

# INTRA-INDUSTRY EFFECTS OF TAKEOVERS: A STUDY OF THE OPERATING PERFORMANCE OF RIVAL FIRMS

Rupendra Paliwal, Sacred Heart University

## ABSTRACT

*This paper investigates whether the managers of industry rivals act to mitigate their agency exposure and improve operating performance when one of the firms in the industry is subject to a takeover attempt. The results indicate that rival firms in general decrease free cash flows, improve operating performance, reduce capital expenditures and increase leverage in response to a control threat within the industry. In particular, rival firms with potentially higher agency costs i.e. fewer investment opportunities and high cash or high free cash flows exhibit a higher reduction in cash levels and free cash flows subsequent to a control threat in their industry. These results are consistent with the inefficient management hypothesis, which suggests poorly performing firms are more likely to be the target of a takeover attempt and the acquisition probability hypothesis proposed by Song and Walkling (2000), which states that rivals of initial targets earn abnormal returns because of an increased probability that they themselves will be targets. These results lend support to the argument that takeovers act as an effective external control mechanism for managers and that they have industry wide effects.*

**JEL:** G34

**KEYWORDS:** Mergers, takeovers, industry rivals, agency costs

## INTRODUCTION

Current research documents that industry rivals of takeover targets earn significant positive announcement period abnormal returns. The traditional explanation for these positive abnormal returns has focused on changes in the level of competition within the industry. However, more recently Song and Walkling (SW) (2000) propose and find support for the acquisition probability hypothesis, which states that the rivals of initial targets earn announcement period abnormal returns because of increased probability that they themselves will be targets. The focus of their investigation is on the market performance of rivals. Existing literature suggests that the removal of inefficient management to improve operating performance is one of the key underlying motives for takeovers commonly referred to as the inefficient management hypothesis. Thus, the acquisition probability hypothesis and inefficient management hypothesis together suggest that poorly performing firms are more likely to be the target of a takeover attempt following an initial takeover announcement in their industry.

This paper investigates, when a firm is subject to a takeover attempt; whether the managers of industry rivals act to mitigate their agency exposure and improve operating performance to reduce probability of being themselves subject to a takeover attempt. Specifically, this research investigates whether rivals with high levels of cash and free cash flows coupled with a low Tobin's q (few investment opportunities), low (or high) managerial ownership, low institutional holdings, lower external monitoring by debt holders and poor operating performance (1) reduce excess funds; (2) reduce capital expenditures; (3) lower their operating expense and (4) increase their leverage.

The results indicate that rival firms in general decrease cash levels and free cash flows, reduce capital expenditures, reduce operating expenses and increase leverage in response to a control threat in the industry. In support of agency arguments, results indicate that rival firms with few investment

opportunities and high cash or high free cash flows reduce cash levels and free cash flows significantly subsequent to a control threat in their industry. Furthermore, rivals with high managerial ownership (entrenched managers) increase leverage and reduce free cash flows in response to a control threat. The results also indicate that those rivals that increase leverage in response to control threat also reduce their cash levels and cash flows. Rival firms with low Tobin's q reduce cash levels, increase leverage and improve asset turnover.

Overall, the evidence supports the argument that takeovers act as an effective external control mechanism for managerial agency behavior and that they have industry-wide effects. Rival firms take steps to reduce their agency exposure and improve operating efficiency in response to a control threat, regardless of the form (horizontal or non-horizontal) and type (hostile or friendly) of the initial takeover.

The research here complements the findings of Servaes and Tamayo (2007) and Song and Walkling (2000) and other papers examining industry-wide effects of control threat. While Song and Walkling (2000) focus on abnormal returns to rivals, Servaes and Tamayo (2007) focus on financial policy variables. Servaes and Tamayo (2007) find that rival firms increase leverage, cut capital expenditures and reduce their cash balances and free cash flows. However, their sample is restricted to the rivals of 218 firms, which receive hostile takeover bids during the period 1983-1998. They focus only on rivals of hostile takeover attempts, as agency problems are likely to be the primary motive for control threat for these firms. They suggest that other firms may have been takeover targets for synergistic reasons unrelated to agency problems, and their rivals may not respond. However, Schwert (2000) concludes that hostile takeovers are not distinguishable from friendly takeovers, which justifies the use of an expanded sample in the research presented here. This study extends their work by (i) covering a much larger and broader sample of takeovers of all types (ii) examining operating performance in addition to the financial policy characteristics and (iii) specifically taking in to consideration investment opportunities, managerial ownership, institutional holdings and level of industry concentration of rivals.

The remainder of the paper is organized as follows. The first section presents background literature and develops hypotheses. The second section describes the data and methodology and the third reports results from the univariate analysis of the full and several sub-samples. The fourth section reports results from a cross-sectional analysis. Section five concludes the paper.

## **LITERATURE REVIEW AND HYPOTHESES**

The positive association between acquisition announcements and stock price movements of rival firms in the same industry as a takeover target has been documented in several studies (See Eckbo (1983, 1985), Stillman (1983), Banerjee and Eckard (1998), Akhigbe, Borde, and Whyte (2000), Mitchell and Mulherin (1996)). The traditional explanation for positive announcement period abnormal returns focuses on horizontal mergers and argues that such mergers decrease competition, thereby encouraging collusion among the remaining firms in the industry. However, the existing empirical literature does not find support for this argument. Song and Walkling (2000) provide an alternative explanation for the rivals' positive announcement period abnormal returns. They propose that the rivals of initial targets earn abnormal returns because of an increased probability that they themselves will be targets. They term this argument as the "acquisition probability hypothesis."

Song and Walkling (2000) find that on average rival firms earn positive abnormal returns regardless of the form and outcome of the acquisition. They also find that rivals' abnormal returns in the announcement period are higher for rival firms with higher probability of acquisition. In addition, rivals who subsequently become targets earn significantly higher abnormal returns in the announcement period. Another implication of the acquisition probability hypothesis is that following an initial takeover announcement rival firm managers may take steps to reduce their agency exposures i.e., their potential to

overinvest and consume excess perks to avoid being subject to a takeover attempt. This paper investigates whether the managers of rivals act to mitigate their agency exposure when one of the firms in the industry is subject to a takeover attempt.

Earlier research has documented that takeover targets usually have small size, low growth rate, low Tobin's  $q$ , low (or high) managerial ownership and a low level of outside block holder ownership. Hasbrouck (1985) concludes that the average  $q$ -ratio of acquired firms is significantly lower than the average  $q$ -ratio of control groups matched by size or industry. Lang, Stulz and Walkling (1989) find that for successful tender offers, target, bidder and total returns are larger when targets have low  $q$  ratios and bidders have high  $q$  ratios. Servaes (1991) uses a broader sample and confirms that these results hold for both mergers and tender offers. Jensen (1976) argues that a firm with excess free cash flows will have a tendency to overinvest by undertaking marginal investment projects with negative net present values. An increase in dividends by such firms will reduce overinvestment and increase market value of the firm. Consistent with this argument, Lie (2000) documents a favorable market response to large special dividends and self tender offers when the announcing firm has potentially large agency problems as indicated by high cash levels coupled with poor investment opportunities (indicated by low Tobin's  $q$ ).

More recently, Shahrur (2005) reports significant positive abnormal returns to rivals', suppliers and corporate customers of merging firms, thus documenting industry-wide effects of horizontal takeovers. Bris and Cabolis (2003) find that the Tobin's  $q$  of an industry increases when firms in that industry are acquired by firms from countries with better shareholder protection and accounting standards. This result implies that the adoption of better corporate governance practices by one firm has industry-wide effects. Berger and Ofek (1999) and Denis, Denis and Sarin (1997) argue that firms that implement corporate refocusing programs often do so in the presence of external control pressures such as a takeover threats. Therefore, I hypothesize that: after an initial takeover attempt in the industry, rival firms with high levels of cash and free cash flows coupled with low Tobin's  $q$ , low, or high, managerial ownership, low institutional holdings, lower external monitoring by debt holders and poor operating performance will reduce their excess funds – a primary symptom of agency costs.

Williamson (1963) argues that managers do not have a neutral attitude towards costs. Managers have what he describes as expense preference i.e. certain class of expenditures have positive value associated with them. Specifically staff expenses, expenditure for emoluments and funds available for discretionary investments have value in addition to that deriving from productivity. He argues that managers may choose to shirk and indulge in excessive perquisite consumption. He also observes that the expansion of physical plant and equipment is also subject to managerial discretion. Takeovers are considered one of the key mechanisms, which can act as a check against such managerial discretionary behavior. Healy, Palepu and Ruback (1992) observe a significant improvement in industry adjusted asset productivity for the combined firm, which leads to higher operating cash flow returns. Trimbath, Frydman and Frydman (2002) conclude that cost inefficiency is a determinant of the risk of being a takeover target. Therefore, I hypothesize that: after an initial takeover attempt in the industry, rival firms with high levels of cash and free cash flows coupled with low Tobin's  $q$ , low, or high, managerial ownership, low institutional holdings, lower external monitoring by debt holders and poor operating performance will improve their operating efficiency with lower operating expenses, and reduce their capital expenditure.

Jensen (1976) also argues that when managers issue debt in exchange for stock, they are bonding their promise to payout future cash flows that cannot be accomplished by a simple dividend increase. Thus, additional debt reduces the agency costs of free cash flows by reducing cash flows available for spending at the discretion of managers. Safieddine and Titman (1999) find that on average targets that terminate takeover offers significantly increase their leverage ratio. These targets which increase their leverage ratio also reduce their capital expenditure, downsize in terms of assets and employment and their cash flows and their stock returns outperform the benchmark in the following 5 years. Based on this evidence

they argue that an increase in leverage by a target in response to a takeover attempt is not a defensive mechanism but it increases the credibility of a target manager's promise to improve performance. Lang, Ofek and Stulz (1996) document evidence suggesting that increased debt induces firms to invest less, especially for firms with low  $q$ . We expect similar behavior from the rivals of targets. Therefore, I hypothesize that: after an initial takeover attempt in the industry, rival firms with high levels of cash and free cash flows coupled with low Tobin's  $q$  (few investment opportunities), low (or high) managerial ownership, low institutional holdings, lower external monitoring by debt holders and poor operating performance will increase their leverage.

## DATA AND METHODOLOGY

Mergers and tender offers during the period 1992-2000 are identified using the Securities Data Company (SDC) on-line Mergers and Corporate Transactions database. SDC provides data on the announcement date, the completion date, acquirer, target six-digit cusip, total deal value, form of payment, and deal classification as hostile or a tender offer. Firms in regulated industries (Financial, Transportation & Communication and Public Administration) are eliminated. All other financial data is from COMPUSTAT. Each target firm is classified according to its four digits SIC code as reported in the Compact Disclosure database. Target firms are sorted chronologically within their industries. Following Song and Walkling (2000), *initial industry targets* are defined as the first firm in an industry to experience acquisition activity following a minimum 12-month dormant period. *Rivals* are defined as firms in the same four digits SIC industry at the time of the initial industry target. Bidders are removed from the sample to focus on the effects of takeovers on the firms that are not involved in the transaction. Rivals that are subject to a takeover attempt in the subsequent two years are not included in the sample. Finally, rivals are included in the sample if they are listed in Compustat and data is available for at least two years before and after the initial takeover announcement.

Table 1 presents the distribution of initial targets and rival firms for the sample. In total 1512, firms are identified as targets of acquisition attempts during the period 1992-2000. Out of these 1512 target firms, 511 firms are categorized as initial industry targets. Only 15 of these are identified by SDC as hostile takeovers. The final sample consists of 4526 rival firms of these 511 initial targets. The number of rivals is distributed almost evenly across the years, with a slight dip in 1999. The average number of rivals per target is 8.87 with a median of five rivals per target.

Table 1: Target Firms, Initial Targets and Rival Firms

Year	Number of Acquisitions	Number of Initial Targets	Number of Rival Firms
1992	80	46	717
1993	72	37	452
1994	129	53	555
1995	159	66	577
1996	175	52	567
1997	205	67	554
1998	273	77	504
1999	222	48	199
2000	197	65	401
Total	1512	511	4526

*This table shows number of acquisitions, initial targets and number of rival firms in the analysis sample.*

Table 2 contains descriptive statistics on some of the test variables for rival firms at the time of the control threat. The number of companies in the sample changes depending on availability of data on insider holdings and institutional holdings. Tobin's  $Q$  is approximated by sum of market value of equity

and book value of debt divided by the book value of assets. The market value of equity is measured three months before the takeover announcement date using CRSP. Insider holdings are the total number of shares held in aggregate by all officers and directors as percentage of shares outstanding in the year acquisition announcement is made (Source: Compact Disclosure). Institutional holdings are from Compact Disclosure database. To measure the level of concentration in an industry, the Herfindahl index is constructed using the market shares of all firms in the industry as defined by four digit SIC. Market shares of each rival = total sales for each rival/ total industry sales. The market share for each rival is then squared and summed.

On average, rival firms have insider holdings of 22.6% (median = 16.8%) and institutional holdings of 33.85% (median =29.69%) when a control threat in their industry is announced. The average Herfindahl index at the time of acquisition announcement is 0.38 (median=0.32). This indicates a relatively modest level of industry concentration. On average at the time of control threat announcement rival firms have a Tobin's q of 1.98 (median =1.27).

Table 2: Descriptive Statistics

	<b>Insider Holding</b>	<b>Institutional Holding</b>	<b>Herfindahl Index</b>	<b>Tobin's Q</b>
Mean	22.59	33.85	0.38	1.98
Median	16.83	29.69	0.32	1.27
N	4435	4402	511	4475

*Descriptive statistics for rival firms at the time of control threat are reported here.*

## UNIVARIATE ANALYSES OF CHANGES IN THE FINANCIAL RATIOS

This section examines changes in financial ratios of the industry rivals of initial takeover targets. Ratios are averaged for the two years prior and the two years after the control threat. The change in ratios from pre-control threat to post-control threat is reported. The following financial ratios are analyzed: OES (operating expense to net sales), OEA (operating expense to total assets), FCFA (free cash flow to total assets), CEA (cash and cash equivalents to total assets), CAPEXA (capital expenditures to total assets), leverage ("TDA") (total debt to total assets), and (LTDA) (long term debt to total assets). Operating expenses include cost of goods sold, and selling, general and administrative expenses. Free cash flow is defined as operating profit minus interest expenses, taxes and dividends.

### Complete Sample

Table 3 contains results for the complete sample of rival firms. Panel A reports analysis based on individual firm observations. In Panel B, ratios are averaged by the control threat before the statistical analysis. In this analysis, each control threat receives the same weight (rather than in proportion to the number of rival firms associated with a takeover bid) and the test statistics are unbiased. Table 3 and subsequent univariate analysis tables, report pre-control threat mean and median values for each ratio in the first column, post-control threat mean and median values of the ratio in the second column. In the third column, the change in the ratio from pre to post control threat is calculated for each firm. The mean and median value of the change is reported. To reduce the influence of outliers, the top and bottom 1 percent of observations for each ratio are removed. This reduces sample size to 4436 rival firms. The statistical significance of changes in financial ratios from paired t-tests (for means) and Wilcoxon sign-rank test for medians are reported.

First, the cash levels of the rivals are examined. Jensen (1976) argues that managers have incentives to expand the corporation beyond its optimal size. If the firm has excess funds it is likely that managers may invest in negative NPV projects. If rival firms want to mitigate the overinvestment problem, they should

reduce excess funds. On average, rival firms have a cash equivalent to total assets ratio of 18.38% (median =10%) two years prior to the control threat. In the two years after the control threat cash the ratio decreases by 7.3% on average (median = 3.39%). This decrease in cash level is statistically significant at 1% level. Changes in free cash flow levels subsequent to a control threat are also investigated. Rival firms on average generate cash flows of 3.69% of total assets (median =7.34%) before the control threat. The average free cash flow decreases to 2.87% (median =7.24%) after the control threat. Thus, the results suggest that rivals reduce their agency exposure by decreasing cash levels and cash flows available to managers.

Table 3: Changes in Financial Ratios of Rival Firms Following Takeover Bids

<b>Panel A: Individual Firm Observations</b>			
<b>Financial Ratios</b>	<b>Pre-Control Threat</b>	<b>Post-Control Threat</b>	<b>Change</b>
Cash and Equivalents/ Total Assets (CEA)	0.1838	0.1704	-0.0134***
	0.1004	0.0925	-0.0034***
Free Cash Flow / Total Assets (FCFA)	0.0369	0.0287	-0.0082 ***
	0.0734	0.0724	-0.0023***
Operating Expenses / Total Assets (OEA)	1.198	1.1884	-0.0096*
	1.0447	1.021	-0.0103***
Operating Expenses / Sales (OES)	1.1387	1.0556	-0.0831***
	0.9027	0.9063	-0.0007
Long term Debt / Total Assets (LTDA)	0.1415	0.1519	0.0104***
	0.0848	0.0966	0.0001 ***
Total Debt / Total Assets (TDA)	0.1948	0.2026	0.0078 ***
	0.1560	0.1643	0.0001**
Capital Expenditure / Total Assets (CAPEXA)	0.0632	0.0592	-0.0041***
	0.0481	0.0434	-0.0021 ***
<b>Panel B: Data Aggregated by Control Threat</b>			
	<b>Pre-Control Threat</b>	<b>Post-Control Threat</b>	<b>Change</b>
Cash and Equivalents/ Total Assets (CEA)	0.1305	0.1192	-0.0113***
	0.1012	0.0891	-0.0072***
Free Cash Flow / Total Assets (FCFA)	0.0546	0.0416	-0.0129 ***
	0.0685	0.0650	-0.0051***
Operating Expenses / Total Assets (OEA)	1.2509	1.2298	-0.0212***
	1.152	1.1497	-0.0189***
Operating Expenses / Sales (OES)	1.162	1.0123	-0.1499***
	0.9025	0.9063	-0.0002
Long term Debt / Total Assets (LTDA)	0.1741	0.1858	0.0117***
	0.1506	0.1661	0.0035***
Total Debt / Total Assets (TDA)	0.2305	0.2486	0.018***
	0.2068	0.2317	0.0072***
Capital Expenditure / Total Assets (CAPEXA)	0.0677	0.0616	-0.006 ***
	0.0558	0.0497	-0.004***

Panel A shows the individual firm analysis. Panel B presents ratios and tests aggregated by control threats (n=511). Rivals are defined as firms in the same four digits SIC industry at the time of the initial takeover attempt in the industry. Free cash flow is defined as operating profit minus interest expenses, taxes and dividends. Operating expenses include cost of goods sold, selling, general and administrative expenses. Ratios are averaged for the two years prior and the two years after the control threat. Means are listed in the first line and median in the second line. In the last column, the mean and median value of change in the ratios from the pre-control threat to post-control threat period is reported. Paired t-test for means and Wilcoxon signed-rank tests for medians are performed. \*, \*\*, \*\*\*, indicate significance at the 10, 5 and 1 percent levels respectively.

Next, the analysis turns to an examination of the extent to which rival firms take steps to improve operating efficiency. Trimbath, Frydman and Frydman (2002) conclude that cost inefficiency is a determinant of the risk of being a takeover target. I expect that rival firms will decrease their operating

expenses in response to control threats. Operating expenses are measured as the sum of cost of goods sold and selling general & administrative expenses. In Table 3, average operating expenses as percentage of total assets decline by 0.8% (median=0.99%) and average operating expenses to sales also decline in the post-control threat period. The changes are statistically significant.

Another interesting issue is whether rival firms increase their leverage and thereby reduce cash flows available for spending at the discretion of managers. On average, rival firms have a long-term debt to total assets ratio of 14.15% (median =8.48%) before the control threat, which increases to an average of 15.19 % (median = 9.66%) after the control threat. Total debt as percentage of assets also increases from an average of 19.48% (median=15.6%) to an average of 20.26 % (median=16.4%).

Finally, changes in the capital expenditure of rival firms are examined. Safieddine and Titman (1999) found that targets that increase their leverage ratios also reduce their capital expenditure. Consistent with the argument that agency problems are often present industry-wide, even rivals reduce capital expenditures in response to control threats. On average the capital expenditure to assets ratio of rival firms declines by 6.45% (median=4.37%). These changes are statistically significant.

The results in Panel B (data aggregated by control threat) are similar to those reported in Panel A. Rival firms reduce cash levels, cash flows, operating expenses and capital expenditures while they increase leverage. Overall, the evidence reported in Table 3 suggests that rival firms take steps to reduce their agency exposure and improve operating efficiency in response to a control threat in the industry.

## **UNIVARIATE ANALYSIS ACROSS PORTFOLIOS OF RIVAL FIRMS**

To test whether a specific subset of rival firms responds more to control threat, test for the univariate statistical significance of changes in financial ratios across sub-samples of acquisitions and rival firms are conducted. Rivals are categorized by the level of managerial ownership, institutional holdings, nature of the initial takeover bid (horizontal or non-horizontal), tender offers, degree of industry concentration, and investment opportunities (Tobin's q).

### Managerial Ownership

Jensen and Meckling (1976) argue that if managers hold a large fraction of outstanding firm shares then agency problems are less severe. However Morck, Schleifer and Vishny (1988) and Stulz (1988) suggest a nonlinear effect of managerial holdings. They argue that higher levels of managerial holdings entrench management from the discipline of market for corporate control. Song and Walkling (1993) document that takeover targets have lower managerial ownership than a control sample. Rival firms with low insider holdings and those with high insider holdings are expected to reduce agency problems in response to a control threat in their industry the most. Insider holdings (IH) is the total number of shares held in aggregate by all officers and directors divided by the number of shares outstanding as reported in the proxy statement in the year prior to the acquisition. In Table 4 rival firms are classified in to two groups based on the level of insider holdings (IH): IH< 5% (insider holdings is less than 5%) and IH>25% (insider holdings is greater than 25%), remaining firms have managerial ownership between 5% and 25%.

The results as reported in Table 4 indicate that rival firms in general decrease their cash levels and free cash flows. However, the percentage decrease in cash levels and cash flows are higher for the rivals with insider holdings greater than 25%. The average cash to assets ratio for rivals with IH<5% declines from 14.04% to 13.21% (a decline of 6%), while it declines by 9.2% for rivals with IH>25%. The median decline in cash to assets ratio for rivals with IH<5% is only 0.71% compared to a median decline of 5.2% for rivals with IH>25%. Similarly, while free cash flow to assets ratio for rivals with IH<5% witness a median increase of 0.52%, while rivals with IH>25% shows a median decline of 8.32%.

Table 4: Managerial Ownership and Rival Firm's Response to Control Threats

	Insider holding<5% (N=966)			Insider holding>25% (N= 1408 )		
	Pre-Control	Post-Control	Change	Pre-Control	Post-Control	Change
CEA	0.1404	0.1321	-0.0084***	0.1861	0.1689	-0.0171***
	0.0714	0.0721	-0.0005**	0.1076	0.0894	-0.0056***
FCFA	0.0530	0.0557	0.0026	0.0423	0.0284	-0.0138***
	0.0767	0.0804	0.0004***	0.0733	0.0697	-0.0061***
OEA	1.0697	1.0328	-0.0369***	1.3336	1.3151	-0.0185
	0.9396	0.8871	-0.0278***	1.1582	1.1484	-0.0051
OES	0.9652	0.9309	-0.0342**	1.0878	1.0311	-0.0568***
	0.8715	0.8678	-0.0042***	0.9152	0.9203	0.0027***
LTDA	0.1708	0.1841	0.0133***	0.1395	0.1518	0.0122***
	0.1432	0.1575	0.0001***	0.0704	0.0884	0.0001***
TDA	0.2177	0.2337	0.0161***	0.2046	0.2112	0.0066**
	0.1978	0.2164	0.0033***	0.1565	0.1691	0.0001
CAPEXA	0.0664	0.0621	-0.0043***	0.0657	0.0599	-0.0058***
	0.0538	0.0489	-0.0027***	0.0461	0.0412	-0.0026***

Rivals are firms in the same four digits SIC industry at the time of the initial takeover attempt in the industry. Means are listed in the first line and median in the second line. Ratios are averaged for the two years prior and the two years after the control threat. In the last column, the mean and median value of change in the ratios from the pre-control threat to post-control threat period is reported. Paired t-test for means and Wilcoxon signed-rank tests for medians are performed. \*, \*\*, \*\*\*, indicate significance at the 10, 5 and 1 percent levels respectively.

Rival firms decrease operating expenses in the two years after the control threat. This decline in operating expenses is higher and more significant for rivals with IH<5%. The median operating expenses to assets ratio for rivals with IH<5% decline from pre-control threat levels of 0.939 to 0.887 in the two years after the control threat. Rivals with IH<5% also reduce operating expense to sales ratio. Rival firms with IH<5% and those with IH>25% reduce their capital expenditure and increase leverage. The median decline in capital expenditure for rivals with IH< 5% and rivals with IH>25% is 5.09% and 5.62% respectively. The average increase in long-term debt to asset ratio for rivals with IH<5% is 7.77% compared to an average increase of 8.76% for rivals with IH>25%.

In sum, the univariate results indicate that while rivals with lower managerial ownership focus on increasing their operating efficiency, rival firms with higher managerial ownership reduce their agency exposure by decreasing cash levels and cash flows. However, rival firms irrespective of level of managerial ownership increase leverage and decrease capital expenditure in response to control threats.

### Institutional Holdings

In Table 5, rival firms are classified based on the level of institutional holdings. Managers in rival firms with higher institutional holdings (higher monitoring) are expected to be forced to improve performance and reduce agency exposure. The results indicate that rival firms with lower (below the median) institutional holdings experience a median decline of 3.12% in cash and equivalents as percentage of total assets and a median decline of 7.24% in free cash flow to total assets ratio in the two years after the control threat. The median cash and equivalents to total assets ratio declines from 11.86% to 10.89%, and the median free cash flow as percentage of assets declines from 5.39% to 5.04%. In comparison, rivals with higher (above the median) institutional holdings experience a median decline of 3.39% in cash and equivalents and 1.48% in free cash flow.

The operating expenses to total assets ratio, for rivals with high institutional holdings declines from a median value of 0.982 to a median value of 0.945. For rivals with high institutional holding, the median long term to debt to total assets ratio increases from 10.79% to 12.38%, and median total debt to assets



ratio also increases from 15.56% to 17.11%. For the rivals with lower institutional holdings, there is no significant change in operating expenses and leverage.

Table 5: Institutional Holdings and Rival Firm’s Response to Control Threats

	Below the median Institutional holdings			Above the median Institutional holdings		
	Pre-Control	Post-Control	Change	Pre-Control	Post-Control	Change
CEA	0.2018	0.1896	-0.0121***	0.1659	0.1526	-0.0133***
	0.1186	0.1089	-0.0037***	0.0854	0.0771	-0.0029***
FCFA	-0.0033	-0.01886	-0.0155***	0.0801	0.0776	-0.0025
	0.0539	0.0504	-0.0039***	0.0877	0.0860	-0.0013
OEA	1.2589	1.2712	0.0122	1.1322	1.1055	-0.0267***
	1.1216	1.117	0.0157	0.982	0.9452	-0.0211***
OES	1.5047	1.223	-0.2817***	0.9019	0.9143	0.0124***
	0.9361	0.9377	-0.0021	0.8723	0.8756	0.0006
LTDA	0.1271	0.1367	0.0097***	0.1539	0.1646	0.0106***
	0.0647	0.0673	0.0001	0.1079	0.1238	0.0001***
TDA	0.1946	0.2026	0.008***	0.1908	0.2019	0.011***
	0.1499	0.1559	0.0001	0.1556	0.1712	0.0001***
CAPEXA	0.0598	0.0541	-0.0057***	0.0661	0.0636	-0.0025***
	0.0413	0.0374	-0.0023***	0.0542	0.0492	-0.0022***

This table shows institutional holding and rival firm responses to control threats. \*, \*\*, \*\*\*, indicate significance at the 10, 5 and 1 percent levels respectively.

The results also indicate that irrespective of levels of institutional holdings rival firms decrease capital expenditures over the two years after control threat. Capital expenditure declines from a median value of 4.13% to 3.74% for rival firms with low institutional holdings and it declines from a median value 5.42% to 4.92% for those with high institutional holdings. In sum, the results indicate that rivals with high institutional holdings (higher external monitoring) take more steps to reduce their agency exposure.

### Industry Concentration

Song and Walkling (2000) predict that an acquisition in a highly concentrated industry lowers the probability of subsequent acquisitions due to anti-trust concerns. Consequently, rivals in less concentrated industries with higher probability of subsequent takeover attempts, are more likely to take steps to reduce agency problems. To examine how the degree of industry concentration affects rival’s response to control threats, the sales-based Herfindahl index is constructed for each industry at the time of the initial acquisition announcement. Higher index values indicate a higher degree of concentration in that industry. Results from this analysis are reported in Table 6. For this analysis firms are aggregated by the control threat, therefore the sample size is 511.

The results indicate that for rivals in less concentrated industries the decrease in cash levels and free cash flow over the two year after the control threat is more significant. The median cash and equivalents to total assets ratio declines by 8.02% from 11.96% before control threat to 10.37% after control threat for rivals in less concentrated industries, below the median Herfindahl index. In comparison, the cash and equivalents to total assets ratio for rivals in more concentrated industries, above the median Herfindahl index, declines by 6.29%. The free cash flow to total assets ratio for rivals in less concentrated industries declines from 6.48% to 6.01%, which is statistically significant at 1%. However, the change in free cash flow to total assets ratio for rivals in more concentrated industries is not statistically significant.

For rivals in less concentrated industries, the median operating expense to total assets ratio declines by 1.85% which is statistically significant at the 3% level. In comparison, for rivals in more concentrated

industries operating expense to total assets ratios decline by 1.46% which is statistically significant at the 7% level. Subsequent to control threats rival firms in both groups increase leverage. For rivals in less concentrated industries, long term debt to total asset ratios increase from a median value of 14.78% to 15.8% while for those in more concentrated industries, a increase from 15.69% to 16.99% occurs. Rival firms exhibit a similar increase in debt levels, with an average increase of 1% for both the groups. Finally, rival firms in both groups decrease capital expenditure in the two years after the control threat. The median capital expenditure to total assets ratio declines by 8.15% for rival firms in less concentrated industries and it declines by 7.03% for rivals in more concentrated industries. In sum, the results indicate that consistent with the acquisition probability hypothesis, rivals in industries with low concentration (higher probability of subsequent takeover attempts) take more steps to reduce their agency exposure.

Table 6: Industry Concentration and Rival Firm's Response to Control Threats

	Below the median Herfindahl Index			Above the median Herfindahl Index		
	Pre-Control	Post-Control	Change	Pre-Control	Post-Control	Change
CEA	0.1511	0.1391	-0.0119***	0.1137	0.1018	-0.0119***
	0.1196	0.1037	-0.0096***	0.0874	0.0781	-0.0055***
FCFA	0.0429	0.0328	-0.0099***	0.0615	0.0461	-0.0154
	0.0648	0.0601	-0.0051***	0.0757	0.0713	-0.0049
OEA	1.2654	1.2513	-0.0141	1.2509	1.2186	-0.0323**
	1.1523	1.1289	-0.0213**	1.152	1.1543	-0.0168
OES	1.643	1.813	0.17**	1.45	1.252	-0.198
	0.913	0.916	0.001	0.896	0.897	-0.001
LTDA	0.1668	0.1758	0.009***	0.1768	0.1927	0.0158***
	0.1479	0.1581	0.0011**	0.1569	0.1699	0.0084***
TDA	0.2265	0.2371	0.0106***	0.2476	0.2832	0.0357***
	0.2037	0.2097	0.0003	0.2176	0.244	0.0112***
CAPEXA	0.0655	0.0593	-0.0062***	0.07082	0.0643	-0.0065***
	0.0577	0.0506	-0.0047***	0.0541	0.0488	-0.0038***

*Herfindahl Index measures industry concentration. The ratios reported below are aggregated by control threats (n=511). Ratios are averaged for the two years prior and the two years after the control threat. In the last column, the mean and median value of change in the ratios from the pre-control threat to post-control threat period is reported. Paired t-test for means and Wilcoxon signed-rank tests for medians are performed. \*, \*\*, \*\*\*, indicate significance at the 10, 5 and 1 percent levels respectively.*

### Horizontal Acquisition

A horizontal acquisition may reduce the number of firms in an industry thereby increasing degree of concentration. This reduces further chances of acquisition attempts in the industry due to antitrust concerns. Thus, acquisition probability hypothesis predicts that rivals are more likely to take steps to reduce agency problems if the initial acquisition in the industry is not a horizontal merger.

Results of the analysis based on this classification of rivals are reported in Table 7. Rivals responding to horizontal acquisitions reduce their median cash to total assets ratio from 7.62% to 6.9%. The median decline is 2.36%. In comparison, rivals responding to non-horizontal acquisitions reduce their median cash to total assets ratio from 11.55% to 10.44% with a median decline of 3.9%. Similarly, the median decline of 3.88% in free cash flow to total assets ratio for rivals responding to non-horizontal acquisitions is higher and statistically significant as compared to a decline of 1.16% for rivals responding to horizontal acquisitions.

For horizontal acquisitions, rivals reduce the median operating expense to total assets ratio by 1.14%, which is statistically significant at 2% level. In comparison, median operating expense to total assets ratios for rivals responding to non-horizontal acquisitions declines by 0.96%, which is statistically

significant at 7% level. On average, the rival firms in both groups reduce their median capital expenditure by about 4.5% in the two years after the control threat. However, the results indicate that only rival firms responding to non-horizontal acquisitions increase leverage, which is statistically significant. Overall results in this section support the acquisition probability hypothesis.

Table 7: Type of Merger and Rival Firm's Response

	Horizontal Merger (N=1488)			Non Horizontal Merger (N=2948)		
	Pre-Control	Post-Control	Change	Pre-Control	Post-Control	Change
CEA	0.1509	0.1405	-0.0105***	0.2014	0.1863	-0.0151***
	0.0762	0.069	-0.0018***	0.1155	0.1044	-0.0045***
FCFA	0.0601	0.0532	-0.0068***	0.0218	0.0129	-0.0091***
	0.0771	0.0757	-0.0009	0.0722	0.0698	-0.0028***
OEA	1.1635	1.144	-0.0194**	1.218	1.2129	-0.0052
	1.0299	0.994	-0.0118**	1.0539	1.043	-0.0101
OES	0.9166	0.9072	-0.0094*	1.3524	1.1842	-0.1681***
	0.8905	0.8957	-0.0011	0.9106	0.913	-0.0003
LTDA	0.1623	0.1727	0.0104***	0.1325	0.1434	0.0108***
	0.1193	0.13903	0.0001**	0.0726	0.0827	0.0001***
TDA	0.2140	0.2196	0.0056*	0.1878	0.1973	0.00945***
	0.1880	0.1991	0.0001	0.1435	0.1519	0.0001**
CAPEXA	0.0698	0.0658	-0.0039***	0.061	0.0568	-0.00412***
	0.0519	0.0469	-0.0022***	0.0463	0.0419	-0.0022***

*Horizontal acquisitions are defined as cases where the initial industry target and its bidder have the same 4-digit SIC code. SIC codes for both target and bidder are obtained from SDC on-line Mergers and Corporate Transactions database as reported at the time of merger announcement. Ratios are averaged for the two years prior and the two years after the control threat. In the last column, the mean and median value of change in the ratios from the pre-control threat to post-control threat period is reported. Paired t-test for means and Wilcoxon signed-rank tests for medians are performed. \*, \*\*, \*\*\*, indicate significance at the 10, 5 and 1 percent levels respectively.*

### Tender Offers

Tender offers might indicate a greater confidence the part acquirers to improve the target firms performance. Agrawal, Jaffe, and Mandelker (1992) and Loughran and Vijh (1997) document higher (less negative) announcement period abnormal returns to bidders in tender offers compared to mergers. Martin and McConnell (1991) document a large turnover of target managers following tender offers, which suggests that such targets might be characterized by inefficient managers. Therefore, in Table 8 rival firms are classified based on whether the initial target was subject to a tender offer or a merger.

Results indicate that rivals responding to a tender offer in the industry reduce their median cash levels by a higher percentage (5.68%) compared to that for rivals responding to a merger attempt (2.73%) in the industry. However, rivals responding to a merger attempt in the industry reduce free cash flow by a higher percentage (3.28%) compared to rivals responding to a tender offer (1.92%) in the industry. Operating expenses to total assets ratio for rivals responding to a tender offer declines by 1.58% compared to a decline of 0.81% for rivals responding to a merger attempt.

Further, rivals responding to a tender offer increase leverage by a higher percentage compared to rivals responding to a merger attempt in the industry. For rivals responding to a tender offer, the long term debt to total assets ratio increases from a pre-control threat median value of 9.67% to a median value of 12.35% post-control threat. Similarly the median total debt to total assets ratio for rivals responding to a tender offer increases from 16.29% to 18.53%, which is statistically significant at 1% level, while the increase in total debt to total assets ratio for rivals responding to merger attempts is not statistically significant. Finally, capital expenditure as percentage of total assets decreases for both groups of firms.

Table 8: Tender Offers and Rival Firm's Response to Control Threats

	Tender offer (n=947)			Merger (n=3489)		
	Pre-Control	Post-Control	Change	Pre-Control	Post-Control	Change
CEA	0.1869	0.1684	-0.0185***	0.1846	0.1724	-0.0123***
	0.0968	0.077	-0.0055***	0.1026	0.0969	-0.0028***
FCFA	0.0385	0.0342	-0.0044	0.0325	0.0225	-0.0101***
	0.0731	0.0735	-0.0014	0.0731	0.0713	-0.0024***
OEA	1.2536	1.2272	-0.0265**	1.1904	1.1845	-0.0059
	1.097	1.0816	-0.0173**	1.0368	1.0125	-0.0084**
OES	1.1649	1.0932	-0.0716*	1.2108	1.0882	-0.1225***
	0.8996	0.9043	0.002	0.9045	0.9074	-0.0012
LTDA	0.1458	0.1696	0.0238***	0.1417	0.1485	0.0067***
	0.0967	0.1235	0.0001***	0.0829	0.0896	0.0001*
TDA	0.1998	0.2206	0.0209***	0.1957	0.2003	0.0046**
	0.1629	0.1854	0.0004***	0.1533	0.1593	0.0001
CAPEXA	0.0606	0.0556	-0.0049***	0.0646	0.0607	-0.0039***
	0.0481	0.0429	-0.0031***	0.0483	0.0436	-0.0019***

*Tender offers are cases as identified by SDC on-line Mergers and Corporate Transactions database. Ratios are averaged for the two years prior and the two years after the control threat. In the last column, the mean and median value of change in the ratios from the pre-control threat to post-control threat period is reported. Paired t-test for means and Wilcoxon signed-rank tests for medians are performed. \*, \*\*, \*\*\*, indicate significance at the 10, 5 and 1 percent levels respectively.*

However, for rivals responding to a tender offer the decrease in median capital expenditure to total assets is higher at 6.31% compared to a 3.93% increase for rivals responding to merger attempts. Overall, consistent with agency arguments results indicate that rival firms responding to a tender offer take more steps to reduce their agency exposure.

### Tobin's Q

Existing research has indicated that takeover targets are characterized by low Tobin's q and low insider holdings. Since firms with lower Tobin's q are more likely to face a takeover attempt, rivals with low Tobin's q are more likely to take steps to reduce agency problems after an acquisition attempt in the industry. In Table 9, firms are classified based on their Tobin's q at the time of control threat. Tobin's q is approximated by the sum of market value of equity and book value of debt, divided by the book value of assets.

Contrary to expectations, rival firms with higher Tobin's q reduce their cash levels and cash flows more significantly than firms with lower Tobin's q. Rival firms with higher Tobin's q reduce the median cash to total assets ratio by 5.43% compared to a decline of 1.48% for rivals with low Tobin's q. The median free cash flow to total assets ratio declines by 4.1% for rival firms with higher Tobin's compared to a decline of 1.92% for rivals with low Tobin's.

Moreover, rival firms with higher Tobin's q reduce their operating expenses to assets ratio by 3.02%. Both rival firms with higher Tobin's q and those with lower Tobin's q increase their leverage. In the presence of control threats, rival firms with higher Tobin's q are expected to take advantage of investment opportunities and increase capital expenditure. However, the results indicate that firms in both groups significantly decrease the capital expenditure to assets ratio over the post-control threat period. In sum, contrary to expectations, rival firms with higher Tobin's q take more steps to reduce agency exposure.

Table 9: Tobin's Q and Rival Firm's Response to Control Threats

	Above median Tobin's q (N=2218)			Below Median Tobin's q (N=2218)		
	Pre-Control	Post-Control	Change	Pre-Control	Post-Control	Change
CEA	0.2611	0.2369	-0.0241 ***	0.1087	0.1051	-0.0036
	0.1932	0.1618	-0.0105***	0.0539	0.0533	-0.0008**
FCFA	-0.0026	-0.0166	-0.0132***	0.0613	0.0557	-0.0056***
	0.0853	0.0784	-0.0035***	0.0677	0.0665	-0.0013*
OEA	1.1214	1.088	-0.0331***	1.2764	1.2888	0.0124*
	0.958	0.9225	-0.0289***	1.1255	1.1212	0.0067
OES	1.7494	1.3896	-0.3599***	0.9021	0.9056	0.0036*
	0.8894	0.8958	-0.0025	0.9114	0.9128	0.0004
LTDA	0.1145	0.1266	0.0121***	0.1708	0.18	0.0092***
	0.0481	0.0509	0.0001	0.1316	0.1449	0.0001***
TDA	0.1634	0.1736	0.0102***	0.2306	0.2371	0.0065***
	0.1016	0.1118	0.0001	0.2108	0.2202	0.0001*
CAPEXA	0.0661	0.0612	-0.0048***	0.0629	0.0569	-0.006***
	0.0525	0.0472	-0.0031***	0.0442	0.0398	-0.0021***

*Tobin's Q is approximated by the sum of market value of equity and book value of debt divided by the book value of assets. Ratios are averaged for the two years prior and the two years after the control threat. In the last column, the mean and median value of change in the ratios from the pre-control threat to post-control threat period is reported. Paired t-test for means and Wilcoxon signed-rank tests for medians are performed. \*, \*\*, \*\*\* indicate significance at the 10, 5 and 1 percent levels respectively.*

## CROSS-SECTIONAL ANALYSIS

Results from univariate analysis in previous sections suggests that rival firms with low or high managerial ownership, higher institutional holdings, those in less concentrated industries and those responding to non-horizontal takeovers improve their agency exposure and operating performance significantly. These results support the hypotheses that improvement in the operational and financial characteristics of rivals in the wake of a control threats would be greater for the rival firms with more agency problems before the initial takeover bid. To further explore this and to control for other factors driving the financial and operating characteristics of the firm, change in financial ratios are used as dependent variables and firm and industry characteristics associated with the probability of acquisition and agency problems are used as independent variables in the regression analysis.

As in previous sections, financial ratio changes are the difference between the ratios averaged over two years post-control threat and the same ratio averaged over the two years prior to the control threat. Control variables are as reported in the year the of control threat announcement. In each regression, the dependent variables are individual firm observations. To model dependence between observations for rivals of the same control threat, appropriate variance-covariance structure for the errors is used.

In the analysis hereafter, Pre-LTD is long-term debt to total asset ratios averaged for the two years prior to the control threat. Pre-CAPEX, Pre-OEA and Pre-Cash are respectively capital expenditure to total assets, operating expenses to total assets and cash and equivalent to total assets ratios, averaged for the two years prior to the control threat. IH5 and IH25 are dummy variables, which are equal to one if insider holdings are less than 5% and greater than 25%, respectively. LINST is a dummy variable equal to one for firms with below the median institutional holdings. Year dummies are included in all regressions (not reported). Low q is a dummy variable equal to one if Tobin's Q for rival firms is below the median. Ln(Size) is natural logarithm of market capitalization (price \* shares outstanding from CRSP, three months before the first bid), Firm age at the time of acquisition is computed from each firm's first CRSP listing date to the date of acquisition announcement, rounded to years. Herfindahl Index measures

industry concentration. Horizontal is a dummy variable equal to one for cases where the initial industry target and its bidder have the same 4-digit SIC code indicating a horizontal merger.

### Cash Levels and Rival Firms

It is expected that after the initial takeover attempt in the industry rivals with high levels of cash and free cash flows coupled with low Tobin's q, low, or high, managerial ownership, low institutional holdings, lower external monitoring by debt holders and poor operating performance will reduce excess funds which are a primary source of agency problems. Two alternate measures of excess funds, cash level and free cash flows, are used. Free cash flow is defined as operating profit minus interest expenses, taxes and dividends. Results with change in free cash flow to total asset as the dependent variable are qualitatively similar to those with change in cash and equivalents to total asset as dependent variable, hence the results are not reported here. To test this hypothesis, the following cross-sectional regression models for industry rivals of the targets is estimated:

$$\begin{aligned} \text{Change in financial ratio} = & a_0 + a_1 \ln(\text{Size}) + a_2 \text{Horizontal} + a_3 \text{Herfindahl index} + a_4 \text{Year dummies} + \\ & a_5 \text{Pre-Long term debt/ Total asset} + a_6 \text{Pre-Capital expenditure/ Total asset} + \\ & a_7 \text{Pre-Operating expenses/ Total asset} + \\ & a_8 \text{Pre-Cash and equivalents /Total asset} + \\ & a_9 \text{Low q} + b_1 \text{Insider Holding (IH) } < 5\% + b_2 \text{IH} > 25\% + b_3 \text{LINST} + \\ & b_4 \text{Low q} * \text{Pre-Cash and equivalents /Total asset} + \\ & b_5 \text{Low q} * \text{Pre-Cash and equivalents /Total asset} * \text{IH} < 5\% + \\ & b_6 \text{Low q} * \text{Pre-Cash and equivalents /Total asset} * \text{IH} > 25\% + \text{Error} \end{aligned} \quad (1)$$

The results with change in cash and equivalents to total asset as the dependent variable are reported in columns 1 and 2 of Table 10. Entries in the second-to-last row indicate that these regressions explain about 15% of the cross-sectional variations in the change in cash to assets ratio, using adjusted R-square. The last row indicates the number of rivals firms for which data is available. Dummy variables IH5 (=1 if IH is less than 5%), IH25 (=1 if IH is greater than 25%), low q (=1 if Tobin's is below median) and LINST (=1 if institutional holdings is below median) are introduced in the first regression. In subsequent regressions, dummy variable low q is interacted with the other dummy variables IH5, IH25 and pre-bid levels of cash and equivalent to total assets ratio. Because of high degrees of multicollinearity among the interaction variables and ownership variables, results from these regressions are reported separately.

The regression results indicate that rivals with higher levels of cash before the control threat significantly reduce cash levels after the control threat. In model 1, rival firms with high managerial ownership (IH>25%) and rival firms responding to a horizontal acquisition in the industry reduce cash levels as indicated by negative coefficients for corresponding variables. Contrary to predictions of the acquisition probability hypothesis, firms in more concentrated industries decrease cash levels significantly.

The coefficients on pre LTD is negative and significant indicating that rivals with a higher pre-bid long-term debt to assets ratio, indicating higher external monitoring, reduce cash levels. Rival firms with higher capital expenditures pre-takeover significantly reduce their cash levels. Results in model 1 also indicate rivals with low q decrease cash levels. Consistent with the agency arguments, the results in model 2 indicate that rival firms with low q and high pre-bid cash levels reduce their cash levels significantly. Overall, these results are consistent with univariate analysis. Rival firms with few investment opportunities reduce cash levels. More importantly, rivals with few investment opportunities and higher levels of cash pre-takeover, indicating higher agency exposure, reduce their cash levels and free cash flows significantly post control threat.

Table 10: Rival Firm Characteristics and Change in Cash Levels and Operating Efficiency

	Change in Cash Levels		Change in Operating Expense	
	1	2	3	4
Intercept	0.0717***	0.0717***	0.1835***	0.2381***
ln(Size)	-0.0005	-0.0018**	-0.0138***	-0.0186***
Horizontal	-0.0097***	-0.0102***	-0.0075	-0.0061
Herfindahl Index	-0.0338***	-0.0339***	-0.0007	0.0015
Pre LTD	-0.0103	-0.0157	0.0473	0.0561*
Pre CAPEX	-0.0834***	-0.0837***	-0.2724***	-0.2924***
Pre OEA	0.0026	0.0019	-0.0942***	0.0944***
Pre Cash	-0.2588***	-0.2288***	0.0664	0.0176
Low q	-0.0163***		0.0542***	
Low q * Pre Cash		-0.0757**		0.1176
Low q * Pre Cash * IH5		-0.0408		-0.0319
Low q * Pre Cash * IH25		-0.0404		-0.0601
IH5	-0.0069		-0.0168	
IH25	-0.0111***		-0.0053	
LINST	0.0099**		0.0063	
R-SQUARE	0.15	0.12	0.35	0.35
N	4402	4402	4402	4402

*This table reports results from the regression model where the dependent variables are the change in cash and equivalent to total assets ratio in model 1 and 2 and the change in operating expenses to total assets ratio from the pre-control threat to post-control threat periods in model 3 and 4. Ratios for each rival firm are averaged for the two years prior and the two years after the control threat before calculating the change. Significance test have been adjusted to reflect the lack of independence of observations associated with the same control threat, \*, \*\*, \*\*\*, indicate significance at the 10, 5 and 1 percent levels respectively.*

### Operating Efficiency and Rival Firms

Following an initial takeover attempt in the industry, it is expected that rivals with more symptoms of agency problems will reduce wasteful expenditure and improve their operating efficiency. Operating efficiency is measured by the operating expense ratio, operating expense divided by assets. Change in the operating expense ratio as dependent variable in regression equation (1). The results of this analysis are reported in columns 3 and 4 of Table 10.

One would expect that industry rivals with more agency symptoms as indicated by high levels of cash and free cash flows coupled with low investment opportunities, low or high managerial ownership, low institutional holdings, lower external monitoring by debt holders and poor operating performance to reduce their operating expenses. The results indicate that large rival firms decrease the operating expenses to asset ratio after the control threat. Contrary to expectations, rival firms with low q increase operating expenses. The results indicate that firms with high capital expenses before a control threat reduce operating expenses significantly subsequent to the control threat. Further, rivals with high operating expenses in pre-bid period, reduce operating expenses post control threat.

### Leverage and Rival Firms

As noted earlier, Jensen (1976) argues that when managers issue debt in exchange for stock, they are bonding their promise to payout future cash flows that cannot be accomplished by a simple dividend increase. Thus, additional debt reduces the agency costs of free cash flows by reducing future cash flows available for spending at the discretion of managers. Lang, Ofek and Stulz (1996) document evidence suggesting that increased debt induces firms to invest less, especially firms with low q. Based on this evidence, one would expect rivals in general and those with high levels of cash and free cash flows

coupled with low  $q$ , low managerial ownership, low institutional holdings, lower external monitoring by debt holders and poor operating performance in particular, to increase the degree of leverage in response to an acquisition attempt in the industry. To test this argument, the change in leverage ratio is used as the dependent variable in regression equation 1. Results of this analysis are reported in Table 11.

Table 11: Rival Firm Characteristics and Change in Leverage

	Change in Debt	
	1	2
Intercept	0.0357***	0.0507***
ln(Size)	0.0022	0.0019
Horizontal	0.0022	0.0031
Herfindahl Index	-0.0023	-0.0001
Pre LTD	-0.3153***	-0.3134***
Pre CAPEX	0.1074***	0.1028***
Pre OEA	-0.0114***	-0.0114***
Pre Cash	-0.0447***	-0.0563***
Low $q$	0.0124**	
Low $q$ * Pre Cash		-0.0271
Low $q$ * Pre Cash * IH5		0.0276
Low $q$ * Pre Cash * IH25		0.0387
IH5	0.0133	
IH25	0.0101**	
LINST	-0.0018	
R-SQUARE	0.14	0.13
N	4402	4402

*This table shows results from the regression model where the dependent variable is the change in long-term debt to total assets ratio from the pre-control threat to post-control threat periods. Year dummies are included in all regressions (not reported). P-values (reported next to coefficients in parentheses) have been adjusted to reflect the lack of independence of observations associated with the same control threat.*

Existing research has documented that firms with entrenched managers have low levels of debt and they increase leverage in response to a control threat. Consistent with this evidence, the results here indicate that firms with higher insider ownership (IH25) increase leverage. A negative and significant coefficient on *Pre LTD* indicates that rivals with higher (lower) levels of debt reduce (increase) long-term debt. Rival firms with high levels of capital expenditures increase leverage. However, rivals with higher cash and those with higher operating expenses reduce leverage subsequent to the control threat. The results also suggest that rivals with fewer investment opportunities increase their leverage.

#### Change in Leverage and Response of Rival Firms

Safieddine and Titman (1999) find that on average targets that terminate takeover offers significantly increase their leverage ratio. These targets which increase their leverage ratio also reduce their capital expenditure, downsize in terms of assets and employment and their cash flows and stock returns outperform the benchmark in the following 5 years. They argue that the increase in leverage by a target in response to a takeover attempt is not a defensive mechanism but it increases the credibility of a target manager's promise to improve performance. To explore whether this findings holds for rival firms, change in cash levels, operating expenses and capital expenditure from pre to post takeover threat are regressed against change in leverage. All ratios are computed as explained in previous sections.

The Results are reported in Table 12 and suggest that Safieddine and Titman (1999) findings for target firms holds up for rival firms as well. Rival firms with higher increase in leverage in two years



subsequent to initial takeover attempt in industry are found to significantly reduce their cash levels, operating expenses and capital expenditure. This suggests managers of rival firms commit to improving long-term performance of the firm.

Table 12: Change in Leverage and Change in Operating and Financial Performance

	Change in Cash Levels	Change in Operating	Change in Capital
Intercept	-0.0129 ***	-0.0076	-0.0046*
Change in long term debt	-0.1463***	-0.1311***	-0.0144***
R-SQUARE	0.03	0.01	0.06
N	4402	4402	4402

## CONCLUSION

Song and Walkling (SW) (2000) find that rivals of initial targets earn abnormal returns because of an increased probability that they themselves will be targets. Existing takeover literature suggests that removal of inefficient management to improve operating performance is one of the key underlying motives for takeovers. Thus, poorly performing firms are more likely to be the target of a takeover attempt following an initial takeover announcement in their industry. This paper investigates whether the managers of rival firms act to mitigate their agency exposure when one a firms in the industry is subject to a takeover attempt. Specifically, this research investigates if (a) the agency symptoms of rival firms improve following the announcement of a control threat in their industries (b) these improvements are related to the level of the agency problems of rival firms in the pre-takeover bid period.

The results indicate that the rival firms in general decrease cash levels and free cash flows, reduce operating expenses and capital expenditures and they increase leverage in response to a control threat in the industry. Consistent with the agency arguments underlying the acquisition probability hypothesis, results indicate that the rival firms with few investment opportunities and high cash or high free cash flows reduce cash levels and free cash flows subsequent to a control threat in their industry. In addition, rivals with high managerial ownership increase leverage and reduce free cash flow in response to a control threat. The results also indicate that rivals, which increase leverage in response to a control threat also, reduce their cash levels, cash flows, capital expenditure and operating expenses.

Overall, the evidence supports the argument that takeovers act as an effective external control mechanism for managers and that they have industry wide effects. Rival firms take steps to reduce their agency exposure and improve operating efficiency in response to a control threat in the industry. This research looks at only one possible reaction from rival firms. However, it is possible managers of some rival firms will not improve their operating performance and entrench themselves more by using takeover defenses. This and other possible responses from rival firms can be subject of future research.

## REFERENCES:

- Agrawal, A., J. F. Jaffe and G. N. Mandelker, 1992, "The Post-Merger Performance of Acquiring Firms: A Re-examination of an Anomaly," *Journal of Finance* 47, 1605-1621.
- Akhigbe, A., S.F. Borde, A.M. Whyte, 2000. The source of gains to targets and their industry rivals: evidence based on terminated merger proposals. *Financial Management* Winter, 101-118.
- Banerjee, A., E. W. Eckard, 1998. Are mega-mergers anticompetitive? Evidence from the first great merger wave. *RAND Journal of Economics* 29, 803-827.

Berger, P., and E. Ofek (1999), Causes and effects of corporate refocusing programs, *Review of Financial Studies* 12, 311–345.

Denis, David J., Diane K. Denis, and Atulya Sarin, 1997, Ownership structure and top executive turnover. *Journal of Financial Economics* 45, 193-221.

Eckbo, E. B., 1983. Horizontal mergers, collusion, and stockholder wealth. *Journal of Financial Economics* 11, 241-273.

Eckbo, E. B., 1985. Mergers and the market concentration doctrine: evidence from the capital market. *Journal of Business* 58, 325-349.

Hasbrouck, J., 1985, The Characteristics of Takeover Targets: q and Other Measures. *Journal of Banking and Finance*, 9 (1985), 351-362.

Healy, P. M., K. G. Palepu and R.S. Ruback, 1992. Does corporate performance improve after mergers? *Journal of Financial Economics* 31, 135-176.

Jensen, Michael C., 1976, Agency costs and free cash flow, corporate finance and takeovers. *American Economic Review* 76, 659-665.

Jensen, Michael C. and William H. Meckling, 1976, Theory of the firm: Managerial behavior, agency costs and ownership structure. *Journal of Financial Economics* 3, 305-360.

Lang, L., E. Ofek, R.M. Stulz, 1996. Leverage, investment and firm growth. *Journal of Financial Economics* 40, 3-29.

Lang, L., R. M. Stulz, 1992, Contagion and competitive intra-industry effects of bankruptcy announcements. *Journal of Financial Economics* 32, 45-60.

Lang, L., R. M. Stulz, and R. A. Walkling, 1989, Managerial performance, Tobin's Q, and the gains from successful tender offers. *Journal of Financial Economics*, 24, 137-154.

Lie, Erik, 2000, Excess funds and agency problems: An empirical study of incremental cash disbursements. *Review of Financial Studies* 13, 219–248.

Loughran, Tim and Anand Vijh, 1997, Do long-term shareholders benefit from corporate acquisitions? *Journal of Finance* 52, 1765-1790.

Martin, Kenneth and John McConnell, 1991, Corporate performance, corporate takeovers, and management turnover, *Journal of Finance* 46, 671-687.

Mitchell, M. L., J. H. Mulherin, 1996. The impact of industry shocks on takeover and restructuring activity. *Journal of Financial Economics* 41, 193-229.

Morck, R.; A. Shleifer; and R. W. Vishny, 1988, Characteristics of targets of hostile and friendly takeovers. In *Corporate Takeovers: Causes and Consequences*. A.J.Auerbach, ed. Chicago, IL: University of Chicago Press, 101-129.

Safieddine, Aseem and Sheridan, Titman, 1999, Leverage and corporate performance: Evidence from unsuccessful takeovers, *Journal of Finance* 54, 547-580.

Schwert, G. William, 2000, Hostility in takeovers: In the eye of beholder? *Journal of Finance* 55, 2599-2640.

Shahrur, Husayn, 2005, Industry structure and horizontal takeovers: Analysis of wealth effects on rivals, suppliers and corporate customers. *Journal of Financial Economics* 76, 61-98.

Servaes, H., 1991, Tobin's q and the gains from takeovers. *Journal of Finance* 46, 409-419.

Servaes, H., Ane Tamayo, 2007, The response of industry rivals to control threats, *Working paper*.

Song, M. H. and Ralph A. Walkling, 1993, The impact of managerial ownership on acquisition attempts and target shareholder wealth, *Journal of Financial and Quantitative Analysis* 28, 439-457.

Song, M. H. and Ralph A. Walkling, 2000, Abnormal returns to rivals of acquisition targets: a test of the "acquisition probability hypothesis." *Journal of Financial Economics* 55, 143-171.

Stillman, R., 1983, Examining antitrust policy towards horizontal mergers. *Journal of Financial Economics* 11, 225-240.

Stulz, R.M., 1988, Managerial control of voting rights: Financial policies and the market for corporate control. *Journal of Financial Economics* 20, 25-54.

Trimbath, S; Frydman, H; and Frydman, R., 2001, Cost inefficiency, size of firms and takeovers. *Review of Quantitative Finance and Accounting*, 17(4), 397-420

Williamson, Oliver E., 1963, Managerial discretion and business behavior. *The American Economic Review* 53, 1032-1057.

## **ACKNOWLEDGEMENT**

I thank Dr. Shantaram Hegde, and seminar participants at University of Connecticut, Sacred Heart University, 2006 annual meeting of Eastern Finance Association and 2006 annual meeting of Financial Management Association for valuable comments and suggestions. This research is supported by University Research and Creativity Grant from Sacred Heart University.

## **BIOGRAPHY**

Dr. Rupendra Paliwal is an Assistant Professor of Finance at Sacred Heart University. He earned his Ph.D. in finance from University of Connecticut. His research interests include Market Microstructure, Agency Theory, Mergers and Acquisitions. Prior to pursuing his Ph.D. Rupendra was an Officer with National Stock Exchange of India. He can be contacted at John F. Welch College of Business, 5151 Park Avenue Fairfield, CT, US. Email: paliwalr@sacredheart.edu.