

Do Takeover Targets Overinvest?

Henri Servaes

University of North Carolina

I examine the capital expenditures of a sample of 700 takeover targets and firms that went private over the period 1972-1987. For the complete sample, I do not find evidence that takeover targets increase their capital expenditures over the four-year period before the acquisition or that they overinvest in capital expenditures relative to several benchmarks. Subsample results provide some evidence of overinvestment in oil and gas firms and large firms. There is no evidence of overinvestment, however, for firms acquired in a hostile takeover or firms that went private. In general, these results are not consistent with the conjecture that takeovers are motivated by the need to reduce excess investment in capital expenditures in target firms.

The free cash flow theory [Jensen (1986)] suggests that managers may be unwilling to distribute the corporation's free cash flow to the holders of the equity claims on the firm. Instead, managers prefer to reinvest the funds in projects with a negative net present value, which increases the size of the firm and the

Some of this work was completed while the author was visiting the Graduate School of Business of the University of Chicago and the Katholieke Universiteit Leuven, Belgium. I would like to thank Becky Amos, Brad Barber, Richard Green (the editor), Steve Kaplan, Randy Kroszner, Gershon Mandelker, John McConnell, Mark Mitchell, Dennis Sheehan, Andrei Shleifer, Cynthia Van Hulle, Rob Vishny, Marc Zenner, an anonymous referee, and seminar participants at the London Business School, Southern Methodist University, the University of Chicago, the University of North Carolina at Chapel Hill, the University of Texas at Austin, and the University of Wisconsin for helpful discussions and comments. An earlier version was presented at the 1993 meetings of the American Finance Association. Address correspondence to Henri Servaes, Kenan-Flagler Business School, University of North Carolina, Carroll Hall, CB 3490, Chapel Hill, NC 27599.

utility of the managers.¹ Under this scenario, takeovers act as a disciplining device. After the takeover, capital expenditures can be cut and prior investment decisions can be reversed. Alternatively, the firm is taken private in a leveraged buyout. The large increase in indebtedness of the LBO firm reduces the available free cash flow and mitigates the associated agency costs.

The evidence in support of these predictions is mixed. On the one hand, Kaplan (1989) and Smith (1990) document large cuts in capital expenditures, relative to their industry, for firms that went private in a management buyout. On the other hand, Healy, Palepu, and Ruback (1992), who examine the 50 largest acquisitions in the United States over the period 1979-1984, find no changes in capital expenditures after the takeover. Related evidence is presented by Bhagat, Shleifer, and Vishny (1990). They examine the aftermath of 62 hostile acquisitions in 1984, 1985, and 1986 and identify at most nine cases where investment cuts may have been important. Moreover, it is not clear whether investment cuts eliminate poor projects or value enhancing investments. That is, managers may decide to reject positive net present value projects because the funds required for the projects are needed to service the corporation's debt.

This paper attempts to resolve some of the debate through the examination of the investment outlays before the control change of takeover targets and firms that go private. I compare the capital expenditures of 700 firms, which were taken over or went private during the 1972-1987 period, against several benchmarks to gauge whether these firms overinvest systematically. I find no evidence of overinvestment when the target firm's industry is used as the benchmark. This result is unchanged after controlling for the investment opportunity set of the targets. In addition, there is no relation between the abnormal returns of target firms and measures of overinvestment and industry investment. After dissecting the sample, I find no evidence of overinvestment for targets in hostile takeovers for firms that went private or for the subset of takeovers that took place during the 1980s. There is some evidence, however, of overinvestment for the larger firms in the sample and for companies operating in the oil and gas industry. This evidence suggests that cuts in capital expenditures may be a source of value creation in takeovers only in a limited number of cases.

The article proceeds as follows. Section 1 reviews the debate and evidence regarding the investment behavior of takeover targets. Sec-

See Stulz (1989) for a model where managers derive utility from investing and, therefore, have an incentive to maximize the size of the firm. Baumol (1959) also suggests that managers strive to maximize firm size. Donaldson (1984) presents empirical evidence in support of this claim.

tion 2 describes the methodology employed to examine the capital expenditures. Section 3 contains the sample selection procedure. Section 4 presents the results, Section 5 contains some sensitivity analysis, and Section 6 concludes.

1. Capital Expenditures and Takeovers

Jensen (1986) argues that free cash flow, which is the cash flow in excess of that required to fund all positive net present-value projects, causes conflicts of interest between managers and shareholders. Managers who act in the interest of shareholders distribute the free cash flow to the shareholders. Any failure to do so is not in the best interest of shareholders since the rate of return earned on additional investment projects is below the opportunity cost of capital. Managers who prefer to maximize their own utility, however, may refuse to hand over control of these funds to the shareholders, because paying out cash reduces the size of the firm and the resources under managerial control.² As a result, free cash flow may be invested in unprofitable projects. Some of these projects may be developed internally,³ and others may involve the acquisitions of another company, often in unrelated industries. While such projects reduce shareholder wealth, they increase the private benefits of the managers. Morck, Shleifer, and Vishny (1990) present evidence consistent with this conjecture when applied to acquisitions. When an acquiring firm pursues objectives that increase the manager's personal benefits, such as growth or diversification, its shareholders lose. Lang, Stulz, and Walkling (1991) present related evidence. Bidders with large amounts of free cash flow and poor internal investment opportunities, as proxied by a low Q ratio, have large negative returns when they announce acquisitions.

This line of thought also suggests a positive role for takeovers. Firms that have made poor investment decisions in the past can be taken over, senior managers can be fired,⁴ and investment decisions can be reversed. Similar objectives can be obtained through a leveraged buyout. The funds required to service the high level of debt associated with such transactions reduce the available free cash flows. Furthermore, the substantial equity position held by managers in the post-buyout company reduces management's incentives to maximize their private benefits at the shareholders' expense.

² Of course, this analysis assumes that perfect mechanisms to align the interests of managers and shareholders are not in place.

³ RJR Nabisco's development of Premier, the smokeless cigarette, is often cited as a pet project of Ross Johnson [see Burrough and Helyar (1990)].

⁴ Takeovers are often associated with turnover in senior management. Martin and McConnell (1991) report turnover in senior management for 141 out of 253 takeovers over the 1958-1984 period.

There is evidence to support the notion that firms that make poor acquisitions are more likely to be taken over themselves. Mitchell and Lehn (1990) study the acquisitions by 1158 firms listed on Value Line at the end of 1981. Of the 280 firms in their sample that made acquisitions, 77 firms became takeover targets themselves and 166 did not become takeover targets.^{5,6} The difference in the acquisition performance of these two groups is striking. The stock prices of non-targets increased by 3.5 percent, on average, when they announced an acquisition while the stock prices of target firms decreased by 3.5 percent. In addition, Mitchell and Lehn find that acquisitions are more likely to be divested when the announcement returns are negative. These divestitures are either done on a voluntary basis, or they are the result of a completed or attempted takeover. These results support the notion that takeovers are motivated, at least partially, by the need to undo poor investment decisions made by target firms.

Other evidence on the investment behavior of takeover targets is presented by Kaplan (1989), Smith (1990), Healy, Palepu, and Ruback (1992) and Bhagat, Shleifer, and Vishny (1990). These articles provide evidence on the capital expenditures of takeover targets and firms that go private. Kaplan (1989) and Smith (1990) document substantial reductions in the capital expenditures of firms after they go private in a management buyout (MBO). Kaplan reports industry adjusted decreases in capital expenditures of 36 percent from one year before to one year after the MBO and industry-adjusted decreases of 33 percent from one year before to two years after the MBO. The cuts reported by Smith are somewhat smaller. Interestingly, however, both Kaplan and Smith also report a significant reduction in capital outlays in the year before the MBO takes place. Kaplan reports that, on an industry-adjusted basis, capital expenditures are reduced by 8 percent from two years to one year prior to the control change. Smith reports a 5.5 percent cut over the same period. There are at least three possible interpretations for this result. It may be that the firm simply has fewer good projects available. An alternative interpretation is that good projects are being omitted, either because the firm is cash constrained or because this will deflate the value of the firm, which will allow managers to take the company private at a lower price. A third possible explanation is that fewer value-destroying investments are being made. The latter interpretation casts doubt upon the MBO as the mechanism that triggers the investment cuts and would suggest that the correlation between MBOs and investment

⁵ Firms that go through a leveraged buyout are also considered takeover targets.

⁶ Thirty-eight firms are classified into a miscellaneous category because they pay greenmail, file for bankruptcy, or are significantly restructured, without being the target of a takeover attempt.

cuts is spurious. Of course, the post-MBO cuts are a lot more substantial than the pre-MBO cuts, which suggests that the MBO triggers more material changes.

Healy, Palepu, and Ruback (1992) study the pre- and postmerger performance for the 50 largest acquisitions of public U.S. companies from 1979 to 1984. Their results show modest operating improvements of the new entity after the acquisition. However, since capital expenditures are not cut relative to the industry, the improvements do not appear to be caused by the elimination of excess investments.

Bhagat, Shleifer, and Vishny (1990) present a detailed examination of the operational changes that took place in 62 firms after they were targets of hostile takeover attempts during 1984, 1985, or 1986. They conclude that investment cuts are important in explaining the takeover premium in at most nine cases. Conclusive evidence of overinvestment before the takeover is only prominent in three takeovers, all in the petroleum industry. Bhagat et al. (1990) argue that "The conspicuous absence of such discussions (about investment cuts) for most other industries might indicate that investment cuts are simply unimportant" (p. 54). Another important issue raised by Bhagat et al. is that posttakeover investment cuts do not necessarily imply overinvestment. Capital expenditures may be curtailed because of liquidity constraints, even if this means foregoing positive net present-value projects.

Firms may also overinvest in other assets, such as inventories, or in employees. Having more employees may also increase the prestige and utility of managers. Evidence regarding overinvestment in other assets is limited. Smith (1990) reports that firms reduce their inventory holding period after MBOs. This result is consistent with the idea that firms had "overinvested" in inventories prior to the MBO. Several studies examine employment following takeovers. Brown and Medoff (1988) examine postacquisition employment for a sample of Michigan firms. They find increases in employment and decreases in wages for a sample of mergers and the opposite pattern for a sample of asset sales. Rosett (1990) examines union wage concessions after takeovers. They are not significantly different from zero. Kaplan (1989) analyzes employment changes following MBOs, but finds no significant declines for those firms that had little divestiture activity after the buyout.

2. Methodology

The question I address is whether the capital expenditures of takeover targets are too high given the set of positive net present-value projects available. Thus, if overinvestment in other assets or in employees is

more prominent than overinvestment in capital expenditures, my tests will not pick it up.

To investigate the investment policy of takeover targets, I have two basic methods at my disposal. Event-study methodology can be employed to study the abnormal stock-price performance at the announcement of investment decisions [see McConnell and Muscarella (1985)]. This is the technique employed by Mitchell and Lehn (1990) to determine whether firms that make poor acquisitions are more likely to become takeover targets themselves. This methodology has two major drawbacks. First, with the exception of acquisitions, few investment decisions are formally announced, which severely limits the number of observations available for study.⁷ Many of the investment outlays are also small in relation to the market value of the firm, which makes it difficult to detect abnormal stock-price movements. Second, because investment decisions are announced on a voluntary basis, event-study results may be biased toward positive returns.

To overcome these drawbacks, I compare the capital expenditures of takeover targets to those of the other firms in their industry.⁸ The distinguishing feature of this study is that I examine levels of capital expenditures prior to the takeover announcement, while previous work has concentrated on changes from the pretakeover to the post-takeover period. In addition, I examine a sample of acquisitions that is considerably larger than the samples used in previous work, which allows for more general conclusions.

Industry statistics are computed using all firms that are listed on the Compustat database and have the same four-digit SIC code as the target firm.⁹ Capital expenditures for year t are divided by assets at the end of year $t - 1$ to make the expenditures comparable for different size firms.^{10,11} In further analyses, I also control for differences

⁷ Denis (1992) uses this methodology to study the investment decisions of 192 firms that subsequently go through a leveraged buyout. However, acquisition announcements dominate his sample.

⁸ This method is employed by Kaplan (1989), Smith (1990), and Healy, Palepu, and Ruback (1992).

⁹ As a sensitivity test, I excluded all Compustat firms with a market value of less than \$100 million (1987 dollars) when computing industry statistics. Compustat may only include small firms after they have been successful for a period of time, which may lead to an upward bias in the level of capital expenditures of the industry. Excluding the smaller Compustat firms does not change the results of the article.

¹⁰ Healy, Palepu, and Ruback (1992) use a similar definition to compute the capital expenditure rate. Smith (1990) uses sales to deflate and compare capital expenditure levels across different size firms. Kaplan compares the raw level of capital expenditures as well as the level of capital expenditures scaled by assets and sales. He finds significant declines in industry-adjusted capital expenditures after MBOs only when the raw level of capital expenditures is used or when capital expenditures are divided by sales. When capital expenditures are deflated by assets, on the other hand, the decline in capital expenditures after the MBO is small and not statistically significant. To examine the sensitivity of my results to the use of deflator, I replicated all my results using sales as a deflator. The conclusions remain unchanged. These results are not reported here but are available from the author upon request.

in the investment opportunity set of firms by estimating the following investment equation for all companies on the Compustat database:

$$\text{CAP}_{jt} = \mathbf{b}\mathbf{X}_{jt-1} + c\text{TO}_j + \epsilon_{jt}, \quad (1)$$

where CAP_{jt} is the capital expenditures rate of firm j at time t , $\mathbf{X}_{jt-1}$ is a matrix of explanatory variables observed at time $t - 1$, $\mathbf{b}$ is the estimated matrix of regression coefficients, and TO_j is an indicator variable, equal to 1 if the firm becomes a takeover target in subsequent years and 0 otherwise. If takeover targets invest more than appropriate, we expect the regression coefficient of this indicator variable, c , to be positive and significant. Industry dummies are also added to the estimated model, together with interaction terms between the explanatory variables and the industry dummies. To assess whether targets in particular industries have capital expenditures higher than appropriate, I also include interaction terms between the industry dummies and the takeover dummy.

Initially, the only variable used to predict investment is Tobin's Q .¹² Under certain conditions [see Hayashi (1982)], the Q ratio is sufficient to determine how much the corporation should invest.¹³ These conditions (the use of constant returns to scale technology, price-taking behavior, and perfect capital markets) are unlikely to hold for all industries. However, as long as Q can explain some of the within-industry variation in investment, the use of this investment equation improves the simple comparison with the industry average. Tobin's Q is computed using the Lindenbergh and Ross (1981) algorithm with the specific assumptions of Hall et al. (1988). Capital expenditures are obtained from the Compustat database (data item 128) for the four-year period before the initial announcement of the takeover.

3. Sample Selection

A sample of successful takeovers is compiled from the firms delisted from the CRSP NYSE/AMEX database for the 1972-1987 period. I

¹¹ For firms that make large acquisitions or divestitures during year t , dividing by assets at the end of year $t - 1$ is not appropriate since this asset measure is not adjusted for the effect of the acquisitions or divestitures, whereas capital expenditures do reflect this effect. To examine whether my results are sensitive to this problem, I scaled capital expenditures in year t by assets at the end of year t and also by the average of assets at the end of year $t - 1$ and year t . Changing the capital expenditure measure as such does not affect the results.

¹² Sensitivity analysis with respect to explanatory variables employed in the investment equation is discussed in Section 5.

¹³ Hoshi, Kashyap, and Scharfstein (1990,1991) and Lang, Stulz, and Walkling (1991) also use average Q as a measure of the investment opportunity set of the firm. Hoshi et al. use average Q as one of several explanatory variables.

Table 1
Distribution of takeover targets by year of takeover

Year of takeover	Number of targets	Hostile targets	Going-private transactions
1971	5	0	0
1972	16	1	0
1973	23	2	0
1974	16	4	1
1975	21	5	0
1976	39	7	2
1977	65	13	3
1978	66	8	3
1979	67	14	2
1980	55	10	8
1981	59	13	10
1982	46	8	14
1983	48	7	15
1984	64	13	14
1985	49	10	17
1986	50	8	10
1987	11	1	0
Total	700	124	99

The sample of takeovers is obtained from the CRSP Tape delistings. Firms in regulated industries (SIC codes starting with 4, 6, or 9) are eliminated. Additional data requirements: (i) four years of Compustat information, (ii) *Wall Street Journal* announcement, (iii) CRSP data to compute market model parameters. Year of takeover refers to the year in which the takeover is announced.

impose several additional data requirements. First, firms in regulated industries are eliminated. In particular, firms with SIC codes beginning with 4 (transportation and communication companies and utilities), 6 (financial companies), and 9 (public administration companies) are excluded from the sample. Second, the acquisition has to be announced in the *Wall Street Journal*. Third, balance sheet information for at least four years prior to the announcement has to be available on the Compustat database. This requirement allows for a time-series study of the capital expenditure outlays of the takeover targets. Fourth, sufficient returns data have to be available on the CRSP database to compute market-model parameters and abnormal returns during the takeover process. The latter requirement is imposed to determine whether a relation exists between the takeover gains and the extent of overinvestment. I also determine from the *Wall Street Journal* whether the takeover is hostile and whether the firm is going private through a leveraged buyout.

My final sample consists of 700 takeovers. Table 1 contains a frequency distribution of the acquisitions by year of announcement. Except for the upward shift in the late 1970s, there is no trend in the number of takeovers in my sample.¹⁴ The sample contains 124 hostile

¹⁴ The sample size drops dramatically in 1987 because it only contains takeovers announced and completed during that year.

acquisitions (18 percent of the sample) and 99 going-private transactions (14 percent of the sample). A large majority of the hostile acquisitions and the going-private transactions take place during the 1980s.

The sample contains 61 percent of all firms delisted from the CRSP NYSE/AMEX database due to takeovers over the period 1972-1987. There is no strong pattern in this fraction over time (the minimum coverage is 53.3 percent in 1984 and the maximum is 70.3 percent in 1979). While there is no increase in the number of acquisitions during the 1980s, there is a strong increase in the value (1987 dollars) of the acquisitions. In dollar terms, 83 percent of the acquisition in my sample take place during the 1980s.

4. Results

4.1 Comparison with industry averages

Table 2 reports the mean and median ratios of capital expenditures to total assets for the sample of takeovers and for the other firms with the same four-digit SIC code on the Compustat database. Time-series data are presented for four years prior to the announcement of the takeover. Observations are eliminated if there are fewer than 10 firms in the same industry. Also, to avoid problems with outliers, firms are not included in the analysis if the capital expenditure ratio exceeds 0.50.¹⁵ As a result, the number of observations varies slightly over the four-year period and is always substantially below the 700 acquisitions reported in Table 1.

Panel A contains the full sample results. The mean capital expenditure ratio for takeover targets remains within a narrow range for all four years. It varies from 8.9 percent three years before the takeover to 9.4 percent two years before the takeover. None of the differences across years are significant. The median ratio is approximately 2.5 percentage points lower, which indicates that the distribution of the capital expenditure ratio is skewed. The median also remains fairly constant over the four years. This evidence indicates that takeover

¹⁵ Firms with capital expenditure ratios above 0.50 have been eliminated for two reasons. First, an examination of a random sample of these companies suggests that several of them have engaged in an acquisition during the year. As such, their capital expenditure ratio is biased upward because it is based on capital spending of the new company but scaled by the assets of the old company. Second, including these companies increases both the variance and the mean of the observations. The effect of the variance increase is that the significance of the difference between the targets and their industries is reduced. Including the outliers has a stronger upward effect on the means of the target industries than on the means of the target firms; that is, the industry means increase more than the target means. Thus, if takeover targets do overinvest, these results should be more apparent in the truncated sample. The median results, which are not subject to outlier problems, remain virtually unchanged.

Table 2
Comparison of capital expenditure ratios of takeover targets with industry means and medians

Year	Target firm		Target firm industry		Difference	Fraction > median	N
	Mean	Median	Mean	Median			
A: Full sample							
- 4	8.97	6.47	8.76	6.23	0.21 (0.48)	50.5 (0.83)	493
- 3	8.92	6.10	9.05	6.24	-0.12 (0.65)	47.3 (0.23)	505
- 2	9.40	6.54	9.03	6.27	0.36 (0.21)	50.2 (0.93)	514
- 1	9.04	6.59	8.88	6.30	0.16 (0.57)	52.0 (0.37)	506
B: Hostile takeovers							
- 4	8.08	5.93	8.70	6.09	-0.62 (0.28)	46.6 (0.52)	88
- 3	8.16	5.74	8.87	6.21	-0.71 (0.17)	50.0 (1.00)	86
- 2	9.12	6.37	8.98	6.27	0.15 (0.82)	54.1 (0.45)	85
- 1	8.75	6.45	9.18	6.34	-0.42 (0.47)	51.8 (0.74)	83
C: Going-private transactions							
-4	8.83	7.32	7.77	5.53	1.06 (0.16)	54.7 (0.42)	75
-3	8.47	6.78	7.86	5.88	0.62 (0.39)	52.1 (0.72)	73
-2	8.79	8.12	7.97	6.34	0.82 (0.27)	52.2 (0.72)	67
-1	8.38	7.28	8.01	6.36	0.37 (0.63)	53.1 (0.62)	64
D: Transactions during the 1980s							
- 4	9.49	6.87	9.23	6.45	0.27 (0.50)	51.4 (0.64)	280
- 3	9.96	7.38	9.70	6.71	0.26 (0.50)	50.2 (0.94)	279
- 2	10.31	7.39	9.81	6.74	0.50 (0.24)	48.8 (0.69)	281
- 1	9.64	7.13	9.48	6.96	0.16 (0.69)	51.7 (0.58)	271
E: Firms with equity value larger than \$250 million in 1987 dollars							
- 4	10.96	8.43	10.30	7.27	0.66 (0.36)	61.0 (0.02)	105
- 3	9.81	7.53	10.16	7.04	-0.35 (0.40)	53.8 (0.44)	104
- 2	11.58	8.80	10.70	7.32	0.88 (0.17)	58.5 (0.08)	106
- 1	11.20	8.01	10.57	7.74	0.63 (0.28)	62.7 (0.01)	102
F: Firms with equity value larger than \$100 million in 1987 dollars taken over during the 1980s							
- 4	11.81	8.59	10.44	7.13	1.37 (0.05)	58.4 (0.06)	125
- 3	11.81	8.28	10.91	7.77	0.90 (0.15)	56.3 (0.16)	126
- 2	12.26	9.13	11.09	7.41	1.17 (0.06)	60.3 (0.02)	126
- 1	11.50	8.98	10.77	7.84	0.73 (0.20)	59.7 (0.03)	119

Industry is defined at the four-digit SIC code level. Observations are eliminated if there are less than 10 firms in the industry. The capital expenditure ratio of firm j in year t is computed as capital expenditures in year t divided by total assets at the end of year $t - 1$. To avoid problems with outliers, observations are eliminated if this ratio exceeds 0.50. Year refers to the number of years before the first acquisition announcement was made. Difference refers to the mean difference between the target firm's capital expenditure ratio and its industry average. The p-value of a matched t-test of equality of this difference to zero is in parentheses. Fraction > median refers to the fraction of the takeover targets investing more than the median firm in their industry. The p-value of a sign test of equality of this fraction to 0.50 is in parentheses.

targets do not increase capital expenditures before the acquisition. Also, the industry comparisons presented in Panel A do not reveal any significant differences between target firms and their industry peers. The mean difference is small, with a maximum of one-third of 1 percent two years before the announcement, and the sign of the difference is not positive for all four years. The year before the takeover, the capital expenditure ratio of takeover targets was only 0.16 percent above the industry mean. A comparison with the industry

median yields the same results. The fraction of targets investing more than their industry median is very close to 50 percent, which suggests that the mean results are not driven by outliers.

Panel B contains a separate analysis for hostile takeover targets. Similar to Morck, Shleifer, and Vishny (1988), a takeover is classified as hostile if management indicates that it does not support the acquisition when the takeover attempt is first announced. This classification method implies that transactions where management drops its resistance during the takeover process are also classified as hostile. Hostile acquisitions are sorted because we have evidence that hostile acquisitions are inherently different from friendly acquisitions. Morck et al. (1988) conjecture that hostile takeovers are more likely to be of a disciplinary nature, whereas friendly acquisitions have more synergistic motives. They also report results consistent with this notion. For a sample of 82 acquisitions of *Fortune* 500 companies from 1981 to 1985 the performance of hostile takeover targets trails the performance of the complete *Fortune* 500 sample. On the other hand, the performance of friendly targets is similar to that of the average *Fortune* 500 company. Obviously, acquisitions performed to curtail overinvestment in the target firm fall into the disciplinary category. Combining hostile and friendly acquisitions may, therefore, add noise to that data and reduce the power of the tests. The evidence presented in Panel B of Table 2 does not support the claim that hostile targets invest more than the other firms in their industry. On the contrary, the mean industry-adjusted ratio is negative for three of the four years. That is, hostile targets invest less than their industry peers, although not significantly so. The median test results reveal a similar pattern, albeit that the fraction of takeover targets investing above their industry median is below 50 percent in only one of the four years. Thus, there is no evidence that the industry-adjusted investment outlays of hostile takeover targets differ from zero. In addition, hostile targets do not significantly increase their investment outlays before being acquired.

The investment expenditures of firms that go private are analyzed in Panel C of Table 2. These transactions are analyzed separately because the evidence of Kaplan (1989) and Smith (1990) indicates that corporations cut their capital expenditures by approximately one-third after going through an MBO. Because they have to service an enormous debt load, these firms are also likely to have a substantial reduction in the available free cash flow. An unfortunate side effect of this debt load is that positive net present-value projects may also be foregone if the firm is cash constrained. The analysis also sheds light on the finding of both Kaplan and Smith that MBO firms cut capital outlays in the year before the control change, as well as in

the years afterward, albeit that the reduction in capital outlays before the control change is smaller than the reduction after the control change. Since Kaplan and Smith report changes in capital expenditures and not levels, we cannot ascertain from their results what the effect is of these changes on the difference in investment between the MBO firms and their industry peers. The data presented in Panel C reveal an interesting pattern. The capital expenditure ratio of the firms that go private declines from 8.8 percent four years before the control change to 8.4 percent one year before the control change. The industry average, however, increases from 7.8 to 8.0 percent over the same time period. As a result, the difference between the investment levels of firms that go private and the other firms in their industry declines from 1.06 percent four years before the transaction takes place to 0.37 percent one year before the transaction takes place. The median ratios are above 50 percent in all four years, but never high enough to approach significance at conventional levels.

It is also worthwhile to observe that the decrease in investment, both with and without industry adjustment, from year -2 to year -1 parallels the findings of Kaplan (1989) and Smith (1990). Overall, when the industry is used as a benchmark, there is no evidence of overinvestment for firms that go private. This result seems to suggest that the investment cuts observed after the buyout may, at least partially, consist of the elimination of positive net present-value projects. Alternatively, the industry may not be the appropriate benchmark to use. I will address this concern in Section 5.

The fourth comparison with the industry benchmark breaks up the sample in acquisitions announced before and acquisitions announced after 1980. I chose 1980 for two reasons. First, it conveniently splits up the sample into two groups of about equal size. Second, and more importantly, several pieces of evidence indicate that takeovers that took place during the 1980s have different attributes from those that took place in earlier decades. The 1980s witnessed the advent of high-yield debt financing, which all but eliminated the immunity of large firms from the discipline of the corporate control market. The resulting bust-up takeovers [see Mitchell and Lehn (1990) and Bhagat, Shleifer, and Vishny (1990)] reversed the diversification wave of the past in favor of corporate specialization. The finding of Morck, Shleifer, and Vishny (1990) that diversifying acquisitions were punished more severely in the 1980s than in the 1970s also suggests that the nature of takeovers changed after 1980.

Panel D of Table 2 presents the capital expenditure ratios of takeover targets for the subset of takeovers occurring during and after 1980. Again, there is no evidence of overinvestment. In general, takeover targets invest more as a fraction of assets during the 1980s than

is the case for the complete sample (see Panel A), but this is mainly an industry effect.

In another subset of the sample, I only consider those firms with a market value of equity of over \$250 million (in 1987 dollars) prior to the first takeover announcement. The larger firms are separated out because they may have been more able to resist takeover attempts for all or part of the sample period, and, thus, non-value-maximizing behavior may have been more pronounced in these firms. The work of Jacobs (1986), who finds more inefficiencies in the larger petroleum firms in his sample, motivates this conjecture. Panel E of Table 2 contains the results. The larger firms in the sample invest more as a fraction of total assets than other companies. Although this is partly an industry effect, the difference between target firms and their industry average is positive, albeit not significant, in three of the four years. The median results suggest that the larger targets do overinvest. The fraction of targets investing above their industry median is significantly larger than 50 percent for three out of the four years.

The final breakup of the sample focuses on large firms (market value larger than \$100 million in 1987 dollars) that were taken over during the 1980s. Panel F of Table 2 contains the results. The average level of excess investment is significantly positive (at the 10 percent level) in two out of four years. The median results provide evidence of excess investment in three out of four years before the acquisition. These results are somewhat stronger than those of Panel E and certainly the most supportive of excess investment of all subsets examined in Table 2.

In summary, when the target firm's industry is used as the benchmark, evidence of overinvestment is limited to the larger firms in the sample and especially to large firms acquired during the 1980s.¹⁶

4.2 Investment equations

One caveat of the previous analysis is that it does not take into account the investment opportunity sets of the companies being examined. If the investment opportunity set of takeover targets is inferior to that of other firms within the industry or economy-wide, it could be that takeover targets are overinvesting, even if their level of investment does not differ markedly from industry norms. To take into account the heterogeneity in the investment opportunity set, I estimate Equation (1) for all firms with sufficient data on the Compustat Tape over the 1968-1987 period. In some of the estimated models, two-digit industry dummies are included, together with interaction terms

¹⁶ I also computed value weighted averages for the complete sample. The results provided no support for the overinvestment argument.

between the industries and the explanatory variables and interaction terms between the industries and the takeover dummy.¹⁷ The takeover dummy is set equal to one if the firm's acquisition is announced within the next two years.¹⁸ If takeover targets invest too much given the investment equation, we would expect the coefficient on the takeover dummy to be positive and significant. The interaction terms between the takeover dummy and the industry dummies will reveal whether there is evidence of excess investment for takeover targets in particular industries. Initially the firm's *Q* ratio is used as the only explanatory variable in the investment equation.

Table 3 contains the investment equation results for 67,389 firm/year observations over the 1968-1987 period. Panel A displays the estimated regression models. The first model contains no industry dummies or industry-*Q* interaction terms. The model reveals a significant positive relation between *Q* and capital expenditures, but the explanatory power of the model is small. The model suggests that an increase in the *Q* ratio of 0.50 leads to an increase in capital expenditures as a fraction of assets of 0.0065. In the second model a takeover dummy is added to gauge whether firms that are subsequently taken over invest more than other companies after controlling for their investment opportunity set. The evidence is not consistent with that conjecture. In fact, the coefficient on the takeover dummy is negative, albeit not significant. Adding the takeover dummy has no impact on the sign or magnitude of the other coefficients up to four decimals, and it does not improve the explanatory power of the model.

The third regression contains industry dummies as well as interaction terms between the industry dummies and the *Q* ratio and interaction terms between the industry dummies and the takeover dummy. (These interaction terms are not displayed.) This model controls for the fact that the investment equation may be industry specific. The explanatory power of the model increases to 13 percent and the coefficient on the takeover dummy turns positive, but it remains insignificant.¹⁹

Although these results do not support the notion that takeover targets invest more than is warranted by their investment opportunity set, it is possible that firms in certain industries are more prone to excess investment. In particular, Jensen (1986) has suggested that wasteful investments may have occurred in the following industries:

¹⁷ Industry dummies were specified at the two-digit level only because of computer limitations

¹⁸ Results are similar for specifications using acquisitions announced within one, three, or four years.

¹⁹ The takeover dummy captures the excess investment of the targets with two-digit SIC code 01: Agriculture, Forestry, and Fishing. Separate industry dummies have been specified for all other industries.

Table 3
Pooled cross-sectional/time-series regression of capital expenditures on Tobin's Q, industry dummies, a takeover dummy, and interaction terms

Variable	A: Regression model		
	(1)	(2)	(3)
Intercept	0.0723 (0.00)	0.0723 (0.00)	0.0637 (0.00)
Q_{it-1}	0.0137 (0.00)	0.0137 (0.00)	0.0189 (0.00)
TO		-0.0004 (0.89)	0.0235 (0.50)
Adjusted R^2	0.02	0.02	0.13
B: Industry effects ¹			
Industry	SIC	Number of acquisitions	TO + TO(IND _k)
Oil and gas extraction	13	37	0.0667 (0.00)
Food products	20	47	-0.0063 (0.53)
Textile mill products	22	16	0.0109 (0.49)
Apparel products	23	22	0.0034 (0.83)
Paper and allied products	26	15	-0.0093 (0.58)
Printing and publishing	27	24	0.0040 (0.77)
Chemicals and allied prod.	28	35	0.0081 (0.47)
Petroleum refining	29	10	0.0335 (0.11)
Rubber and misc.	30	20	-0.0001 (0.99)
Stone, clay, glass	32	18	0.0020 (0.90)
Primary metal industries	33	23	-0.0213 (0.13)
Fabricated metal products	34	37	-0.0130 (0.22)
Industrial machinery	35	73	-0.0048 (0.56)
Electronic equipment	36	50	-0.0046 (0.62)
Transportation equipment	37	41	-0.0023 (0.83)
Instrum. and related prod.	38	30	-0.0060 (0.62)
Misc. manufacturing	39	17	-0.0011 (0.53)
Gen. merchandise stores	53	15	-0.0209 (0.28)
Food stores	54	10	-0.0112 (0.58)
Eating and drinking places	58	10	0.0223 (0.59)
Miscellaneous retail	59	19	-0.0436 (0.18)
Business services	73	21	0.1450 (0.01)

Regression model ($n = 67,389$)

$$CAP_{it} = a_1 + a_2(IND_2) + \dots + a_{54}(IND_{54}) + b_1Q_{it-1} + b_2Q_{it-1}(IND_2) + \dots + b_{54}Q_{it-1}(IND_{54}) \\ + c_1TO + c_2TO(IND_2) + \dots + c_{54}TO(IND_{54}) + e_{it}$$

All firms with sufficient Compustat data to compute capital expenditure ratios and Tobin's Q over the period 1986-1987 are included in the regression model. The capital expenditure ratio for firm j in year t (CAP_{jt}) is computed as capital expenditures in year t divided by total assets at the end of year $t - 1$. Observations are eliminated if this ratio exceeds 0.50. Q_{jt-1} is the Q ratio of firm j at the end of year $t - 1$. IND_k is a dummy variable equal to 1 if the firm is in two-digit industry k , and 0 otherwise. TO is a dummy variable equal to 1 if that firm is taken over within two years, and 0 otherwise. $Q_{it-1}(IND_k)$ and $TO(IND_k)$ are interaction terms. a_k , b_k , and c_k ($k = 1, 54$) are regression coefficients. Regression model (3) is the complete model with industry dummies and interaction terms; the coefficients on these interaction terms are not displayed.

¹ For each industry with more than 10 observations in the sample, this panel contains the sum of the takeover dummy (TO) and the interaction term between the takeover dummy and the industry dummy [TO(IND_k)]. The p-value of the F-test of equality of that sum to zero is listed in parentheses.

oil, tobacco, forest products, food, and broadcasting. To investigate this conjecture, I examine the interaction terms between the takeover dummy and the industry dummies estimated (but not displayed) in model (3) of Panel A. In particular, the sum of this interaction term

and the takeover dummy measures excess investment in specific industries. A simple F-test can be performed to determine whether this sum is significantly different from zero. Panel B of Table 3 contains these results for those industries with at least 10 takeovers in the sample.

Panel B shows that there are two industries where takeover targets invest more than warranted. In the oil and gas extraction industry, targets invest 6.67 percent more as a percentage of assets than their peers. For the sample period, capital spending for the oil and gas industry averaged approximately 20 percent of assets. If we assume that this is the optimal level, a cut in capital expenditures of over 30 percent (6.67 percent divided by 20 percent) is warranted.

The evidence of overinvestment in the oil and gas extraction industry is consistent with Jensen's (1986) conjecture and complements prior work on the inefficiencies in the oil industry. McConnell and Muscarella (1985) find that announcements of increases in capital expenditures by oil companies during the 1975-1981 period were associated with significant negative stock-price reactions. In contrast, the stock prices of other firms reacted positively when increases in capital outlays were announced. Jacobs (1986) estimates that agency costs of corporate control for the largest 98 firms in the petroleum industry amounted to almost \$200 billion at the end of 1984.

The second industry where targets are shown to invest more than expected is the business services industry. However, this finding is mainly due to the heterogeneity of firms in the industry. This industry grouping contains firms as diverse as advertising agencies and computer leasing companies, which have different capital outlays. When the investment equation is reestimated with dummies at the three-digit level for this industry, the finding of overinvestment disappears.

I also added indicator variables to measure whether there is evidence of excess investment within the categories of targets examined separately in Table 2 (not shown). These variables do not enter the regression model at conventional significance levels.

4.3 Abnormal returns and overinvestment

A further implication of the conjecture that takeover targets overinvest is that the premium accruing to the shareholders of target firms is related to the level of overinvestment. To test this implication, I estimate the following regression model:

$$\begin{aligned} \text{CAR} = & a + b_1 (\text{Tobin's } Q > 1) + b_2 (\text{multiple bidders}) \\ & + b_3 (\text{cash payment}) + b_4 (\text{hostile takeover}) \\ & + b_5 (\text{CAPI}) + b_6 (\text{DINV}) + e, \end{aligned} \quad (2)$$

where CAR is the cumulative abnormal return accruing to the share-

holders of the target firms starting one day before the initial announcement and ending at the resolution of the takeover, or the delisting day, whichever occurs first;²⁰ CAPI is the average capital expenditure ratio of the target firm's industry, and DINV is computed as the capital expenditures ratio of the target firm reduced by its industry average; the other variables are indicator variables, set equal to 1 if the condition in parentheses is fulfilled and 0 otherwise.²¹ CAPI is included to investigate whether there is an industry effect in excess investment. That is, it is possible that the whole industry is wasting resources, in which case we expect the coefficient on CAPI, b_5 , to be positive and significant. If the difference from the industry standard is important, then b_6 , the coefficient on the difference from the industry mean, is expected to be positive.

Table 4 contains the results. Four models are estimated, using capital expenditure data from four years to one year before the takeover announcement. None of the models reveal a significant relation between target firm abnormal returns and industry investment or the deviation from the industry average. Moreover, the coefficients on the investment measures are positive in only three of the eight cases. The control variables have the expected sign, but only the coefficient on the Q ratio is significantly different from zero in all models. These results do not support the conjecture that the abnormal returns in takeovers are related to the level of industry investment or firm overinvestment. Because the level of overinvestment may be correlated with the firm's Q ratio and with target management resistance, I also estimated the models without these control variables. Omitting these variables does not alter the previous results. Also, estimating separate regression models for different subsets of takeover targets (i.e., hostile targets, going-private transactions, takeovers taking place during the 1980s and large targets) does not increase the significance of the regression coefficients or the explanatory power of the models.

The cross-sectional regressions of abnormal returns on investment levels and controls presented in Table 4 implicitly assume that the degree of overinvestment is public information. If the bidder has some private information about the level of excess investment, tra-

²⁰ Abnormal returns are computed using traditional eventstudy methodology. Market-model parameters are estimated using continuously compounded returns over a 200-day period starting 210 trading days before the initial takeover announcement.

²¹ Multiple bidders, cash payment, hostile takeover, and Tobin's $Q > 1$ are included in the regression model as control variables. Previous research indicates that they may be important in explaining target firm abnormal returns. Targets have higher abnormal returns when cash is used as the form of payment [Huang and Walkling (1987)], when more than one bidder makes an offer [Bradley, Desai, and Kim (1988)], and when target firms have low Q ratios [Lang, Stulz, and Walkling (1989), Servaes (1991)]. Huang and Walkling (1987) have also examined the relation between abnormal returns and the reaction of target management.

Table 4

Cross-sectional regression of the abnormal returns of target firms on industry capital expenditures, the deviation from industry capital expenditures, and control variables

Variable	(1)	(2)	(3)	(4)
Intercept	0.2224 (0.00)	0.1997 (0.00)	0.2616 (0.01)	0.2428 (0.00)
Tobin's $Q > 1$	-0.0986 (0.01)	-0.0967 (0.01)	-0.1276 (0.00)	-0.1140 (0.00)
Multiple bidders	0.0551 (0.16)	0.0601 (0.11)	0.0538 (0.17)	0.0541 (0.17)
Cash payment	0.0551 (0.10)	0.0573 (0.08)	0.0257 (0.44)	0.0387 (0.26)
Hostile takeover	0.0604 (0.19)	0.1033 (0.27)	0.0442 (0.35)	0.0433 (0.37)
CAPI-4	-0.1758 (0.65)			
DINV-4	0.2868 (0.27)			
CAPI-3		0.1033 (0.77)		
DINV-3		-0.3059 (0.24)		
CAPI-2			-0.1730 (0.63)	
DINV-2			0.3493 (0.18)	
CAPI-1				-0.1043 (0.80)
DINV-1				-0.2010 (0.46)
N	459	469	476	467
Adjusted R-squared	0.03	0.04	0.03	0.03

Abnormal returns are computed using standard event-study methodology and cumulated from one day before the initial announcement of the takeover until the resolution of the takeover or the delisting date, whichever comes first. Market-model parameters are computed over a 200-day period starting 210 days before the initial takeover announcement. Definition of explanatory variables: Tobin's $Q > 1$ is a dummy variable equal to 1 if the target firm's Q ratio is larger than 1 in the year before the announcement of the takeover. Multiple bidders is a dummy variable equal to 1 if more than one bidder enters the bidding contest. Cash payment is a dummy variable equal to 1 if the bidder pays all cash for the acquisition. Hostile takeover is a dummy variable equal to 1 if the transaction is hostile. CAPI - t is the capital expenditure ratio of the takeover target's industry (four-digit level) t years before the acquisition announcement. DINV - t is the difference between the capital expenditure ratio of the takeover target and its industry (four-digit) t years before the acquisition announcement.

ditional OLS estimation may yield inconsistent results [see Eckbo, Maksimovic, and Williams (1990)]. To examine whether this concern is valid in this case, I reestimate my regression models using the maximum likelihood approach proposed by Eckbo, Maksimovic, and Williams (1990). For three out of the four models, I obtain results similar to OLS. In the model estimated with investment levels three years before the takeover announcement, I find a significant negative relation between announcement returns and the difference in investment from the industry mean. However, the overinvestment hypothesis suggests a positive relation between excess investment and announcement returns. Thus, this alternative estimation approach does not alter the previous conclusion. It also indicates that the bidder does not possess much private information about the investment behavior of the targets.

5. Sensitivity Analysis

To examine the robustness of these results, I perform three sets of sensitivity tests: (i) changing the definition of the industry, (ii) adding

an additional explanatory variable to the investment equation, (iii) using postacquisition data to determine the industry benchmark.

In the first part of the article, I define industry at the four-digit SIC code level. Since observations are eliminated if there are less than 10 firms in an industry on Compustat, the sample size for the tests is reduced by approximately 180 observations. To gauge whether the industry definition alters the results of Table 2, I define industry at the three-digit SIC code level and recompute all test statistics. All the previous results remain qualitatively unchanged, and, thus, they do not appear to be sensitive to the definition of industry.

A second sensitivity test relates to the variables included in the investment equation. Since Hayashi's (1982) conditions are unlikely to hold for all industries, it is possible that other variables, in addition to Tobin's Q , are important determinants of the level of the firm's investment. In particular, the work of Myers and Majluf (1984) suggests a positive relation between investment and financial slack. Raising funds externally may be costly if managers have more information about the firm's investment opportunities than outside shareholders. This cost may be high enough for firms to forego positive net present-value opportunities under certain circumstances, and, therefore, the model suggests a positive relation between investment and liquidity. To capture the effect of liquidity on investment, I add a variable to the investment equation: cash flow over total assets. One problem with this approach is that it ignores the conflicts of interest between managers and shareholders. As stressed by Jensen (1986), firms with large amounts of free cash flow and poor investment opportunities are more prone to invest in negative net present-value projects. Thus, if we observe that firms with more cash flows invest more, it may be because of a fundamental link between investment and liquidity, as in Myers and Majluf, or because these firms are overinvesting, as in Jensen. Given this qualification, the results of this test should be interpreted with caution.

In general, the investment equation yields a positive relation between cash flow and investment. It is, therefore, not surprising that the dummy variable for takeover targets is not significantly different from zero. An investigation of the industry effects shows that targets in the oil and gas industry invest 4.23 percent more than predicted, which is significant at the 1 percent level, but there is no evidence of excess investment for other industries. Thus, these results support the earlier findings. Also, if some targets have low cash flow, and therefore underinvest, the addition of cash flow to the investment equation should control for that effect. As an additional test to determine whether the underinvestment by some targets may explain my results, I eliminate all firms (targets and nontargets) with a cash flow

ratio below 3 percent and I repeat the simple univariate tests. The reduced sample is less likely to consist of firms that are cash constrained and that are being acquired by a firm with free cash flow but poor investment opportunities. However, the results of this analysis do not support claims of excess investment.

The major caveat of the results presented up to this point is that they rely on the assumption that the industry is the appropriate benchmark, regardless of whether additional adjustments are made to control for the within-industry variation in the investment opportunity set. This assumption, however, may not be correct. As Jensen (1986) has forcefully argued, all or most firms within certain industries may invest more than optimal. This may be the case in industries that generate large cash flows but encounter a declining demand for their products. Takeovers will then create efficiencies by promoting orderly exit from the industry. Under this scenario, we do not observe any difference between the level of investment of takeover targets and other firms in the industry. Nevertheless, overinvestment takes place. There are at least three reasons, however, why we would still expect to observe that takeover targets invest more than the industry norms if the above description of industry-wide overinvestment is correct. First, the sample period spans 17 years. It is not likely that all firms in a particular industry consistently invest more than appropriate for such an extended period of time.²² Second, aggregating firms into industries based on their three-digit SIC codes gives less weight to each four-digit industry. Since this level of aggregation yields results similar to those based on a comparison at the four-digit level, one would have to argue that all firms within a particular three-digit industry are overinvesting if one wants to attribute the results of this article to industry-wide overinvestment. This may be entirely possible, although it is less probable than overinvestment at the four-digit level. Third, even if all firms in an industry are overinvesting, more can be gained from curtailing investment in those firms that are the worst offenders. The evidence presented here on the acquisitions in the oil and gas industry supports this argument. Previous research [McConnell and Muscarella (1985), Jacobs (1986)] has indicated that most firms in the oil and gas industry overinvested and, as such, destroyed shareholder wealth. However, we still find that the takeover targets are the ones who invested even more than the other firms in the industry.

I also test the industry-wide overinvestment conjecture empirically. If the takeovers occur to curtail overinvestment within an industry, the average capital expenditures within that industry should decline

²² Of course, if more takeovers occur when more firms in the industry overinvest, it is likely that the average difference between the targets and nontargets within a particular industry is small.

Table 5
Comparison of capital expenditure ratios of takeover targets with postacquisition industry averages

Year	Sample	Target firm	Target firm industry	Difference	N
0	Full sample	9.10	8.90	0.20 (0.52)	469
0	Hostile takeovers	8.89	8.73	0.16 (0.81)	79
0	Going-private firms	8.10	8.16	-0.07 (0.93)	61
0	1980s transactions	9.80	9.25	0.54 (0.23)	247
0	Larger than \$250M	11.16	10.14	1.02 (0.12)	94
0	1980s & larger than \$100M	11.86	10.24	1.62 (0.02)	110
+1	Full sample	9.21	8.89	0.33 (0.34)	422
+1	Hostile takeovers	8.98	8.60	0.38 (0.60)	72
+1	Going-private firms	7.56	7.80	-0.24 (0.78)	49
+1	1980s transactions	10.13	9.15	0.97 (0.08)	204
+1	Larger than \$250M	11.53	9.94	1.57 (0.04)	81
+1	1980s & larger than \$100M	12.65	9.93	2.72 (0.00)	89

The capital expenditure ratio for firm j in year t is computed as capital expenditures in year t divided by total assets at the end of year $t - 1$. Observations are eliminated if this ratio exceeds 0.50. Year 0 is the year of the takeover announcement; year 1 is the year after the takeover announcement. Target firm averages are computed in the year before the takeover announcement. Target firm industry averages are computed the year of the announcement (year 0) and the year after the announcement (year +1).

after the acquisition. Therefore, I use the mean and median capital expenditure ratio of the target firm's industry computed in the year of the acquisition and the year after the acquisition as the appropriate benchmark.

Table 5 presents the results of this sensitivity test. The table contains the comparison of the target firm's capital expenditure ratio in the year prior to the announcement of the acquisition with the industry mean computed after the acquisition. The first set of results uses the target firm's industry in the year of the takeover as the benchmark. There is no evidence of overinvestment for the full sample or for any of the subsamples, except for large firms acquired during the 1980s. For this category of 110 companies, investment one year before the takeover announcement is 1.62 percent above the industry benchmark. Using industry data obtained one year after the takeover announcement, the difference increases to 2.7 percent. There is also some evidence of overinvestment for large firms and firms acquired during the 1980's when these groups are considered separately.²³ The other samples do now show a significant difference.

Another check to examine industry-wide overinvestment is to compare the investment levels of the industries of takeover targets with

²³ Industry analysis indicates that the results for large targets and for large targets acquired during the 1980s are mainly driven by oil and gas companies. When these firms are excluded, the differences reported in Table 5 decline and they become insignificant.

Table 6
Capital expenditures ratios of industries of takeover targets versus economy means and medians

Year	Target firm industry		Economy		Difference	Fraction > median	N
	Mean	Median	Mean	Median			
A: Full sample							
- 4	8.96	6.26	9.15	6.63	-0.19 (0.32)	43.5 (0.00)	510
- 3	9.20	6.29	9.14	6.58	-0.06 (0.77)	48.9 (0.63)	517
- 2	9.02	6.27	9.08	6.58	-0.06 (0.75)	46.6 (0.12)	515
- 1	8.89	6.25	9.16	6.53	-0.28 (0.13)	46.3 (0.09)	510
B: Firms with equity value larger than \$250 million in 1987 dollars							
- 4	10.40	7.37	9.37	6.85	1.03 (0.05)	57.4 (0.12)	108
- 3	10.39	7.14	9.29	6.63	1.10 (0.04)	56.5 (0.15)	108
- 2	10.70	7.32	9.28	6.63	1.43 (0.01)	60.4 (0.03)	106
- 1	10.66	7.80	9.30	6.53	1.37 (0.01)	60.2 (0.04)	103

Industry is defined at the four-digit SIC code level. Observations are eliminated if there are less than 10 firms in the industry. The capital expenditure ratio of firm j in year t is computed as capital expenditures in year t divided by total assets at the end of year $t - 1$. To avoid problems with outliers, observations are eliminated if this ratio exceeds 0.50. Year refers to the number of years before the first acquisition announcement was made. Difference refers to the mean difference between the industry's capital expenditure ratio and the economy average. The p-value of a matched t-test of equality of this difference to zero is in parentheses. Fraction > median refers to the fraction of the industries of takeover targets investing more than the economy median. The p-value of a sign test of equality of this fraction to 0.50 is in parentheses.

economy-wide investment levels. However, these results should be interpreted with caution, because finding that takeover targets belong to high-investment industries does not necessarily imply that these industries have been overinvesting. Table 6 contains such a comparison for the complete sample as well as for the sample of large targets. I use all firms on Compustat in a particular year to proxy for the economy. The results are aggregated over time and each takeover in the sample is considered as one observation. Panel A contains the full sample results. The evidence does not suggest that takeover targets are in high-capital-expenditure industries relative to all firms in the economy. However, when large firms are analyzed separately (in Panel B), there is evidence supporting the notion that the industries of large targets are industries that have higher capital expenditures than the average firm in the economy. The results indicate that target industries spend from 1 to 1.4 percent more on capital expenditures than the average firm on Compustat. To investigate whether the results of Panel B are due to oil and gas firms (SIC 13), I exclude these companies from the analysis (not displayed). After eliminating these firms, there is no more evidence in support of the claim that large targets operate in high-capital-expenditure industries.²⁴

²⁴ In a further test, I exclude those industries with average cash flow ratios below 3 percent since firms in these industries are less likely to be overinvesting. The above results remain unchanged.

6. Discussion and Conclusion

I investigate the capital expenditures of a sample of 700 takeover targets and firms that go private for a period of four years before the control change. The sample period covers 1972 to 1987. In general, takeover targets do not invest more than the other firms in their industry. This result also holds for several subsets of the sample: hostile takeovers, going-private transactions, transactions taking place during the 1980s, and firms in individual industries. There is some evidence that large firms and firms in the oil and gas industry invest more than their industry peers, where the large target results are mainly driven by oil and gas firms. These findings are not sensitive to changes in the definition of the industry. I also do not find that takeover targets overinvest when I take into account the differences in the investment opportunity set of these companies or when postacquisition industry data are used to determine the appropriate benchmark. Also, there is no relation between takeover gains and measures of industry investment and excess investment.

Overall these results are, at best, only weakly consistent with the conjecture that takeover targets overinvest in projects developed internally. This contrasts with the strong evidence on external investment projects (i.e., acquisitions of other firms), which supports the notion that takeover targets are more likely to make value destroying acquisitions than other firms [see Mitchell and Lehn (1990)]. The lack of evidence in support of overinvestment is not necessarily inconsistent with the free cash flow theory since the theory does not distinguish between internally generated investment projects and acquisitions as outlets of free cash flows. In fact, it may be more convenient to waste resources on acquisitions than on internal investment projects since acquisitions can often be completed faster than expansion programs. And in some industries, such as the oil and gas industry, the evidence presented here does support overinvestment.

Two caveats should be pointed out. Firms may overinvest in other assets, such as inventories or in employees. Since I only examine capital expenditures, other types of overinvestment cannot be detected. Another possibility is that the explanatory variables in the investment equation do not capture all the elements of the investment opportunity set. If that is the case and takeover targets and firms that go private have poor investment opportunities when compared to industry peers, then these firms may be overinvesting, but my tests will not pick it up.

My results complement the work of Healy, Palepu, and Ruback (1992), who do not find evidence of capital budget cuts after acquisitions, and they are also consistent with the conjecture and evidence of Bhagat, Shleifer, and Vishny (1990) that investment cuts are not

an important source of value creation in takeovers. The results also question whether the investment cuts observed after MBOs [see Kaplan (1989) and Smith (1990)] create value or destroy value since there is no evidence of excess investment in going-private transactions. Clearly, the large increases in corporate performance documented by both Kaplan and Smith suggest that value is created in these transactions, but is that because of the investment cuts or despite the investment cuts? More case-specific research is required to address this question.

References

- Baumol, W. J., 1959, *Business Behavior, Value and Growth*, Macmillan, New York.
- Bhagat, S., A. Shleifer, and R. W. Vishny, 1990, "Hostile Takeovers in the 1980s: The Return to Corporate Specialization," *Brookings Papers on Economic Activity: Microeconomics*, 1-72.
- Bradley, M., A. Desai, and E. H. Kim, 1988, "Synergistic Gains from Corporate Acquisitions and their Division between the Stockholders of Target and Acquiring Firms," *Journal of Financial Economics*, 21, 3-40.
- Brown, C., and J. L. Medoff, 1988, "The Impact of Firm Acquisitions on Labor," in A. J. Auerbach (ed.), *Corporate Takeovers: Causes and Consequences*, University of Chicago Press, Chicago, IL.
- Burrough, B., and J. Helyar, 1990, *Barbarians at the Gate*, Harper and Row, New York.
- Denis, D. J., 1992, "Corporate Investment Decisions and Corporate Control: Evidence from Going Private Transactions," *Financial Management*, 21, 80-94.
- Donaldson, G., 1984, *Managing Corporate Wealth*, Praeger, New York
- Eckbo, B. E., V. Maksimovic, and J. Williams, 1990, "Consistent Estimation of Cross-Sectional Models in Event Studies," *Review of Financial Studies*, 3, 343-365.
- Hall, B., C. Cummins, E. Laderman, and J. Mundy, 1988, *The R&D Master File Documentation*, National Bureau of Economic Research, Boston, MA.
- Hayashi, F., 1982, "Tobin's Marginal q and Average q : A Neoclassical Interpretation," *Econometrica* 50, 213-224.
- Healy, P., K. Palepu, and R. Ruback, 1992, "Does Corporate Performance Improve after Mergers?," *Journal of Financial Economics*, 31, 135-175.
- Hoshi, T., A. Kashyap, and D. Scharfstein, 1990, "Bank Monitoring and Investment: Evidence from the Changing Structure of Japanese Corporate Banking Relationships," in R. G. Hubbard (ed.), *Asymmetric Information, Corporate Finance, and Investment*, University of Chicago Press, Chicago, IL.
- Hoshi, T., A. Kashyap, and D. Scharfstein, 1991, "Corporate Structure, Liquidity, and Investment: Evidence from Japanese Industrial Groups," *Quarterly Journal of Economics*, 106, 33-60.
- Huang, Y., and R. A. Walkling, 1987, "Target Abnormal Returns Associated with Acquisition Announcements: Payment, Acquisition Form and Managerial Resistance," *Journal of Financial Economics*, 19, 329-349.
- Jacobs, E. A., 1986, "The Agency Cost of Corporate Control: The Petroleum Industry," working paper, Massachusetts Institute of Technology.
- Jensen, M. C., 1986, "Agency Costs of Free Cash Flow. Corporate Finance and Takeovers," *American Economic Review*, 76, 323-329.

- Kaplan, S. N., 1989, "The Effects of Management Buyouts on Operating Performance and Value," *Journal of Financial Economics*, 24, 217-254.
- 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.
- Lang, L., R. M. Stulz, and R. A. Walkling, 1991, "A Test of the Free Cash Flow Hypothesis: The Case of Bidder Returns," *Journal of Financial Economics*, 29, 315-335.
- Lindenberg, E., and S. Ross, 1981, "Tobin's q and Industrial Organization," *Journal of Business*, 54, 1-32.
- Martin, K. J., and J. J. McConnell, 1991, "Corporate Performance, Corporate Takeovers, and Management Turnover," *Journal of Finance*, 46, 671-687.
- McConnell, J. J., and C. J. Muscarella, 1985, "Corporate Capital Expenditure Decisions and the Market Value of the Firm," *Journal of Financial Economics*, 14, 399-422.
- Mitchell, M. L., and K. Lehn, 1990, "Do Bad Bidders Become Good Targets?," *Journal of Political Economy*, 98, 372-398.
- Morck, R., A. Shleifer, and R. W. Vishny, 1988, "Characteristics of Targets of Hostile and Friendly Takeovers," in A. J. Auerbach (ed.), *Corporate Takeovers: Causes and Consequences*, University of Chicago Press, Chicago, IL.
- Morck, R., A. Shleifer, and R. W. Vishny, 1990, "Do Managerial Objectives Drive Bad Acquisitions?," *Journal of Finance*, 45, 31-48.
- Myers, S., and N. Majluf, 1984, "Corporate Financing and Investment Decisions When Firms Have Information That Investors Do Not Have," *Journal of Financial Economics*, 13, 187-221.
- Rosett, J. G., 1990, "Do Union Wealth Concessions Explain Takeover Premiums? The Evidence on Contract Wages," *Journal of Financial Economics*, 27, 263-282.
- Servaes, H., 1991, "Tobin's Q and the Gains from Takeovers," *Journal of Finance*, 46, 409-419.
- Smith, A. J., 1990, "Corporate Ownership Structure and Performance: The Case of Management Buyouts," *Journal of Financial Economics*, 27, 143- 164.
- Stulz, R. M., 1991, "Managerial Discretion and Optimal Financing Policies," *Journal of Financial Economics*, 26, 3-27.