

## **IS ACQUISITION OF MARKET POWER A DETERMINANT OF HORIZONTAL MERGERS?**

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### **Abstract**

Most studies on mergers and acquisitions are not sample selective. This study directly examines the motives of horizontal mergers by utilizing a sample of acquiring firms based on same SIC codes. A three factor Arbitrage pricing model was utilized, with Tobin's q ratio as a measure of market power, to study the performance of the firms involved in the mergers. The results indicate the acquisition of market power not to be a significant motive for the mergers.

### **INTRODUCTION**

The 1980s saw the highest level of merger activity, in both number and value of mergers, of any period in the corporate history of the US. The boom in merger activity makes it important to understand the motives for and consequences of mergers, i.e., the sources of gains and losses to stakeholders in the merging firms. Traditional motives for merger include efficiency gains or "synergy" (e.g., economies of scale) and the acquisition of market power. More recent explanations include wealth transfer from labor to shareholders, tax gains, and the replacement of inefficient management. The inefficient management and the transfer of wealth from labor to shareholders have not been shown to be influential factors in motivating mergers (Scherer, 1988, Scherer and Ravenscraft, 1987, and Brown and Medoff, 1987). The tax effect explanation has some support in the literature. For example Auerbauch and Reihaus (1987) found that only about 20% of the mergers and acquisitions in their sample showed any tax effect.<sup>1</sup>

However, the acquisition of market power is usually the first motive for mergers suggested, especially for horizontal mergers (e.g., Scherer and Ross, 1990, Carlton and Perlof, 1990, Hay and Morris, 1991). The argument is that horizontal mergers increase market concentration, which, by increasing market power, increases profitability. The relationship between market concentration and profitability has been extensively studied, with the empirical evidence suggesting a generally positive relationship.<sup>2</sup> Many of the mergers and acquisitions of the 1980s were horizontal in nature suggesting that some of these mergers and acquisitions may have been motivated by the desire to acquire market power.

Despite its prominence as a possible motive for mergers, there are no studies that directly examine the acquisition of market power as a motive for mergers. Most studies of mergers and acquisitions analyze all mergers during the sample period. Acquisition of market power is not likely to be a motive in vertical or conglomerate mergers, and thus such a motive would be difficult to find. Stillman (1983) and Eckbo (1983) provide the only indirect tests of market power as a motive. Both Stillman and Eckbo argue that if increased market power, especially the ability to raise prices, is the source of gains from merger, then rivals of the merging firms should also benefit, and the value of rival firms increase. However, if the increased market power takes other forms, say, increased ability to engage in price discrimination or predatory pricing, then the value of rival firms may fall. Thus, the indirect approach provides a weak test of market power as a motive for mergers. Nonetheless, Stillman's and Eckbo's results provide some support for the acquisition of market power as a motive for horizontal mergers.

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In this study we provide a direct test of the acquisition of market power as a motive for horizontal mergers. The basic idea is that if horizontal mergers increase market power, then we should observe abnormal returns<sup>3</sup> as the increased profitability of the merged firm is capitalized into its market value. To analyze the returns of firms involved in mergers we use a version of the APT (Ross, 1976) that is an extension of the single index market model. The single index market model asserts that the firm's return depends on its systematic risk. We extend the model to include measures of market power and agency costs. These additional factors are included to help distinguish among possible motives for mergers. We apply this model to horizontal mergers occurring between 1981 and 1984.

Section I develops the empirical model, including the definitions of the variables. Section II presents the empirical results. Section III provides brief concluding remarks.

## THE MODEL

Our goal is to study the role of the market power in influencing the mergers and acquisitions. The model for this study utilizes the arbitrage pricing theory (APT) model (Ross, 1976). APT assumes the return generating process takes the form:

Equation 1

$$R_{it} = a_i + b_{i1}F_{1t} + b_{i2}F_{2t} + \dots + b_{iK}F_{Kt} + \varepsilon_{it}$$

where  $R_{it}$  is the one period rate of return on the  $i^{th}$  asset in time period  $t$ ,  $a_i$  is the expected return of an asset if all other risk factors have value of zero,  $F_{kt}$  is the  $K^{th}$  risk factor affecting an asset's returns,  $b_{ik}$  measures the sensitivity of an asset's returns to the  $K^{th}$  factor, and  $\varepsilon_{it}$  is an i.i.d  $N(0, \sigma^2)$  error term. The identification of the factors to be used in APT can be accomplished in two ways. One way is to follow Roll and Ross's (1980) technique of using factor analysis in the "first pass" regression equation to identify factors. But this approach is questionable (see Dhrymes, Friend, and Gultkein (1987)) and not necessary. An alternative approach is to identify the factors based on economic theory, thus, bypassing the first step of identifying the factors using factor analysis. The latter approach is the one being utilized in this study. The three factors which are employed in this study are the firm's beta ( $\beta$ ), its Tobin's q ratio and INS, which equals stock holdings by the management, and serves as a proxy for the agency effect. The economic validity of each of these factors is well established in the literature.<sup>4</sup>

There is one remaining point which needs further clarification. It will be noted that equation (1) (for the factors utilized in this study), in its currently specified form implies:

$$R_{it} = f(\beta_{it}, q_{it}, INS_{it})$$

But if we expand  $R_{it}$ , we obtain  $R_{it} = (P_{it} - P_{it-1}) / P_{it-1}$ . Similarly expanding the definition of  $q$  gives us:

Equation 2

$$q_{it} = (P_{it}^c N_{it}^c + P_{it}^p N_{it}^p + D_{it}) / RC_{it}$$

where  $N_{it}^c$  and  $N_{it}^p$  are the number of outstanding shares of common and preferred stock,  $P_{it}^p$  is the price of preferred stock,  $D_{it}$  is the market value of the firm's debt, and  $RC_{it}$  is the replacement cost of the firm's assets. By examining the expanded version of  $R_{it}$  and equation (2), it is clear that both the current period return and the current period  $q$  depend on the current price of the firm's shares, creating a potential endogeneity bias. This may cause the estimator of the coefficient on  $q$  to be biased downward. To avoid this problem, we employ  $q_{t+1}$  as an instrumental variable. With this modification, the model utilized in this study takes the general form:

Equation 3

$$R_{it} = f(\beta_{it}, q_{it+1}, INS_{it})$$

Equation (3) therefore, states that the return on an asset, in period  $t$ , is a function of its systematic risk and its market power in the next period.

We examine the behavior of both the  $q$  ratio and  $\beta$ , pre- and post-merger. The acquisition of market power through merger should lead to an increase in  $q$ . Moyer and Chatfield (1983) argue that an increase in market power also reduces systematic risk. In addition, if the merger leads to an increase in market power, then we should observe abnormal returns (and the merger is not fully priced, i.e., the gains from the acquisition are not fully reflected in the price of merger) around the merger. To estimate the abnormal returns, the model in (1) is estimated separately for each firm in the sample using monthly estimates of  $\beta$  and annual estimates of  $q$  and  $INS$ . This approach, used by Bernier (1987), Nguyen and Bernier (1988), and Chen, Cheng, and Hite (1986), assumes that there is no change in the  $q$  ratio within the year.

There is one more factor which has to be accounted for, namely, that the acquisition may have been motivated by the desire to attain synergy gains. This will cause any potential abnormal performance of the acquiring firm to be partly made up of the synergy effects. However, there is no explicit measure of synergy effect. To account for this effect, Ellert's (1976) approach of studying the abnormal gains will be utilized. Ellert contends that the presence of any positive abnormal gains will validate the presence of synergy benefits. This in conjunction with results on the analysis of the  $q$  ratio will enable us to distinguish the source of gains.

### Estimation Of $q$ Ratio

Tobin's  $q$  ratio is defined as the ratio of the market value to replacement cost of a firm. The approach utilized in this study follows those of Lindenberg and Ross (1981) and Von Furstenberg, Burton, and Watson (1980). The estimation of the market value of a firm involves estimation of the value of common stock, preferred stock, and debt. The valuation of common stock involved obtaining the highest and the lowest prices of common equity during the year in order to obtain the average equity price for the year. This average price is then multiplied by the total number of common equity outstanding to obtain a dollar figure for the value of the common equity. The valuation of the preferred stock is slightly more difficult, since COMPUSTAT lists only the cumulative preferred dividends and for the firms in the sample, the preferred stock ratings were not found in any trade publications. Thus, the preferred yields were estimated utilizing CAPM, and cumulative preferred dividends are then divided by the estimated yield to obtain estimates of preferred equity. The estimation of the value of a firm's debt can be very complicated. Bowman (1980) demonstrated that "there is a high degree of correlation between the market value and the book value of debt thus the probability of misspecification due to using book value measures is probably very small" (p. 242). Therefore in this study the book value of the debt is assumed to be equivalent to its market value.

Lindenberg and Ross (1980) defined the total replacement cost,  $RC$ , as:

Equation 4

$$RC = TA + RNP - HNP + RINV - HINV$$

where  $TA$  is the total assets of the acquiring firm,  $R$  denotes replacement value,  $H$  denotes historical value,  $NP$  denotes net plant and  $INV$  denotes inventory firm (thus,  $RNP$  is net plant at replacement value, etc.). We discuss estimation of each component in turn.

The COMPUSTAT definition of plant-net includes plant, equipment, land, and other real properties used in revenue production. All are listed at their book values. First, the gross book value of the net-plant was divided by the Gross National Price deflator, to obtain the gross replacement cost of the net-plant. Second, this is converted to net replacement cost. This is accomplished by multiplying the ratio of net to gross plant (obtained from COMPUSTAT) by the gross plant replacement value, giving a dollar value of the current net-plant replacement cost.

When valuing inventories, one has to account for differences in various accounting methods of measuring inventories which can affect inventory measures. The adjustment to correct for inventory accounting methods are the same as in Lindenberg and Ross (1981). FIFO assumes that the first units acquired are the first to be sold, and since inventories are valued at the most recent prices, no adjustment is necessary. LIFO assumes that the last units

acquired are the first ones to be sold, which tends to under price the unsold inventory. The adjustment for this accounting method is:

Equation 5

$$RINV_t = RINV_{t-1}(P_t / P_{t-1}) + (HINV_t - HINV_{t-1}) [1/2(P_t = P_{t-1}) / P_{t-1}]$$

The average cost method values inventories at the average of prices from the previous and current periods. The adjustment to current period prices is:

Equation 6

$$RINV_t = HINV_t [ P_t / 1/2(P_t = P_{t-1}) ]$$

The retail cost method uses expected retail prices to value inventory. The difficulty is that most producers use wholesale prices. Thus, the adjustment made is:

Equation 7

$$RINV_t = HINV_t (WPI_t / CPI_t)$$

where *WPI* and *CPI* are the wholesale and consumer price indices.

## EMPIRICAL ANALYSIS

The sample consists of all horizontal mergers during 1981-1984, as reported in the *Journal of Mergers and Acquisitions*. The sample of mergers and acquisitions was obtained over the years 1981-1984. The basic sample criteria are that the acquired firm must be in the same industry as the target, all of the assets of the target firm were acquired, and the acquiring firm was not involved in any other mergers or acquisition during the sample period.<sup>5</sup> This was accomplished by monitoring the firms activities throughout the sample period. As a result the initial sample of 120 firms was reduced to the sample utilized in this study. Balance sheet data were obtained from the expanded version of COMPUSTAT tape. Stock returns as well as the value weighted market returns were obtained from the CRSP tape. We require that the acquiring firm be listed on either the AMEX or the NYSE, and have complete balance sheet data on COMPUSTAT and complete daily return data on the CRSP tape. The sample excluded banking firms, insurance and investments firms due to their highly leveraged nature. Data was collected for 1977-1980 and 1985-1988 to examine pre- and post-merger performance. Table 1 lists the names of the acquiring as well as the acquired firms and the date at which the acquisition took place. Table 2 lists the sources of the variables used in this study.

The q ratios for the acquiring firms before and after the merger are also reported in Table 1. The overall level of the q ratios is quite low, especially in the pre-merger period, where the sample average is 0.59. In the post-merger period, the sample average q ratio is 0.858; only 6 firms had lower q ratios after the merger.<sup>6</sup> While the average is still relatively low, it nonetheless represents a substantial increase. The difference in the pre- and post-merger q ratios is statistically significant at the one percent level ( $t = 3.1498$ ). This increase in the q ratios is not due to overall movements in the market. A random sample of 58 firms yielded averages of 1.32 in 1980 and 1.33 in 1985; the difference is not significant. This supports the hypothesis that the increase in q ratios in the sample was associated with specific market events.

Table 1 also lists the size of the target relative to the acquiring firm; where size is measured in terms of sales. This information was available for 29 firms; the remaining target firms are too small to be listed on COMPUSTAT. Even though the q ratios for the target firms are apparently above those of the acquiring firms, it does not seem to be able to account for the increase in q after the merger. Even if the average target firm had a q ratio of 2.66, the post-merger q would average approximately 0.7. This suggests the horizontal mergers create a positive interaction between the acquired and acquiring firms.

## Market Power And Beta

Increases in market power have been suggested as a possible source of reductions in systematic risk.<sup>7</sup> To examine this hypothesis, we compared pre- and post-merger betas for the acquiring firms. As shown in Table 2, only five firms had a statistically significant change in  $\beta$ . In three of the five cases, the change was an increase in systematic risk. Thus, using the hypothesis of change in systematic risk as a result of market power acquisition provided no general support to the hypothesis of gains in market power as a result of horizontal mergers. But this finding does not imply that horizontal mergers do not lead to increases in market power, but rather only that the increase in market power may not have been large enough to affect the systematic risk of firms.

The model in (1) was estimated by OLS separately on the pre- and post-merger data for each acquiring firm in the sample.<sup>8</sup> The results are reported in Table 3, Panel A for the pre-merger data, and in Table 3, Panel B for the post-merger data. In the pre-merger data, the relationship between  $q$  and return was found to be positive for 35 firms, and negative for 23 firms. However, the  $q$  ratio was positive and significant at better than the ten percent level for only 10 firms; none of the negative relationships were significant. In the post-merger period, a total of 37 firms exhibited a positive  $q$  relationship, nine of which were statistically significant; again, none of the negative relationships were significant. Only four firms were found to have a positive and significant relationship between the  $q$  ratio and return both before and after the acquisition. Of these four, only two firms had increased their  $q$  ratios to a level greater than one. But the main implication of these results is that market power (at these levels) is not significantly related to the performance of most of the firms in the sample.

The variable for the agency effect,  $INS$ , was found to be significant for only five firms in the pre-merger period and for only four firms in the post-merger period. In all cases this relationship was negative.<sup>9</sup> A closer examination of this relationship indicated that all of these firms had a lack of equity holdings. This behavior is very consistent with the concept of agency effect first discussed by Jensen and Meckling (1976).

The analysis of the abnormal performance is done by utilizing the cumulative average residuals. The Dodd and Warner (1983) approach, based on the standardized residuals, is used to test the significance of the residuals. The residuals are calculated as:

Equation 8

$$e_{it} = R_{it} - \hat{\alpha}_i - \hat{b}_{1i}\beta_i - \hat{b}_{2i}q_{it} - \hat{b}_{3i}INS_{it}$$

then standardized by dividing by the standard error of the residual. The standardized residuals have zero mean and variance of one. The residuals are used as a measure of the adjustments made by the market with regard to any information about the merger or acquisition. These residuals are averaged across firms for each month to compute the average residual,  $AR_t$ . The average residuals are then cumulated over time.

Equation 9

$$CAR_{t_1, t_2} = \sum_{s=t_1}^{t_2} AR_s$$

In the absence of any abnormal returns, both the average and cumulative average residuals can be expected to be zero.

The CARs from the post-merger period are all negative but none are significant. The pre- and post-merger average CARs are reported in Table 4, Panel A. Both pre- and post-merger averages are negative, but not significantly different from zero. As shown in Table 4, Panel B, there is no significant change from the pre-merger to post-merger period. There are two possible explanations for these findings. One, that since the  $q$  ratio for most of the firms was less than one, even after the merger, it is possible that the acquisition of market power may not have been sufficient to generate market power rents. If this is the case then we would expect to see no abnormal performances as a result of the acquisition. The second possibility is that the market fully anticipates and prices the future cash flows causing the net present value of the investment (merger) to be zero. So what was the motive for acquisition? The negative abnormal performance of the prior to acquisition may have been one of the incentives to merge or get acquired, either to collect market power rents or to collect synergy benefits.

## CONCLUSION

The goal of this study was to determine whether market power acquisition is a motive for horizontal mergers. Although most of the firms found increase in their q ratios, most firm's q ratio was still less than one. This would imply lack of significant market power gains to be able to influence the product markets. This conclusion was supported by the analysis of the systematic risk. The systematic risk of most of the firms was found to be unchanged as a result of the acquisition. If there had been sufficient market power generated as a result of the acquisition, we would have found the systematic risk of the acquiring firms to be smaller than the pre-merger period. As a result, there was no abnormal performance detected for the acquiring firms. This is evident by analyzing the cumulative average residuals of the acquiring firms. The CARs from the acquiring firms from the pre-merger period were found to be insignificantly different from the CARs from the post-merger period. The implication of these results is that horizontal mergers don't necessarily lead to market power rents. Thus it can be deduced that horizontal acquisitions must be motivated by the desire to attain synergy gains.

**TABLE 1**  
**Firms Involved In Mergers Or Acquisitions**

Acquiring Firm	Acquired Firm	Acquisition Date	Rel. Size	Pre-Merger q	Post-Merger q
AAR Corp.	Circamet Coating Tech Inc.	5/18/84		0.4900	0.9225
Action Ind.	Savin Industries, Inc.	10/23/83	10.00	0.5100	0.7100
Air Products & Chem	Empire Welding Supply	3/3/82		0.525	0.8350
Alberto-Culver Co.	Best Barber 7 Beauty Supply	8/4/81	3.02	0.3125	1.0375
Alco Std. Corp.	Ritz-Ann Distrib.	9/16/83	3.59	0.4775	0.8025
Angelica Corp.	Clean Craft Inc.	1/23/84		0.5975	1.0200
Arrow Electronic Inc.	Tolver-Oschan Corp.	2/24/83		0.6500	0.8200
Ashland Oil Inc.	U. S. Filter Corp.	3/31/81	13.17	0.4325	0.6575
Automatic Data Proc.,	Telephone Computing Co.	4/6/81	0.44	1.4550	1.6450
Avery Int'l	G. J.Ainger Co.	10/21/81	6.46	0.5125	0.9500
Baruch Foster Corp.	Republic Production Co.	3/31/81		1.2350	0.6750
Boeing Corp.	Ronson Hydraulic Units	4/3/81	1.06	0.4050	0.5400
Brown Group Inc.	Arnold Dunn Inc.	4/16/84		0.4275	0.8650
Browning Ferris	Connecticut-Trmt.	4/13/84		0.5525	1.5600
Circle K. Corp.	Utotem Inc.	12/28/83	40.64	0.6450	0.9125
Clorox Co.	Launitzen & Co.	1/25/81		1.7325	1.3725
Coachmen Inc.	Marlette Homes Inc.	3/31/81	15.29	0.3525	0.7350
Commercial Metals Co.	Island City Iron & Supply	12/18/83		0.2850	0.5325
Commodore Int'l Ltd.	Amiga Corp.	10/29/84		1.3775	0.8975

**TABLE 1**  
**Firms Involved In Mergers Or Acquisitions**

(CONT'D)

Acquiring Firm	Acquired Firm	Acquisition Date	Rel. Size	Pre-Merger q	Post-Merger q
Consolidated Oil & Gas	Fayette Oil & Gas Corp.	6/23/82		0.7450	0.7925
Continental Metals	Phoenix Manuct.	12/20/83	40.00	0.3400	0.5425
Crompton & Knowles	Chemhurst Industries	8/26/81		0.4775	0.8075
Crown Crafts Inc.	Decorator Cofertures Inc.	2/23/84		0.330	0.7275
Dover Corp.	Sargent Industries Inc.	9/24/84		1.1175	1.2925
Echlin Inc.	Mechanex Corp.	6/8/81		1.1175	1.0250
Federal Signal Corp.	Automatic Parking Devices	1/12/82		0.7550	0.8575
Foote Cone & Belding	Fixtures Manf. Co.	8/5/82		0.3650	0.3975
GE Corp	Great Western Silicone	2/3/81		0.5450	0.8350
General Inst.	Century III Elect. Corp.	11/1/83		0.5350	0.7350
Harris Corp.	Lanier Business Prod.	10/28/83	20.00	0.8000	0.5850
Harvey Group Inc.	Components Plux Inc.	6/19/81		0.6100	0.3975
Heinz Corp.	Weldon Farm Prod.	4/6/81	8.62	0.4500	1.3000
Horn & Hornet Co.	BJangles of America	11/30/81	7.84	0.5750	0.6925
Kleer-Vu Ind. Inc.	American Microform	7/18/83		0.3175	0.7125
Kroger Co.	Dillon Co.'s Inc.	1/25/83		0.2775	0.8425
Maytag Corp.	Hardwick Co.	1/6/81	7.33	1.1375	1.6475
McKesson Corp.	Johnson Drug Co.	12/12/84	2.58	0.4050	0.6375
Mickeleberry	F. William Free	12/11/81		0.4400	0.5600
Mobile Corp.	Superior Oil Co.	9/28/84		0.3245	0.4075
Motorolla Inc.	Four Phase Systems Inc.	3/2/81	2.90	0.7300	0.8575
National Medical Corp.	Pulmonary Services Co.	8/9/83		0.6600	0.8375
National Services Ind.	Acme Lighting and Fixt. Manf.	4/7/82		0.7175	1.1325
New York Times Co.	Cruising World Publ. Inc.	7/6/84		0.5600	1.5075
Occidental Petrl. Corp.	Cresmont Oil & Gas Co.	3/31/81	0.46	0.4775	0.6350
Oneida Ltd.	Buffalo China Co.	11/30/83	7.52	0.4625	0.6150
Phillips Petroleum	General American Oil Co.	3/8/83	2.29	0.5000	0.4375
Pope-Talbot Inc.	Homestake Forest	2/5/81	0.39	0.5000	0.5825
Science Mgmt Corp.	Intech Systems Corp.	10/31/83		0.3875	0.4625
Scott Paper Co.	American Conven. Prod.	10/5/81	0.49	0.3400	0.6000
SIFCO Corp.	Piddington & Assoc.	7/24/81		0.4250	0.3925
Standard Brands Paint	Zynolyte Products Co.	11/30/81	4.45	1.1700	0.9900
Suave Shoe Corp.	Bori Shoe Co.	1/26/81	5.29	0.4250	0.3925
Trinity Ind.	Pullman Standard	3/6/84		0.4150	0.8050
Valspar Corp.	Furman-Ford Paint Inc.	11/16/81	5.88	0.4150	1.0725
Vulcan Materials Co.	Southern Exploration Inc.	1/15/81		0.4800	0.8700
Wal-Mart Stores	Khohn's Big K Stores	8/11/81	7.47	2.0450	2.7625
Warner Comm.	Franklin Mint	3/2/81	17.48	0.6475	1.0125
Wolverine Corp.	Town & Country Shoes	11/5/81	0.04	0.4800	0.5375

**TABLE 2**  
Results Of Testing Equality Of Beta

Firm	Pre-Merger $\beta$	Post-Merger $\beta$	t-statistic
Avery Int'l	-0.06453	0.08382	-1.45*
General Inst. Corp.	0.04282	0.17361	-1.79**
Harvey Grp.	0.13890	-0.04834	1.78**
Kroger Corp.	-1.17140	-1.98601	-1.98**
Mobil Corp.	-1.34560	1.57800	-2.20**

\*Significant at 90%, \*\*Significant at 95%

**TABLE 3**  
Relationship Between q And Return

**Panel A**  
Firms With Significant Pre-Merger q

Firm	Coefficient	t-statistic
Automatic Data Processing	0.176800	2.30**
Consolidated Oil & Gas	0.23883	1.99**
Dover Corp.	0.013943	1.74**
Kleer-Vu Corp.	0.184804	1.90**
Mobil Corp.	0.101750	1.87**
Motorolla Inc.	0.054360	1.58*
Pope-Talbot Inc.	0.130507	3.00**
Trinity Ind.	0.053963	3.05**
Valspar Corp.	0.093553	1.33*
Wolverine Corp.	0.010698	1.37*

**Panel B**  
Firms With Significant Post-Merger q

Firm	Coefficient	t-statistic
Air Products & Chemical Corp.	0.00839	1.5920*
Alberto-Culver Co.	0.03860	1.5920*
Dover Corp.	0.01990	1.8690*
McKesson Corp.	0.04075	1.5820*
Motorolla Inc.	0.02352	1.5700*
Pope-Talbot Inc.	0.06113	1.4010*
Science Manag. Corp.	0.14701	1.9820**
Vulcan Materials Co.	0.02623	2.2110**
Warner Comm.	0.03984	2.0560**

\*Significant at 90%, \*\*Significant at 95%



**TABLE 4**  
**Analysis Of Cumulative Average Residuals**

**Panel A**  
**CARs Over Pre-And Post-Merger Periods**

Interval	CAR	t-statistic
(-48 -1)	-6.7180	-0.1515
(1 48)	-6.5962	-0.2524

**Panel B**  
**Tests For Differences In CARs**

Avg. CAR	Avg. CAR	t-statistic
(Pre-merger)	(Post-merger)	
-0.5917800	-0.5497083	-0.3551

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**ENDNOTES**

1. See Jensen and Ruback (1983) and Jarrell, Brickley and Netter (1987) for surveys of the empirical evidence on the size and sources of gains in changes in corporate control.
2. See Sherer and Ross (1990), Carlton and Perlof, (1990) and Hay and Morris, (1991).
3. Abnormal returns will be observed only if the cash flows from the mergers are not fully priced by the market. If the market fully anticipates all future cash flows, then the NPV of the investment (merger) will be zero and no abnormal returns should be observed.
4. For a discussion on the relationship between the q ratio and firm value, see Smirlock, et.al (1986), Moyer and Chatfield (1983). For a discussion on the relationship between agency cost and firm value, see Jensen and Meckling (1976), Fama (1980), and Sheleifer and Vishney (1988).
5. Firms are defined to be in the same industry if they have the same SIC Codes.
6. One note on using Lindenberg and Ross's (1981) methodology to calculate q ratio is the tendency of getting smaller (than a typical q ratio of 1.0) q ratios. This was found to be true not only in this study, but also in Kim, Henderson, Garrison (1993) who use this methodology to calculate q ratios. Thus, the "actual" q ratios would probably be larger than the ones found in this study.
7. For example see Moyer and Chatfield (1983).
8. The RESET specification test was performed; the null hypothesis of no misspecification could not be rejected.
9. This is approximately the number of significant coefficients one would expect to find in a sample of this size if there was no relationship.

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