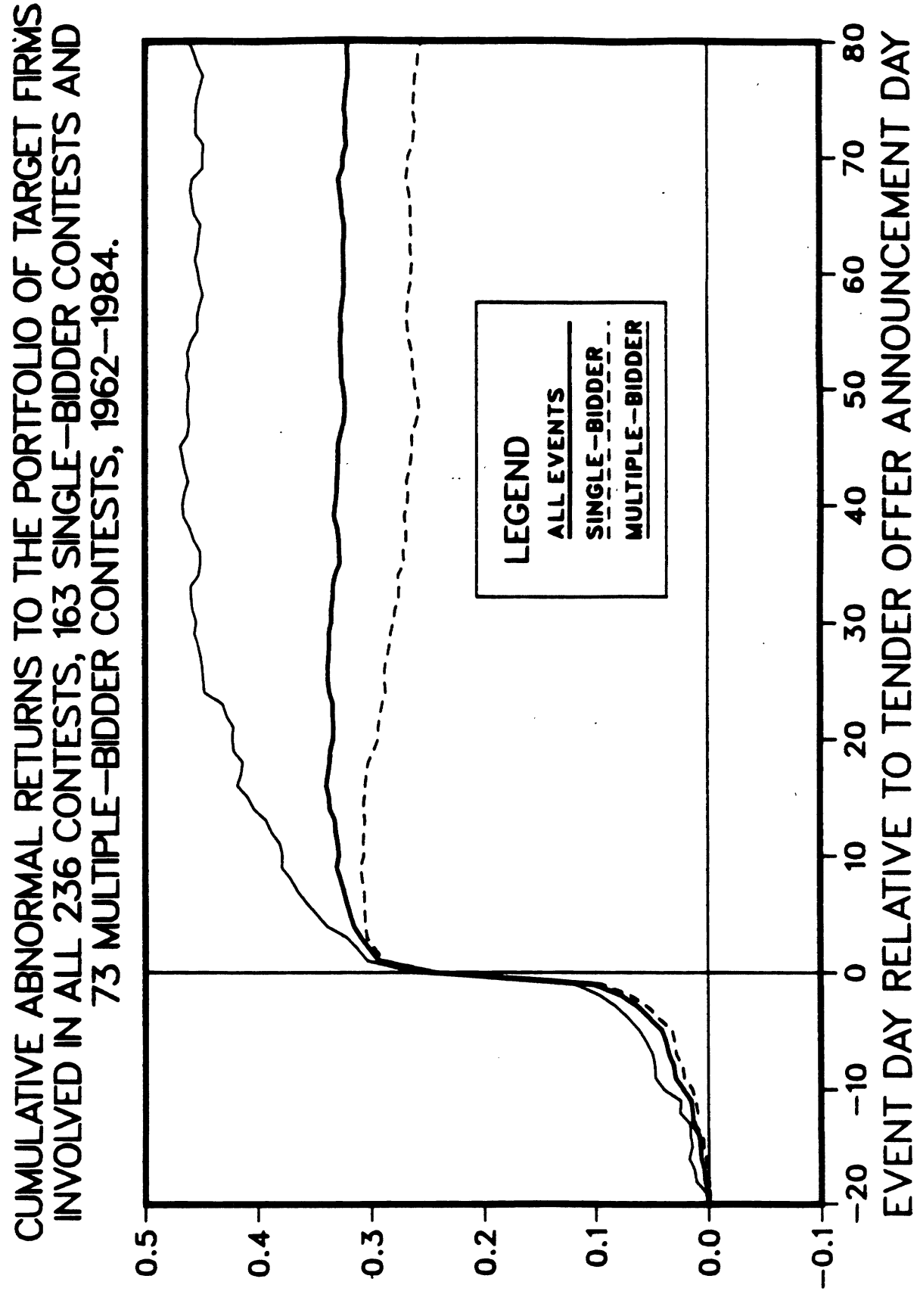
Table 3

Percentage Abnormal Returns (AR) and Cumulative Abnormal Returns (CAR) to the Portfolio of Target Firms Involved in All 236 Tender Offer Contests, 163 Single Bidder Contests, 73 Multiple-Bidder Contests Between 1962-1984[1]

	Single-Bidder Subsample				Multiple-Bidder Subsample				Total Sample			
Event Day	NT	NP	AR	CAR	NT	NP	AR	CAR	NT	NP	AR	CAR
-20	163	73	-0.11	-0.11	71	33	0.11	0.11	234	106	-0.04	-0.04
-15	163	88	0.20	0.44	71	30	-0.27	1.45	234	118	0.06	0.75
-10	162	79	0.29	1.42	73	39	1.56	3.96	235	118	0.69	2.21
-5	162	85	0.22	3.20	73	44	0.61	6.05	235	129	0.34	4.08
-4	160	84	1.09	4.29	73	40	0.92	6.97	233	124	1.04	5.12
-3	162	94	0.98	5.27	73	38	1.09	8.06	235	132	1.01	6.13
-2	159	103	1.57	6.84	73	44	1.47	9.52	232	147	1.54	7.67
-1	147	101	2.63	9.48	72	52	2.27	11.79	219	153	2.51	10.19
0	163	139	14.68	24.16	73	66	14.12	25.92	236	205	14.51	24.70
1	135	96	4.72	28.88	56	41	4.43	30.34	191	137	4.63	29.33
2	156	79	0.79	29.67	61	29	0.83	31.18	217	108	0.80	30.13
3	159	72	0.70	30.38	66	29	0.96	32.14	225	101	0.78	30.91
4	159	80	0.14	30.51	71	41	1.80	33.94	230	121	0.65	31.56
5	160	76	0.06	30.57	70	34	0.89	34.83	230	110	0.31	31.87
10	162	81	-0.29	30.64	70	32	-0.06	37.82	232	113	-0.22	32.83
15	160	74	-0.13	30.57	68	37	0.53	40.90	228	111	0.06	33.73
20	152	73	-0.42	29.34	70	35	0.09	42.25	222	108	-0.26	33.31
30	130	58	-0.27	27.99	69	33	-0.18	45.45	199	91	-0.24	33.47
40	117	45	-0.27	26.79	63	30	0.10	46.67	180	75	-0.14	33.12
50	108	50	0.27	26.08	59	27	-0.11	46.07	167	77	0.14	32.44
60	97	42	-0.05	26.42	53	33	0.17	45.30	150	75	0.03	32.39
70	89	41	-0.04	26.68	43	19	0.01	44.88	132	60	-0.02	32.43
80	84	42	-0.31	25.45	41	24	0.46	46.13	125	66	-0.06	32.01

[1]
NT = Total Number of Firms
NP = Number of Firms with Positive Abnormal Returns

FIGURE 1


CUMULATIVE ABNORMAL RETURNS TO THE PORTFOLIO OF TARGET FIRMS
INVOLVED IN ALL 236 CONTESTS, 163 SINGLE-BIDDER CONTESTS AND
73 MULTIPLE-BIDDER CONTESTS, 1962-1984.
LEGEND
ALL EVENTS
SINGLE-BIDDER
MULTIPLE-BIDDER
CUMULATIVE ABNORMAL RETURNS
0.5
0.4
0.3
0.2
0.1
0.0
-0.1
-20
-10
0
10
20
30
40
50
60
70
80
EVENT DAY RELATIVE TO TENDER OFFER ANNOUNCEMENT DAY

and 24.16%). This suggests that when a target receives an initial offer, the average value of this offer does not depend on whether or not it is followed by other bids.

Additional returns accrue to the targets of multiple-bidder contests when competing, higher valued bids are announced, and this is reflected in the gradual rise of the CAR series in Figure 1. 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.

Comparison of the two CAR series also suggests that multiple-bidder contests simply do not arise in situations where the initial bid was "too low." Accord- According to this "low-balling" hypothesis, the CAR to the targets of multiple-bidder contests would start out low on the event day and rise gradually to the level of the CAR of the targets of single-bidder tender offers.

The CAR series for the three portfolios of the acquiring firms are presented in Table 4 and plotted in Figure 2. 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 +10 is 0.70% with a t-statistic of 1.22. This is not significantly different from zero. However, the CAR from -5 through +20 is 1.63% (t=2.22), which is significant at the 5% level. Thus, unlike target firms, there is mixed evidence concerning the returns to acquiring firms.

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[18]Some of this difference can be attributed to the post-execution drop in the price of the remaining target shares (see footnote 2). Of the 163 single-bidder offers, 119 (or 73%) were executed within 40 trading days of the initial announcement. By contrast, 32 of the 73 multiple-bidder offers (44%) were executed during this same 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 the firms have to wait until the cross-sectional tests in Section IV. B.

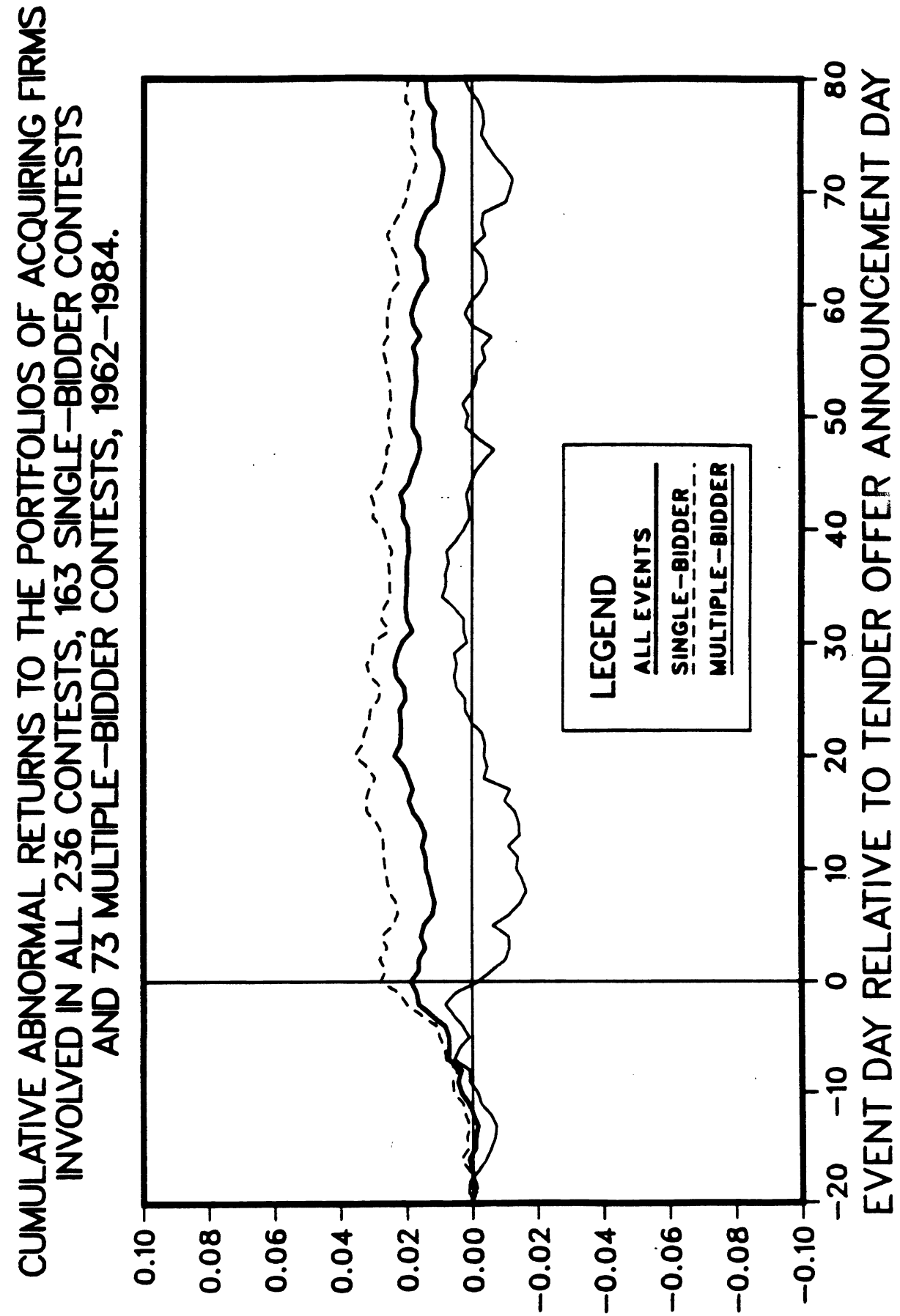
Table 4

Percentage Abnormal Returns (AR) and Cumulative Abnormal Returns (CAR) to the Portfolio of Acquiring Firms Involved in All 236 Tender Offer Contests, 163 Single-Bidder Contests, 73 Multiple-Bidder Contests Between 1962-1984[1]

	Single-Bidder Subsample				Multiple-Bidder Subsample				Total Sample			
Event Day	NT	NP	AR	CAR	NT	NP	AR	CAR	NT	NP	AR	CAR
-20	163	83	0.11	0.11	73	33	-0.04	-0.04	236	116	0.06	0.06
-15	163	72	-0.22	0.13	73	30	-0.15	-0.57	236	102	-0.20	-0.08
-10	163	87	0.28	0.57	73	35	0.10	-0.16	236	122	0.23	0.34
-5	163	80	0.15	1.00	73	33	-0.30	0.10	236	113	0.01	0.72
-4	163	72	0.06	1.06	73	40	0.17	0.27	236	112	0.10	0.82
-3	163	90	0.48	1.54	73	37	0.30	0.57	236	127	0.42	1.24
-2	163	84	0.46	2.00	72	29	0.25	0.82	235	113	0.40	1.64
-1	163	85	0.22	2.22	72	28	-0.30	0.52	235	113	0.06	1.70
0	163	80	0.57	2.79	73	30	-0.71	-0.19	236	110	0.17	1.87
1	162	76	-0.15	2.64	71	35	-0.42	-0.61	233	111	-0.23	1.64
2	163	80	0.18	2.82	73	32	-0.43	-1.03	236	112	-0.01	1.63
3	163	74	-0.23	2.59	73	35	-0.11	-1.14	236	109	-0.19	1.44
4	163	73	0.18	2.77	72	38	0.01	-1.13	235	111	0.13	1.57
5	163	66	-0.35	2.42	73	36	0.48	-0.65	236	102	-0.09	1.47
10	163	94	0.06	2.65	73	37	0.19	-1.37	236	131	0.10	1.41
15	163	77	0.30	3.19	73	31	0.11	-1.34	236	108	0.24	1.80
20	163	84	0.37	3.55	73	33	0.10	-0.38	236	117	0.29	2.34
30	163	72	-0.03	3.00	73	31	-0.38	0.16	236	103	-0.14	2.13
40	162	79	0.11	2.72	73	29	-0.24	0.24	235	108	0.00	1.96
50	162	78	0.03	2.56	73	34	-0.07	0.12	235	112	-0.00	1.81
60	162	82	-0.07	2.51	73	38	-0.17	0.05	235	120	-0.10	1.76
70	161	79	-0.06	1.96	73	37	-0.12	-1.17	234	116	-0.08	1.00
80	161	72	-0.04	1.93	73	36	0.15	0.24	234	108	0.02	1.42

[1] NT = Total Number of Firms
NP = Number of Firms with Positive Abnormal Returns

FIGURE 2


CUMULATIVE ABNORMAL RETURNS TO THE PORTFOLIOS OF ACQUIRING FIRMS
INVOLVED IN ALL 236 CONTESTS, 163 SINGLE-BIDDER CONTESTS
AND 73 MULTIPLE-BIDDER CONTESTS, 1962-1984.
CUMULATIVE ABNORMAL RETURNS
0.10
0.08
0.06
0.04
0.02
0.00
-0.02
-0.04
-0.06
-0.08
-0.10
-20
-10
0
10
20
30
40
50
60
70
80
EVENT DAY RELATIVE TO TENDER OFFER ANNOUNCEMENT DAY
LEGEND
ALL EVENTS
SINGLE-BIDDER
MULTIPLE-BIDDER

An examination of the returns to the portfolios of acquiring firms classified by the level of competition reveals that the CAR from -5 through +20 to the single-bidder portfolio is 2.7% (t=2.86) whereas the return to the multiple bidder portfolio is -0.78% (t=-0.63) 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 that entered the contest after some other bidding firm had 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 -5 to +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. Moreover these data suggest that the negative CAR from -5 to +1 to the portfolio of acquirers in multiple-bidder contests is due primarily (exclusively) to the (negative) returns to late-bidder acquirers--more commonly known as white knights. In other words, our data indicate that the averge 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. It is only when competing bids are actually made that we observe greater returns to target shareholders and dissipation of initial gains to bidding firms.

The fixed window CAR statistics reported above do not accurately capture the marginal effect of a multiple-bidder contest. The median number of days between the announcement of the first bid and the ultimately successful bid in our multiple-bidder sample is 19 trading days (mean = 32.2). Consequently, the CAR on day 20, for example, captures only the effects of about one-half of the ultimately successful bids in our sample. For the remaining multiple-bidder sample, the uncertainty about the eventual outcome of the take-over process has not yet been resolved.

B. Cross-Sectional Tests

In this section, we use variable-window CARs to examine the cross-sectional differences in the returns to the stockholders of target and acquiring firms. Specifically, we test the implications of our model by examining the effects of regulation, competition and the fraction of target shares purchased on the rates of returns to these stockholders. We also test the effects of the above variables on the value-weighted percentage synergistic gains ($\Delta\Pi/\Pi$).

B.1 Returns to Target Stockholders

For each target firm we begin cumulating the abnormal returns from five trading days before the announcement of the first bid and end five days after the announcement of the ultimately successful bid.[19] The model's predictions are then tested using the following equation:

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[19]See footnote 2 for the rationale for choosing this particular window.

$$\frac{CART_i}{\sigma_i\sqrt{K_i}} = \alpha_0\left(\frac{1}{\sigma_i\sqrt{K_i}}\right) + \alpha_1\left(\frac{ENV_1}{\sigma_i\sqrt{K_i}}\right) + \alpha_2\left(\frac{ENV_2}{\sigma_i\sqrt{K_i}}\right) + \alpha_3\left(\frac{DSM}{\sigma_i\sqrt{K_i}}\right) + \alpha_4\left(\frac{F_p}{\sigma_i\sqrt{K_i}}\right) \quad (17)$$

where $CART_i$ = the K_i day CAR to target firm i.

ENV_1 = a dummy variable that equals one if the offer is made between July 1968 and December 1980, and zero otherwise.

ENV_2 = a dummy variable that equals one if the offer is made after December 1980, and zero otherwise.

DSM = a dummy variable that equals one if the offer is a multiple-bidder contest, and zero otherwise.

F_p = fraction of target shares purchased in the offer by the successful bidder.

σ_i = the standard error of the daily abnormal returns to the target firm, estimated from the Market Model estimation period data.

The dummy variables ENV_1 and ENV_2 indicate the environment in which the tender offer is made. The variable ENV_1 is included to account for the effect of the passage of the Williams Amendment in July, 1968. Jarrell and Bradley (1980) argue that this Act and subsequent state statutes resulted in increased gains to target stockholders. Consequently, we hypothesize that the estimate of α_1 will be positive.

The second dummy variable ENV_2 is included to account for the changes in the acquisitions arena that have occurred in the 1980's. The liberal attitude of the Reagan Administration towards corporate takeovers has further encouraged competition among bidding firms. Moreover, the evolution of sophisticated defensive tactics on the part of target firms, coupled with the advent of innovative techniques used in financing corporate takeovers, may have forced bidders to make more aggressive pre-emptive bids in an attempt to ensure a successful acquisition. The combined effect of these changes would result in increased gains to target stockholders. Thus, we expect the estimate of α_2 to be positive as well.

The dummy variable DSM reflects the level of competition in the takeover contest. Our model implies that the estimate of α_3 will be significantly positive; that is, the returns to targets of multiple-bidder contests will be greater than the returns to targets of single-bidder tender offers.

The final independent variable included in our regression model is F_p, the fraction of target shares purchased by the successful bidding firm. Our model predicts that for single-bidder offers, the return to target stockholders will be positively related to F_p; for multiple-bidder contests, the return to target stockholders will be independent of F_p. Since our sample has more than twice as many single-bidder offers as multiple-bidder contests, we expect that for the total sample, the returns to target stockholders will be positively related to F_p but that this relation is due entirely to the single-bidder subsample.

Finally, to account for the possibility of heteroskedasticity in the data, all observations are divided by the standard error of the K_i-day $CART_i$. 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 standard error of CART is equal to $\sigma_i\sqrt{K_i}$, where σ_i is the standard deviation of the daily abnormal returns to firm i in the Market Model estimation period.

The results of our regression analysis are reported in the first row of Table 5. The estimate of α_1 is 0.076 (t=3.08) and is significantly positive. Thus, greater government regulations is associated with greater returns to target stockholders. The point estimate of α_2 is also positive (0.051); however, it is not significantly different from zero (t=1.36). Thus, the post 1980 developments in the market for corporate control have not increased the rate of return to target stockholders.

Table 5

Weighted Least Squares Estimates of the Effects of Environment, Multiple-Bidder Contests and Fraction of Shares Purchased on the Abnormal Returns to the Stock-holders of the Targets of 236 Successful Tender Offers, 1962-1984 (t-statistics)

$$\text{Model}^{a}: \quad \frac{CART_i}{\sigma_i\sqrt{K_i}} = \alpha_0\left(\frac{1}{\sigma_i\sqrt{K_i}}\right) + \alpha_1\left(\frac{ENV_1}{\sigma_i\sqrt{K_i}}\right) + \alpha_2\left(\frac{ENV_2}{\sigma_i\sqrt{K_i}}\right) + \alpha_3\left(\frac{DSM}{\sigma_i\sqrt{K_i}}\right) + \alpha_4\left(\frac{F_p}{\sigma_i\sqrt{K_i}}\right)$$

Sample (size)	$\hat{\alpha}_0$	$\hat{\alpha}_1$	$\hat{\alpha}_2$	$\hat{\alpha}_3$	$\hat{\alpha}_4$	R^2	F Statistic
Total (236)	0.102 (4.10)	0.076 (3.08)	0.051 (1.36)	0.131 (4.27)	0.164 (4.20)	0.70	111.6
Single (163)	0.096 (3.44)	0.078 (2.83)	0.065 (1.40)		0.170 (3.87)	0.68	84.6
Multiple (73)	0.264 (4.62)	(0.075) (1.13)	0.027 (0.37)		0.125 (1.29)	0.76	56.5

[a] $CART_i$ = the K_i day CAR to target firm i.

ENV_1 = a dummy variable that equals one if the offer is made between July 1968 and December 1980, and zero otherwise.

ENV_2 = a dummy variable that equals one if the offer is made after December 1980, and zero otherwise.

DSM = a dummy variable that equals one if the offer is a multiple-bidder contest, and zero otherwise.

F_p = fraction of target shares purchased in the offer by the successful bidder.

σ_i = the standard error of the daily abnormal returns to the target firm, estimated from the Market Model estimation period data.

The estimated coefficient of the single/multiple-bidder dummy variable is 0.13 (t=4.27) and is significantly greater than zero. Consistent with our hypothesis, 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_p, is also significantly positive (t=4.20). However, our model predicts that this positive relation should be due entirely to the single-bidder subsample. Thus, the following regression model is estimated for the single- and multiple-bidder subsamples separately:

$$\frac{CART_i}{\sigma_i\sqrt{K_i}} = \alpha_0\left(\frac{1}{\sigma_i\sqrt{K_i}}\right) + \alpha_1\left(\frac{ENV_1}{\sigma_i\sqrt{K_i}}\right) + \alpha_2\left(\frac{ENV_2}{\sigma_i\sqrt{K_i}}\right) + \alpha_4\left(\frac{F_p}{\sigma_i\sqrt{K_i}}\right).$$

The results of this test are reported in rows 2 and 3 of Table 5. For the single-bidder subsample, the coefficient on F_p is significantly positive (t=3.87). For the multiple-bidder subsample, the point estimate of the coefficient on F_p is not significantly different from zero (t=1.29). These results are consistent with the implication of our model. The offer price in single-bidder contests reflects the reservation price of the marginal tendering stockholder. With the reservation price being an increasing function of F_p, the rate of return to target stockholders in single-bidder offers is positively related to the fraction of target shares purchased. The offer price in multiple-bidder contests, on the other hand, reflects the per share value of the target resources in their next best allocation and is therefore independent of F_p.[20,21]

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[20]Some have suggested that the lack of significant relation between F_p and the rate of return to targets of multiple-bidder contests may be due to the lack of variance in F_p. However, the distribution of F_p in the multiple-bidder subsample is not unlike the distribution of F_p in the single-bidder

(Footnote 20 and 21 continue on next page.)

Comparison of the coefficients $\hat{\alpha}_1$, between the single- and multiple-bidder subsamples, reveals that increased government regulation is associated with greater returns to target stockholders only in the single-bidder tender offers. The main impact of the Williams Amendment has been to increase competition among bidders and allow target stockholders to take advantage of competing offers. The data indicate that the marginal impact of the Williams Amendment on tender offers in which there is already competition among bidders (multiple-bidder contests) has been insignificant.

Finally, the estimate of the constant term in all regressions of Table 5 is significantly positive. This suggests that the target shareholders earn positive excess returns as a result of successful tender offers prior to regulation, regardless of the degree of competition and the fraction of shares purchased. Also, note that the R^2 values indicate that our model is able to explain about 70% of the cross-sectional variation in the excess returns earned by the targets of tender offers.

(Footnote 20 and 21 continued)

sub-sample. The mean and median F_p in the single-bidder subsample are 57.7% and 56.0%, respectively (with a cross-sectional standard deviation of 31.6%). The mean F_p in the multiple-bidder subsample is 66.5%, the median is 68.4% and the cross-sectional standard deviation is 26.1%.

[21]The value of a tender offer depends on three variables; P_T, P_E, and F_p [see equation (8)]. Although an increase in any one of these variables will increase the returns to target shareholders, the bidding firm can always neutralize its effect by an offsetting decrease in either of the remaining two variables. Thus, the positive relation between F_p and the rate of return to target stockholders in the single-bidder subsample is an economic relation, not a spurious one. The fact that we do not observe the significant positive relation in the multiple-bidder subsample further demonstrates that the relation is not spurious.

B.2 Returns to the Stockholders of Acquiring Firms

In order to test the effects of regulation, competition and the fraction of target shares purchased on the returns to the stockholders of the acquiring firms, we use a regression model similar to equation (17). Specifically, we run the following weighted least squares regression:

$$\frac{CARA_i}{\sigma_i\sqrt{K_i}} = \alpha_0\left(\frac{1}{\sigma_i\sqrt{K_i}}\right) + \alpha_1\left(\frac{ENV_1}{\sigma_i\sqrt{K_i}}\right) + \alpha_2\left(\frac{ENV_2}{\sigma_i\sqrt{K_i}}\right) + \alpha_3\left(\frac{DSM}{\sigma_i\sqrt{K_i}}\right) + \alpha_4\left(\frac{F_p}{\sigma_i\sqrt{K_i}}\right) \quad (18)$$

where $CARA_i$ is the K_i day CAR to acquiring firm i and is defined as the CAR from five trading days before the first offer made by this firm through five days after the announcement of the ultimately successful bid. The standard error of the daily abnormal returns to the acquiring firm, σ_i, is obtained from the Market Model estimation period data, and all other variables are as defined earlier.

The tests indicated by equation (18) are run on two data sets: the entire 236-observation sample and a subsample of observations where the value of the target relative to the acquiring firm is at least 10%, i.e., $RST \equiv W_T/W_A \geq 10\%$, where W_T and W_A are the market values of the firm's equities as of two months prior to the month of the announcement.[22] Of the 236 tender offer contests in our total sample, 171 satisfy the condition $RST \geq 10\%$.

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[22]Research suggests 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 value disparity between 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. Relatedly, Kim and McConnell (1977) and Acquith and Kim (1982) limit their analysis to acquisitions involving targets that are at least 10% of the value of their respective acquiring firms.

Table 6 reports the results of our cross-sectional regression analysis for acquiring firms. The upper panel reports our results using all observations, while the lower panel pertains to the sample of 171 contests where RST $\geq$ 10%. In either case, the coefficients in the constant term in rows 1 and 4 (estimates of α_0) indicate that the average return to single-bidder, pre-regulation offers is significantly positive. Further, the marginal effects of regulation are negative. The estimates of α_1 in rows 1 and 4 are significantly negative. That is, regulation enacted by the Williams Act is associated with lower returns to acquiring firms. The estimates of α_2 in rows 1 and 4 are also negative, indicating that the returns to acquiring firms were further reduced in the 1981-1984 subperiod.

The point estimate of the coefficient (α_3) on the single/multiple-bidder dummy variable shows that the marginal impact of multiple-bidder contests is to reduce the returns to the acquiring firms, but not significantly below the returns realized by single-bidder acquirers. We showed in Section III.D that higher returns to targets from multiple-bidder contests would not translate into corresponding lower returns to the acquiring firms unless the total dollar synergistic gains ($\Delta\Pi$) were the same in the two subsamples classified by the level of competition. Our data show that the mean $\Delta\Pi$ in single-bidder offers is \$29.9 million (with a median of \$9.6 million) while the mean $\Delta\Pi$ in the multiple-bidder subsample is \$151.4 million (with a median of \$21.0 million). The non-parametric Wilcoxon Signed Rank test of the difference yields a z-statistic of 3.5, which is statistically significant at the 1% level. Due to the greater $\Delta\Pi$ in multiple-bidder contests, the greater returns to targets in multiple-bidder contests do not translate into lower returns to the acquiring firms.

Table 6

Weighted Least Squares Estimates of the Effects of Environment, Multiple-Bidder Contests and Fraction of Shares Purchased on the Abnormal Returns to the Stockholders of Acquiring Firms in 236 Successful Tender Offers, 1962-1984
(t-statistics)

$$\text{Model}^{a}: \quad \frac{CARA_i}{\sigma_i\sqrt{K_i}} = \alpha_0\left(\frac{1}{\sigma_i\sqrt{K_i}}\right) + \alpha_1\left(\frac{ENV_1}{\sigma_i\sqrt{K_i}}\right) + \alpha_2\left(\frac{ENV_2}{\sigma_i\sqrt{K_i}}\right) + \alpha_3\left(\frac{DSM}{\sigma_i\sqrt{K_i}}\right) + \alpha_4\left(\frac{F_p}{\sigma_i\sqrt{K_i}}\right)$$

Sample (size)	$\hat{\alpha}_0$	$\hat{\alpha}_1$	$\hat{\alpha}_2$	$\hat{\alpha}_3$	$\hat{\alpha}_4$	R^2	F Statistic
All Observations							
Total (236)	0.034 (2.56)	-0.026 (-2.17)	-0.057 (-3.53)	-0.016 (-1.22)	0.008 (0.46)	0.07	4.6
Single (163)	0.036 (2.31)	-0.025 (-1.74)	-0.051 (-2.53)		0.002 (0.08)	0.07	3.6
Multiple (73)	0.015 (0.56)	-0.049 (-1.76)	-0.088 (-2.89)		0.045 (1.32)	0.09	2.6
Observations where RST[b] $\geq$ 10%							
Total (171)	0.047 (2.72)	-0.042 (-2.58)	-0.076 (-3.70)	-0.025 (-1.50)	0.015 (0.62)	0.12	5.4
Single (111)	0.054 (2.53)	-0.042 (-2.10)	-0.075 (-2.77)		0.003 (0.10)	0.12	4.4
Multiple (60)	-0.004 (-0.11)	-0.045 (-1.35)	-0.082 (-2.35)		0.060 (1.53)	0.11	2.6

[a] $CARA_i$ = the K_i day CAR to acquiring firm i.

ENV_1 = a dummy variable that equals one if the offer is made between July 1968 and December 1980, and zero otherwise.

ENV_2 = a dummy variable that equals one if the offer is made after December 1980, and zero otherwise.

DSM = a dummy variable that equals one if the offer is a multiple-bidder contest, and zero otherwise.

F_p = fraction of target shares purchased in the offer by the successful bidder.

σ_i = the standard error of the daily abnormal returns to the target firm, estimated from the Market Model estimation period data.

[b] RST = relative size of target, which is the ratio of the pre-offer market value of the target firm to the pre-offer market value of the acquiring firm.

The data in Table 6 also show that the fraction of target shares purchased has no effect on the returns to the stockholders of acquiring firms: the estimate of the coefficient α_4 is 0.08 for the sample of all 236 acquiring firms, and the t-statistic is 0.46. This lack of significance is also observed for all subsamples in Table 6.

The positive relation between the rate of return to targets and F_p, which was documented in the preceding subsection, would translate into a negative relationship between CARA and F_p if F_p and ΔW_T (the dollar gain) were positively related (see footnote 13). For the sample of 236 offers, the product moment correlation between F_p and ΔW_T is 0.06 and this is insignificantly different from zero at the 10% level.

Finally, unlike our results on the cross-sectional tests for the returns to target stockholders, the R^2 values in Table 6 are generally low indicating that the model in equation (18) is unable to explain much of the variation in the excess returns to acquiring firms. As Jensen and Ruback (1983) suggest, the large cross-sectional standard deviation in the returns to acquiring firms seems to be swamping most of the hypothesized determinants of the gains to acquiring firms.

The coefficients of the dummy variables reported in Table 6 were estimated by a weighted least squares regression technique. Consequently, these estimates cannot be interpreted as partial elasticities. As a result, one cannot simply add the estimates of α_0, α_1, α_2, and α_3 to obtain an estimate of the mean return to acquiring firms in multiple-bidder contests effected during the period 1981-1984. Nor can we say that the average abnormal return to acquirers is lower in multiple-bidder events by 1.6%, which is the estimate of α_3 in Equation (18). Thus, we report the mean and the standard deviation of the mean

of the percent abnormal returns to acquiring firms by time period and our multiple/single-classification in Table 7.

The data in Table 7 again confirm our hypotheses that the effect of increased regulation and/or competition is a significant reduction in the gains to acquiring firms. Acquiring firms gained most (4.54%) in single-bidder contests effected during the unregulated period of 1962-1968; they lost the most (-5.01%) in multiple-bidder contests effected in the most recent period (1981-1984).

Perhaps the most notable of the data reported in Table 7 is the fact that the 52 acquiring firms in the most recent period (1981-1984) realized a significant capital loss of -2.89%. We attribute these losses to increased competition in the market for corporate control. The increase in the extent and degree of government regulations, the advent of investment banking firms that specialize in raising funds to finance takeover bids, and the development of sophisticated defensive tactics have all contributed to this increase in competition. Consistent with this observation, the table shows an increasing trend in the relative frequency of multiple-bidder contests over time; 18%, 30%, and 46%, in subperiods 62-68, 68-80, 81-84, respectively.

B.3 Total Percentage Synergistic Gains

Finally, we examine the relation between our measure of the relative synergistic gains ($\Delta\Pi/\Pi$) and the environment, the level of competition, and the fraction of target shares purchased. Table 8 reports the results of the following weighted least squares regression:

$$\frac{(\Delta\Pi/\Pi)_i}{\sigma_{c_i}} = \alpha_0\left(\frac{1}{\sigma_{c_i}}\right) + \alpha_1\left(\frac{ENV_1}{\sigma_{c_i}}\right) + \alpha_2\left(\frac{ENV_2}{\sigma_{c_i}}\right) + \alpha_3\left(\frac{DSM}{\sigma_{c_i}}\right) + \alpha_4\left(\frac{F_p}{\sigma_{c_i}}\right) \qquad (19)$$

Table 7

Percent Mean Abnormal Return to Acquirers, by Time Period and Multiple/Single-Classification (Standard Deviation of Mean)

	Time Period			
	6/62 - 6/68	7/68 - 12/80	1/81 - 12/84	Total
Single	4.54** (1.71) N=42	1.77* (0.91) N=93	-1.08 (-1.53) N=28	2.00** (0.74) N=163
Multiple	1.71 (2.34) N=9	0.14 (1.64) N=40	-5.01** (-1.94) N=24	-1.36 (-1.17) N=73
Total	4.04** (1.47) N=51	1.28 (0.80) N=133	-2.89* (-1.23) N=52	0.96 (0.63) N=236

*Significant at $\alpha = .05$

**Significant at $\alpha = .01$

Table 8

Weighted Least Squares Estimates of the Effects of Environment, Multiple-Bidder Contests and Fraction of Shares Purchased on the Total Percentage Synergistic Gains, $\Delta\Pi/\Pi$, Created by 224 Successful Tender Offers, 1962-1984 (t-statistics)

$$\text{Model}^{a}: \quad \frac{(\Delta\Pi/\Pi)_i}{\sigma_{c_i}} = \alpha_0\left(\frac{1}{\sigma_{c_i}}\right) + \alpha_1\left(\frac{ENV_1}{\sigma_{c_i}}\right) + \alpha_2\left(\frac{ENV_2}{\sigma_{c_i}}\right) + \alpha_3\left(\frac{DSM}{\sigma_{c_i}}\right) + \alpha_4\left(\frac{F_p}{\sigma_{c_i}}\right)$$

Sample (size)	$\hat{\alpha}_0$	$\hat{\alpha}_1$	$\hat{\alpha}_2$	$\hat{\alpha}_3$	$\hat{\alpha}_4$	R^2	F Statistic
Total (224)	0.073 (4.74)	-0.019 (-1.30)	0.018 (0.86)	0.044 (3.25)	0.004 (0.17)	0.49	43.4

[a] ENV_1 = a dummy variable that equals one if the offer is made between July 1968 and December 1980, and zero otherwise.

ENV_2 = a dummy variable that equals one if the offer is made after December 1980, and zero otherwise.

DSM = a dummy variable that equals one if the offer is a multiple-bidder contest, and zero otherwise.

F_p = fraction of target shares purchased in the offer by the successful bidder.

σ_{c_i} = standard error of $(\Delta\Pi/\Pi)_i$ estimated from the Market Model estimation period data.

where $(\Delta\Pi/\Pi)_i$ is the total percentage synergitic gans from the i^{th} combination and is defined by equation (4), and σ_{c_i} is the standard error of $(\Delta\hat{\Pi}/\Pi)_i$ (see footnote 6).

The data show that only the estimates of α_0 and the coefficient on the single/multiple-bidder dummy variable are 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 DSM indicates that the presence of multiple-bidders generates additional synergistic gains. This finding suggests that competition among bidding firms generates additional information which leads to a higher valued allocation of the combined resources of the two firms.

Furthermore, the results of Table 8 show that there is no significant relationship between $\Delta\Pi/\Pi$ and F_p. This result is not surprising in light of our earlier finding of no relation between ΔW_T and F_p. Apparently, the fraction of target shres purchased has no effect on the dollar gains to target shareholders or the total percentage synergistic gains.

Finally, the estimates of the coefficients on both dummy variables for the environment are insignificantly different from zero. This suggests that the marginal impact of regulation is a zero-sum game. That is, the gains to the target stockholders from regulation come at the expense of the stockholders of the acquiring firm.

V. SUMMARY AND CONCLUSIONS

In this paper we investigate the magnitude of the synergistic gains created by corporate acquisitions by tender offers. Our measure of these synergistic gains is the revaluation of the combined wealth of the shareholders of the acquired and the acquiring firms. We also investigate how these gains are

divided between the two groups of shareholders. To this end, we develop a model of the tender offer process that is consistent with existing legal and institutional constraints. The implications of our model are then tested using 236 successful tender offers made between 1962 and 1984.

We find that successful tender offers result in an average synergistic gain of $67 million, representing an 8% revaluation of the combined wealths of the stockholders of the target and the acquiring firms. This finding is inconsistent with Roll's hubris hypothesis.

To investigate the impact on the synergistic gains of the legal and institutional changes that have occurred in the market for corporate control during the 23-year period used in our study, we divide our total sample into three subperiods: 1962-1968, 1968-1980, and 1981-1984. Our subperiod analysis shows that the total dollar synergistic gains created by tender offers have increased over time. This is due primarily to an increase in the size of target firms, especially in the post-1980 subperiod. During this most recent period, the liberal attitude of the federal government toward large-scale combinations, together with the advent of innovative financing techniques for corporate takeovers, has enabled bidding firms to obtain control of large targets. When we control for firm size, we find that the percentage synergistic gains have remained remarkably constant throughout the entire 1962-1984 period.

Our model of the tender offer process implies several determinants of the division of the synergistic gains from tender offers between the stockholders of the target and the acquiring firms. The model's implications are tested using cross-sectional analysis of the returns to these firms.

We find that target shareholders earn greater rates of return from multiple-bidder contests than from single-bidder offers. We also find that the synergistic gains are greater in multiple-bidder contests than in single-bidder

offers. In other words, competition among bidding firms leads to a higher valued allocation of the combined resources of the two firms, and most of these gains accrue to the stockholders of target firms.

We also find that the return to target firms is positively related to the fraction of target shares purchased in single-bidder offers but not in multiple-bidder contests. With heterogeneous capital gains tax positions and/or expectations among target shareholders, the reservation price demanded by the target stockholders is positively related to the fraction purchased. In the absence of competition among the bidding firms, the acquiring firm need only pay the reservation price of the marginal tendering stockholder. Consequently, the rate of return to target stockholders in single-bidder offers is positively related to the fraction purchased. On the other hand, in multiple-bidder contests, the rate of return to targets is determined by the synergistic gains attainable in the second-best allocation of the target resources, which is unrelated to the fraction purchased by the acquiring firm. Thus, the return to targets in multiple-bidder contests is independent of the fraction of target shares purchased.

In conclusion, the major finding of this study is that corporate acquisitions by tender offer generate significant positive synergistic gains. These results suggest that acquisitions by tender offer reallocate corporate resources to higher valued uses. Based on these findings we conclude that public policy should be directed towards facilitating this capital market transaction.[22]

We also find that increased competition among bidding firms increases the returns realized by the target stockholders and decreases the returns realized

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[22]We recognize that, theoretically, these gains may stem from the creation of market power and not necessarily from increased efficiency. However, the work of Eckbo (1982) and Stillman (1982) indicates that corporate acquisitions have no measurable effect on the degree of market power in the economy.

by the stockholders of the ultimately successful acquirer. Moreover, our data suggest that increased competition among bidding firms is not a zero sum game. We find that the increase in the gains to targets from increased competition outweighs the lower return realized by the stockholders of acquiring firms. In other words, the total synergy created by multiple-bidder contests is significantly greater than that created by single-bidder contests.

One may be tempted to conclude from our results that public policy should be directed towards encouraging auctions (multiple-bidder contests). However, if increased competition among potential acquirers results in the winning bidder losing money (as our data indicate has in fact happened during the most recent period) then legislation and judicial rulings that encourage auctions may in the long run reduce social welfare.

Requiring open and protracted auctions may result in fewer tender offers being made. If information indicating that a higher valued allocation of the target resources becomes a public good during the auction process, then such information may never be produced. Just as inventors need patent laws to protect themselves from "free riders" and to maintain the proper incentive to invest, the firm best able to produce information regarding a value-increasing reallocation of the target resources needs a reward mechanism to encourage the search for this information.

APPENDIX

A MODEL OF THE TENDER OFFER BIDDING PROCESS

The purpose of this appendix is to demonstrate that in a tâtonnement process for the target shares, the bidding firm that can create the greatest synergistic gains by combining with a particular target will, in fact, be the winner in the bidding contest for the target shares. To this end, we derive an optimal bidding strategy under the assumption of risk neutrality. When bidding firms (including the current management) follow this optimal strategy, the acquiring firm pays at least the full pre-offer market value for control of the target resources and more if there is a rival bidding firm. Specifically, we show that if there is more than one firm that is capable of acquiring the target and generating synergistic gains, the acquirer must pay at least the next highest valued allocation of the target resources.

An important by-product of developing this model is a review of several of the theoretical issues concerning the mechanics of the tender offer process. Specifically, we review how the market solves the problem of "free riders" on the one hand and "corporate raiders" on the other. While these issues have been discussed elsewhere in the literature, we feel that we do provide some new insights into how the tender offer process channels corporate resources to their highest valued use.

A. TENDER OFFERS AND THE FREE-RIDER PROBLEM

A.1 The Problem

The free-rider problem associated with tender offers has been analyzed by several authors.[1] The issue can be illustrated by means of a simple numerical example. Consider an all-equity target firm with ten shares outstanding, each

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

selling at $40: a $400 firm. Assume that if a potential acquiring firm were to 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; i.e., $60 per share.

Assume that in an attempt to exploit the available synergies, a potential acquirer makes the following offer. It will purchase five (controlling interest) of the outstanding target shares at $50 per share. If fewer than five shares are tendered, the offer will be withdrawn and none will be purchased.

If we assume that the target stockholders behave as atomistic wealth-maximizers, their optimal responses are 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 enhanced by the takeover. If target stockholders are a homogeneous group in terms of the information they possess and the expectations they hold, none 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 other stockholders will tender so that the value of the target will be enhanced by the takeover, but none will tender for $50 if the post-execution 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 since all target stockholders will feel this way no shares will be tendered.

A.2 The Solution

The obvious solution to the free-rider problem for the bidding firm is 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) post-offer price. In our example, the bidding firm could offer to buy five shares at $60 and stipulate in the offer that if five shares (a controlling block) were obtained, then the bidding firm would effect a "freeze-out" merger and redeem the remaining five target shares for $50 a piece.

The dominating response for any target stockholder to this revised bid is to tender. Regardless of the aggregate response, which by assumption he cannot affect, his payoffs will be greater if he tenders rather than holds. And, if target stockholders are homogeneous, 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 breaks the free rider-problem.[2]

B. THE PRISONER'S DILEMMA AND CORPORATE RAIDERS

B.1 The Problem

Critics of the tender offer process claim that front-end loaded offers are coercive in that target stockholders have no real choice but to tender under such terms. Further, these 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 its pre-offer market value. To illustrate this point, we return to the numerical example in which the hypothetical target has 10 shares outstanding, each worth $40: a $400 firm. Assume that a potential corporate raider makes the following two-tier bid. The firm will pay $50

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[2]There is empirical evidence to support the proposition that successful tender offers are front-end loaded. See Bradley (1980) and the SEC study of two-tier offers (1984).

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 term 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 A.I illustrates the payoff matrix facing 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: less 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;[3] 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 A.I reflect the changes from current wealth of $80.

Reading the entries across the first row of Table A.I, if the stockholder does not tender and the offer is unsuccessful, his wealth will be unaffected. However if the offer is successful, 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. 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.

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

Table A.I

Changes in the Wealth of a Target Stockholder with Two Shares with Pre-offer Value of $40 Each

	Aggregate (Market) Response		
	Unsuccessful	Successful	
Individual Response	Less than Five Shares Tendered	Five Shares Tendered	All Other Shares Tendered
Hold	0	-40	-40
Tender	0	+20	-10

Bid 1: P_T = \$50, P_E = \$20, F_p = 5/10

P_T = Offer price

P_E = Post-offer price

F_p = Fraction of shares purchased

The entries in Table A.I indicate that the value-maximizing response is to tender. Moreover, since by assumption no one target stockholder can determine the outcome of the offer, all target stockholders face a response/outcome payoff matrix similar to that illustrated in Table A.I. 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.

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. 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.

B.2. The Optimal Bidding Strategy

The preceding analysis of the prisoner's dilemma suggests an optimal bidding strategy between two competing acquiring firms. To illustrate, consider a second offer for the same target made by a rival corporate raider. The second bidder (B_2) offers $50 for five shares and if successful will exchange the remaining five target shares for some worthless security; i.e., $P_E = 0$. The response/outcome matrix facing our two-share target stockholder is illustrated in Table A.II.

It is clear from the entries in Table A.II that tendering to either bidding firm dominates the hold strategy. However, in order to predict whether the stockholder will tender to bidder 1 or bidder 2 we must make some assumptions about the stockholder's attitude toward risk and his subjective

Table A.II

Changes in the Wealth of a Target Stockholder with Two Shares with Pre-offer Value of $40 Each

	Aggregate (Market) Response					
	B_1 Successful		B_2 Successful		Neither	
Individual Response	50% Tendered	All Other Shares Tendered	50% Tendered	All Other Shares Tendered	Successful	Σ
Hold	-40	-40	-80	-80	0	-240
Tender B_1	+20	-10	-80	-80	0	-150
Tender B_2	-40	-40	+20	-30	0	-90

Bid 1: P_T = $50, P_E = $20, F_p = 5/10

Bid 2: P_T = $50, P_E = $0, F_p = 5/10

P_T = Offer price

P_E = Post-offer price

F_p = Fraction of shares purchased

Σ = Decision index.

probability of the outcome of the offer. We assume that target stockholders are risk-neutral and each is completely ignorant with respect to the tendering decision of the other target stockholders. Specifically, we assume that each target stockholder assigns an equal probability to each of the possible outcomes of a tender offer contest. With these two assumptions we can derive implications from the entries in Table A.II.

We entertain three possible outcomes of the contest between bidders 1 and 2: B_1 successful, B_2 successful and neither successful. With equal probabilities of outcome and risk-neutrality, a decision index (Σ) can be constructed by summing across the row for each response. Thus the index is -240 for the hold strategy, -150 for tendering to B_1 and -90 for tendering to B_2. Based on this criterion, the expected wealth-maximizing decision is to tender to B_2, even though the total value of B_2's offer is less than that of B_1's ($250 versus $350).

The intuition behind this rather paradoxical outcome (B_2's winning) lies in B_2's extremely low back-end price ($P_E = 0$). The potential of losing $80 (the entire pre-offer value of the portfolio) if B_2 is successful and the shares are tendered to B_1 provides a strong incentive to tender to B_2. In addition, the higher back-end price of B_1 ($P_E = 20$) acts as a safety net for the value of the target shares if they are tendered to B_2 but B_1 wins the contest. Both of these factors work to the advantage of the second bidder.

The preceding analysis provides an important implication for the structure of tender offers; namely, that in an acquisitions market dominated by atomistic and risk-neutral target stockholders, the bidding firm that sets the maximum $P_T - P_E$ will win the contest. The higher the front-end price the greater the incentive to tender; the lower the back-end price the greater the (potential) cost of tendering to some other bidder or holding. However, this implication also provides the "solution" to the prisoner's dilemma.

B.3 The Solution to the Prisoner's Dilemma

A possible solution to the prisoner's dilemma is competition among potential raiders. If B_2 were able to obtain a \$400 firm for \$250 by simply setting $P_T = 50$ and $P_E = 0$, other raiders would enter the auction with a higher $P_T - P_E$ before B_2's offer expired.[5] In our example, the maximum $P_T - P_E$ that a potential raider can offer without exceeding \$400 (the pre-offer value of the target) is \$80; i.e., $P_T = 80$ and $P_E = 0$. But at this combination of P_T and P_E, the target shareholders will be paid exactly the pre-offer market value of their shares.

A more direct solution to the prisoner's dilemma lies in the ability of the target management to make an offer to repurchase its own shares that dominates any offer made by a corporate raider. To see this assume that there is only one offer outstanding -- B_2's. Recall that B_2's offer was for five shares at \$50 per share with a back-end exchange into a worthless security; i.e., $P_T = 50$, $P_E = 0$. Now assume that the target managers make the following counteroffer: They will repurchase five shares (on a pro rata basis) at \$70 a share. Given that the pre-offer value of the firm was \$400, a \$350 (\$70 x 5 shares) repurchase program implies that the post-offer value of a target share will be \$10; i.e., $P_T = 70$, $P_E = 10$. Table A.III illustrates the response/outcome payoff matrix facing our two-share target stockholder in the wake of the B_2 and repurchase offers.

The last column in Table A.III shows our decision index for each of the three strategies. Consistent with our previous analysis, the value-maximizing

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[5]Provisions of the Williams Amendment allow target stockholders who have tendered their shares to one bidding firm 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, then all target stockholders, even those who tendered their shares at the previous terms, must receive the higher price.

Table A.III

Changes in the Wealth of a Target Stockholder with Two Shares with Pre-offer Value of $40 Each

	Aggregate (Market) Response					
	Repurchase Successful		B_2 Successful		Neither	
Response	50% Tendered	All Other Shares Tendered	50% Tendered	All Other Shares Tendered	Successful	Σ
Hold	-60	-60	-80	-80	0	-280
Tender B_2	-60	-60	+20	-30	0	-130
Tender Repurchase	+60	0	-80	-80	0	-100

Bid 2: P_T = \$50, P_E = \$0, F_p = 5/10

Share Repurchased: P_T = \$70, P_E = \$10, F_p = 5/10

P_T = Offer price

P_E = Post-offer price

F_p = Fraction of shares purchased

Σ = Decision index

strategy is to tender to the repurchase program. The intrafirm tender offer dominates the interfirm tender offer because the spread between P_T and P_E is greater in the former than it is in the latter ($70 - $10 = $60 versus $50 - $0 = $50).

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 pre-offer market value. The potential for such a dominating intrafirm tender offer solves the prisoner's dilemma. As a result, value-decreasing bids will never be successful and, as a consequence, probably are never made.

C. TENDER OFFERS WITH SYNERGISTIC GAINS

Although an intrafirm tender can always be constructed to defeat an offer by a corporate raider, it can never be used to defeat a value-increasing bid. This is because the firm that can maximize the spread between P_T and P_E will elicit the target shares and the maximum spread between P_T and P_E that the target management can offer is constrained by the current market value of the firm. Thus, if a bidder is willing to make an offer that has a value greater than the current market value of the target, it can offer a greater spread between P_T and P_E than the target management; consequently, the target management cannot fend off a value-increasing bid by using an intrafirm tender offer.

If there is more than one firm that can effect a higher valued allocation of the target resources, the firm that can effect the highest synergistic gain can also offer the largest spread between P_T and P_E without decreasing its own shareholder's wealth. Thus, assuming that firms will not make offers that will harm their own shareholders, the successful acquirer will be the firm that can effect the highest synergistic gains.

Further, a tâtonnement process for target shares requires that the winning bidder construct an offer with a spread between P_T and P_E that exceeds the maximum spread that the second-best user of the target resources can offer. Since the maximum spread that the second-best bidder can offer (without harming its own shareholders) is constrained by the synergistic gains it can create with target resources, the total value of the winning offer must be at least equal to the next highest valued allocation of the target resources.

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