Does corporate performance improve after mergers?*

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We examine post-acquisition performance for the 50 largest U.S. mergers between 1979 and mid-1984. Merged firms show significant improvements in asset productivity relative to their industries, leading to higher operating cash flow returns. This performance improvement is particularly strong for firms with highly overlapping businesses. Mergers do not lead to cuts in long-term capital and R&D investments. There is a strong positive relation between postmerger increases in operating cash flows and abnormal stock returns at merger announcements, indicating that expectations of economic improvements underlie the equity revaluations of the merging firms.

1. Introduction

This study examines the postmerger cash flow performance of acquiring and target firms, and explores the sources of merger-induced changes in cash flow performance. Our research is motivated by the inability of stock price

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performance studies to determine whether takeovers create real economic gains and to identify the sources of such gains.

There is near-unanimous agreement that target stockholders benefit from mergers, as evidenced by the premium they receive for selling their shares. The stock price studies of takeovers also indicate that bidders generally breakeven, and that the combined equity value of the bidding and target firms increases as a result of takeovers. These increases in equity values are typically attributed to some unmeasured source of real economic gains, such as synergy. But researchers have had little success in relating the equity value gains to improvements in subsequent corporate performance. Therefore, the equity value gains could also be due to capital market inefficiencies, arising simply from the creation of an overvalued security.

To determine whether the equity value increases in takeovers are from real economic gains or capital market inefficiencies, stock price studies have analyzed unsuccessful takeovers. But these studies, too, are unable to distinguish between the real economic gains and the market inefficiency explanations. That the stock prices of unsuccessful merger targets return to their preoffer level is consistent with the loss of an anticipated premium – whatever its source. From the stock price perspective, the anticipation of real economic gains is observationally equivalent to market mispricing. It is therefore difficult to conceive of a pure stock price study that could resolve the ambiguity in the interpretation of the evidence.

Stock price studies are also unable to provide evidence on the sources of any merger-related gains. Yet differences of opinion about the source of the gains in takeovers underlie much of the public policy debate on their desirability. Gains from mergers could arise from a variety of sources, such as operating synergies, tax savings, transfers from employees or other stakeholders, or increased monopoly rents. Equity gains from only some of these sources are unequivocally beneficial at the social level.

Our approach is to use postmerger accounting data to test directly for changes in operating performance that result from mergers. Our tests use accounting data collected from company annual reports, merger prospectuses, proxy statements, and analysts' reports for 50 large mergers between U.S. public industrial firms completed between 1979 and mid-1984. We recognize that accounting data are imperfect measures of economic perfor-

1See Caves (1989) for a review of the studies that examine the ex post performance of merged firms.


3Three recent studies have examined earnings performance following management buyouts of corporations [Bull (1988), Kaplan (1990), and Smith (1990)]. Our paper focuses on acquisitions of one public company by another in either a merger or a tender offer, rather than on management buyouts.
formance and that they can be affected by managerial decisions. As we explain in section 2, we use cash flow measures of economic performance to mitigate the impact of the financing of the acquisition and the method of accounting for the transaction. We also recognize that our cash flow variables measure period-by-period performance, which is affected by firm-specific and industry factors. We therefore use industry performance as a benchmark to evaluate postmerger performance.

Results reported in section 3 show that the merged firms have increases in postmerger operating cash flow returns in comparison with their industries. These increases arise from postmerger improvements in asset productivity. We find no evidence that the improvement in postmerger cash flows is achieved at the expense of the merged firms' long-term viability, since the sample firms maintain their capital expenditure and R&D rates in relation to their industries. Our results differ from the findings reported by Ravenscraft and Scherer (1987) and Herman and Lowenstein (1988), who examine earnings performance after takeovers and conclude that merged firms have no operating improvements.

In section 4 we examine the relation between our cash flow measures of postmerger performance and stock market measures used in earlier studies. Postmerger improvements in operating cash flow returns explain a significant portion of the increase in equity values of the merging firms at the announcement of the merger. This suggests that the stock price reaction to mergers is driven by anticipated economic gains after the merger.

Section 5 discusses the implications of our primary findings and explores some popular hypotheses on factors that influence postmerger performance. There is little evidence that transaction characteristics such as the method of financing, whether the merger is hostile or friendly, or the size of the target firm explain cross-sectional variation in postmerger performance. We find some support, however, for the view that mergers between firms in overlapping businesses lead to better performance than other mergers.

2. Experimental design

2.1. Sample

The analysis in this study is based on the largest 50 acquisitions during the period January 1979 to June 1984. We limit the number of acquisitions studied to make the hand data collection tasks manageable. The largest acquisitions have several important advantages over a similarly sized random sample. First, although the sample consists of a small fraction of the total acquisitions in the sample period, the total dollar value of the 50 firms selected accounts for a significant portion of the dollar value of domestic
merger activity. Second, if there are economic gains from a takeover, they are most likely to be detected when the target firm is large. Third, it is less likely that the acquirers in the sample undertake equally large acquisitions before or after the events we study, reducing the probability of confounding events. Finally, public concern about the consequences of takeovers is typically triggered by the largest transactions, making them interesting in their own right.

The sample period is selected to focus on recent mergers and also to have sufficient postmerger performance data. To select the acquisition sample, we identify the 382 merger-related delistings on the Center for Research in Security Prices (CRSP) database in the sample period. The names of the acquirers are identified from the Wall Street Journal Index. The sample comprises acquisitions involving the 50 largest targets that satisfy the following two criteria: the acquirer is a U.S. company listed on the New York Stock Exchange (NYSE) or the American Stock Exchange (Amex), and the target and acquirer are not financial or regulated companies. Target-firm size is computed from Compustat as the market value of common stock plus the book values of net debt and preferred stock at the beginning of the year before the acquisition. Acquisitions are deleted from the sample if the acquirers are non-U.S. or private companies, since post-acquisition financial information is not available for these mergers. Regulated (railroads and utilities) and financial firms are deleted because they are subject to special accounting and regulatory requirements, making them difficult to compare with other firms.

A summary of the sample is provided in the appendix. The information provided includes target and acquiring firms' names, a description of their businesses and industries from Value Line reports, target equity value before the merger, the target's assets as a percentage of the acquirer's assets, and the merger completion date. The sample targets and acquirers represent a wide cross-section of Value Line industries. The target firms belong to 27 industries; the acquiring firms come from 33 industries.

The transactions are approximately evenly distributed over the sample years: eight acquisitions in the sample were completed in 1979, seven in 1980, twelve in 1981, eleven in 1983, and two in 1984. Since we focus on mergers completed in only a few years, however, the sample firms' postmerger performance is likely to be influenced by economywide changes. Our tests, therefore, control for these factors by comparing sample firms' performance with their corresponding industries'.

4The aggregate market value of equity of the 50 target firms in our sample one year before the acquisition is $43 billion.

5The sample period ends in June 1984 to ensure that when the study was initiated, at least five years of postmerger data were available on Compustat for the sample firms. Compustat files end in June each year.
The sample acquisitions are significant economic events for purchasing firms. On average, target firms are 42% of the assets of acquirers, where assets are measured by the book value of net debt (long-term debt, plus short-term debt, less cash and marketable securities) plus the market value of equity one year prior to the merger.

2.2. Performance measurement

We use pretax operating cash flow returns on assets to measure improvements in operating performance. Conceptually, we focus on cash flows because they represent the actual economic benefits generated by the assets. Since the level of economic benefits is affected by the assets employed, we scale the cash flows by the assets employed to form a return measure that can be compared across time and across firms. We measure assets employed using market values, which represent the opportunity cost of the assets. In our opinion, market-based measures of asset values dominate accounting and other historical estimates in this context because they simplify intertemporal and cross-sectional comparisons. Our market-based measure has a potential limitation, however, because unexpected cash flow realizations can change expectations about future cash flows, and hence market values. The sensitivity tests in section 3.2 show no evidence of such a feedback effect for our sample of mergers.

We define operating cash flows as sales, minus cost of goods sold and selling and administrative expenses, plus depreciation and goodwill expenses. This measure is deflated by the market value of assets (market value of equity plus book value of net debt) to provide a return metric that is comparable across firms. Unlike accounting return on book assets, our return measure excludes the effect of depreciation, goodwill, interest expense and income, and taxes. It is therefore unaffected by the method of accounting for the merger (purchase or pooling accounting) and the method of financing (cash, debt, or equity). As discussed below, these factors make it difficult to compare traditional accounting returns of the merged firm over time and cross-sectionally.

2.2.1. Effects of purchase and pooling accounting

In our sample, 38 mergers (76%) use the purchase method and the remaining 12 use the pooling of interests method. The purchase method restates the assets and liabilities of target firms at their current market values. No such revaluation is permitted under the pooling method. Further, under the purchase method the acquirer records any difference between the acquisition price and the market value of identifiable assets and liabilities of the target company as goodwill, and amortizes it. No goodwill is recorded
under the pooling-of-interests method. Finally, for the first year of the merger, the purchase method consolidates results of the target with those of the acquirer from the date the merger took place; the pooling method consolidates results for the two firms from the beginning of the year regardless of when the merger took place.

The same transaction typically results in lower postmerger earnings under purchase accounting than under pooling. The purchase method increases depreciation, cost of goods sold, and goodwill expenses after the takeover. Also, in the year of the merger, earnings are usually lower under purchase accounting because the target's and acquirer's earnings are consolidated for a shorter period than under pooling. The lower earnings reported under the purchase method are due to differences in the method of accounting for the merger and not to differences in economic performance. Further, postmerger book assets under the purchase method will be larger than those under pooling because of the asset write-up under the purchase method. It is therefore misleading to compare post- and premerger accounting rate of return for firms that use purchase accounting to infer whether there are economic gains from mergers.

Our operating cash flow performance measure – unlike earnings-based performance measures – is unaffected by depreciation and goodwill. It is comparable cross-sectionally and on a time-series basis when firms use different methods of accounting for the merger. We exclude the first year of the merger in our analysis because of the differences between the purchase and pooling methods in timing the consolidation of the target with the acquirer. Excluding the first year also mitigates the effect of inventory write-ups under the purchase method, since this inventory is usually included in cost of sales in the merger year. Because the asset base in our return metric is the market value of assets, rather than book value, it is also unaffected by the accounting method used to record the merger.

2.2.2. Effects of method of financing mergers

The method used to finance the sample transactions varies considerably. Thirty percent of the sample mergers are stock transactions, 26% are financed by cash, and the remaining 14% are financed by combinations of cash, stock, and other securities. It is important to control for these financing differences in measuring postmerger performance. If an acquisition is financed by debt or cash, its post-acquisition profits will be lower than if the

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6Firms using the LIFO inventory valuation method expense the written-up inventory as inventory layers are depleted, making it difficult to determine when to adjust earnings for the effect of the write-up. We therefore do not make any adjustments for these firms. This lack of adjustment will not lead to a serious downward bias in our earnings measure, however, since LIFO inventory liquidations are relatively infrequent.
same transaction is financed by stock, because income is computed after deducting interest expenses (the cost of debt), but before allowing for any cost of equity. Since the differences in earnings reflect the financing choice and not differences in economic performance, it is misleading to compare reported accounting earnings, which are computed after interest income and expense, for firms that use different methods of merger financing. We use operating cash flows before interest expense and income from short-term investments deflated by the market value of assets (net of short-term investments) to measure performance. This cash flow return is unaffected by the choice of financing.

2.3. Performance benchmark

We aggregate performance data of the target and bidding firms before the merger to obtain the pro forma premerger performance of the combined firms. Comparing the postmerger performance with this premerger benchmark provides a measure of the change in performance. But some of the difference between premerger and postmerger performance could be also due to economywide and industry factors, or to a continuation of firm-specific performance before the merger. Hence, we use abnormal industry-adjusted performance of the target and bidding firms as our primary benchmark to evaluate postmerger performance.

Abnormal industry-adjusted performance is measured as the intercept of a cross-sectional regression of postmerger industry-adjusted cash flow returns on the corresponding premerger returns. For each year and firm, industry-adjusted performance measures are calculated by subtracting the industry median from the sample firm value. The data for sample firms are excluded when calculating the industry median. Value Line industry definitions immediately before the merger are used for the target and acquirer in both the premerger and the postmerger analysis. Industry data are collected from Compustat Industrial and Research files.

2.4. Comparison with prior research

Earlier studies of postmerger performance have a number of methodological problems, making their findings difficult to interpret. Ravenscraft and Scherer (1987) examine the performance in 1974 to 1977 for firms acquired between 1950 and 1977. Since the postmerger years examined are not aligned with the merger, it is hard to know what to make of the performance comparisons.

Ravenscraft and Scherer focus exclusively on acquired firms' lines of business. It is not obvious why gains from mergers would be reflected only in the acquired segments; synergies are just as likely to improve the perfor-
mance of the other lines of business of the acquiring firms. The authors also use FTC line-of-business data, which have several potential problems. Definitions of business segments may change systematically after mergers if acquirers restructure their operations. Results of tests using segment data reported to the FTC are also likely to be difficult to interpret, since reporting firms have incentives to use accounting discretion to mask superior performance, thereby reducing the likelihood of antitrust suits by the FTC [see Watts and Zimmerman (1986)].

Herman and Lowenstein (1988) examine postmerger performance using a sample of hostile acquisitions between 1975 and 1983. Complete postmerger data are unavailable for transactions after 1979, however, which limits the analysis to a small number of postmerger years for many sample firms. Further, the return on equity measure, which is used to judge postmerger performance, does not control for differences in pooling and purchase accounting, methods of merger financing, or the effect of common industry shocks. These limitations make it difficult to interpret the study’s findings.

3. Cash flow return performance

3.1. Operating cash flow returns

As described in section 2, we aggregate pretax operating cash flows for the target and acquiring firms to determine pro forma cash flows for the combined firms in each of the five years before the merger (years −5 to −1). Postmerger operating cash flows are the actual values reported by the merged firm in years 1 to 5. We deflate the operating cash flows by the market value of assets. Operating cash flow returns are the ratio of operating cash flows during a given year to the market value of assets at the beginning of that year. The market value of assets is recomputed at the beginning of each year to control for changes in the size of the firm over time. For premerger years the market value of assets is the sum of the values for the target and acquiring firms. The market value of assets of the combined firm is used in the postmerger years.

We exclude the change in equity values of the target and acquiring firms at the merger announcement from the asset base in the postmerger years. For the target the change in equity value is measured from five days before the first offer is announced (not necessarily by the ultimate acquirer) to the date the target is delisted from trading on public exchanges. For the acquirer the change in equity value is measured from five days before its first offer is announced to the date the target is delisted from trading on public exchanges. In an efficient stock market these revaluations represent the capitalized value of any expected postmerger performance improvements. If merger announcement equity revaluations are included in the asset base, measured
cash flow returns will not show any abnormal increase, even though the merger results in an increase in operating cash flows.

For example, consider an acquiring firm (company A) and a target (company T) with annual operating cash flows of $20 and $10 forever. Both firms have the same cost of capital (10%), implying that their market values are $200 and $100. Therefore, a portfolio comprising of A and T has a market value of $300 and cash flows of $30, producing an annual return of 10%. Suppose that when A acquires T combined cash flows increase to $35 per year. An efficient market capitalizes this $5 improvement at $50. If post-merger cash flow returns are computed as the ratio of postmerger cash flows ($35) and postmerger assets including the premium ($350), measured performance will be identical to the premerger operating return for the portfolio of A and T (10%). There is no improvement in the measured cash flow return even though cash flows per year have increased by $5. Our measure of performance is computed as the ratio of postmerger cash flows ($35) and postmerger assets excluding the asset revaluation ($350 - $50). This return measure (11.7%) correctly reflects the improvement in operating performance after the merger.

We also adjust the merging firms' performance for the impact of contemporaneous unrelated events by measuring industry cash flow returns during the same ten-year period. We use Value Line industry definitions, and exclude the target and acquiring firms' returns from the industry computations. Before the merger, industry values for the sample firms are constructed by weighting median performance measures for the target and acquiring firms' industries by the relative asset sizes of the two firms at the beginning of each year. In all of the postmerger years target and acquirer industry cash flow returns are weighted by the relative asset sizes of the two firms one year before the merger.

We focus our analysis on years -5 to -1 and 1 to 5. Year 0, the year of the merger, is excluded from the analysis for two reasons. First, many of the acquiring firms use the purchase accounting method, implying that in the year of the merger the two firms are consolidated for financial reporting purposes only from the date of the merger. Results for this year are therefore not comparable across firms or for industry comparisons. Second, year 0 figures are affected by one-time merger costs incurred during that year, making it difficult to compare them with results for other years.

3.1.1. Changes in cash flows and assets

Table 1 reports the changes in cash flows and assets in years 1 to 5 relative to the year before the merger. The merged firms have a median increase in cash flows of 14% in year 1, 17% in year 2, 16% in years 3 and 4, and 9% in year 5. This cash flow growth does not indicate that the merged firms
Table 1
Postmerger firm and industry growth in operating cash flows and market value of assets for 50 combined target and acquirer firms in mergers completed in the period 1979 to mid-1984.a

<table>
<thead>
<tr>
<th>Growth period in relation to merger</th>
<th>Firm cash flow growth rate</th>
<th>Firm asset growth rate</th>
<th>Industry cash flow growth rate</th>
<th>Industry asset growth rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year −1 to 1</td>
<td>14%</td>
<td>15%</td>
<td>10%</td>
<td>20%</td>
</tr>
<tr>
<td>Year −1 to 2</td>
<td>17</td>
<td>20</td>
<td>11</td>
<td>33</td>
</tr>
<tr>
<td>Year −1 to 3</td>
<td>16</td>
<td>28</td>
<td>14</td>
<td>40</td>
</tr>
<tr>
<td>Year −1 to 4</td>
<td>16</td>
<td>23</td>
<td>22</td>
<td>43</td>
</tr>
<tr>
<td>Year −1 to 5</td>
<td>9</td>
<td>18</td>
<td>24</td>
<td>56</td>
</tr>
</tbody>
</table>

aOperating cash flows are sales less cost of goods sold, less selling and administrative expenses, plus depreciation. The market value of assets, measured at the beginning of the year, is the market value of equity plus the book values of preferred stock and net debt. Year −1 cash flow and asset values for the combined firm are weighted averages of target and acquirer values, with the weights being the relative asset values of the two firms. Postmerger values use data for the merged firms. Industry-adjusted cash flow and asset growth rates are computed for each firm and year as the difference between the sample-firm growth rate in that year and growth rates for aggregated cash flows and assets of other firms in the same industry (as defined by Value Line in year −1). Target and acquirer industry growth rates are weighted by the relative asset values of the acquirer and target firms in year −1.

bSignificantly different from zero at the 1% level, using a two-tailed test.

cSignificantly different from zero at the 5% level, using a two-tailed test.

performed better in the postmerger period, however, because assets also increased during this period. Asset values increase by 15% in year 1, 20% in year 2, 28% in year 3, 23% in year 4, and 18% in year 5. Also, the sample firms’ industries experience growth in cash flows and assets in the postmerger period. The cash flow return measures we use to gauge performance adjust for changes in the size of the sample firms and their corresponding industries that are evident in table 1.

3.1.2. Raw cash flow returns

Panel A of table 2 reports median pretax unadjusted operating cash flow returns for the merged firms (column 2) in years −5 to −1 and 1 to 5. The median pretax operating returns range from 24.5% to 26.8% in the five years before the merger, with a median annual value of 25.3%. After the merger, the median pretax operating returns are lower, ranging from 18.4% to 22.9% with a median annual value of 20.5% for the whole period. As indicated in table 1, this decline arises because cash flows grow more slowly than assets in

7To calculate the sample median pretax operating cash flow return for years −5 to −1, we first compute the median return in these years for each sample firm. The reported sample median is the median of these values. Sample median returns in the postmerger period are calculated the same way.
the postmerger period. These changes cannot be attributed to the merger, however, if there is a contemporaneous downward trend in industry cash flow returns. Industry-adjusted returns, which are differences between values for the merged firms and their weighted-average industry median estimates, correct for this problem.

3.1.3. Industry-adjusted cash flow returns

Columns 3 and 4 in panel A, table 2 show median industry-adjusted cash flow returns and the percentage of sample firms with positive industry-adjusted returns. Merged firms have higher operating cash flow returns on assets than their industries' in the postmerger period. Median industry-adjusted operating returns for the merged firms are 3.0% in year 1, 5.3% in year 2, 3.2% in year 3, and 3.0% in year 4, all significantly different from zero. Year 5 also shows better performance than the industry, but is not statistically significant. The percentage of positive industry-adjusted returns is 67% in year 1, 79% in year 2, 70% in year 3, and 68% in year 4, all well above the value expected by chance alone (50%). Overall, the annual median return for the sample firms in the five postmerger years is 2.8%, about 16% larger than their industries' returns.

The benchmark for the significant postmerger industry-adjusted returns depends on the relation between industry-adjusted returns before and after the merger. If there is no relation between pre- and postmerger industry-adjusted returns, the appropriate benchmark for the postmerger industry-adjusted returns is zero. Alternatively, the appropriate benchmark is the premerger industry-adjusted return if firms that perform above or below their industries before the merger are likely to realize the same performance after the merger.

For our sample, there is no evidence of superior industry-adjusted pretax operating cash flow returns in the premerger period. Median returns are not significantly different from zero in four of the five years. The percentage of positive industry-adjusted returns is not significantly different from the value expected by chance in four of the five years before the merger. The overall median annual return in the premerger period is only 0.3%, which is statistically insignificant. This suggests that, on average, the postmerger performance is not due to a continuation of superior premerger industry performance. In the next section we use a cross-sectional regression approach to compare performance before and after the merger.

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8Throughout the paper we use a two-tailed test and a 10% or lower cutoff significance level. This is equivalent to a 5% cutoff one-tailed test for the many cases where the hypotheses examined are directional.

9We calculate the percentage increase relative to the industry as 2.8/(20.5 - 2.8).
Table 2
Median operating cash flow return on actual market value of assets for 50 combined target and acquirer firms in years surrounding mergers completed in the period 1979 to mid-1984.a

Panel A: Pre- and postmerger operating cash flow returns

<table>
<thead>
<tr>
<th>Year relative to merger</th>
<th>Firm median</th>
<th>Industry-adjusted</th>
<th>Number of observations</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Median</td>
<td>% positive</td>
<td></td>
</tr>
<tr>
<td>-5</td>
<td>24.5%</td>
<td>0.4%</td>
<td>50%</td>
</tr>
<tr>
<td>-4</td>
<td>26.2</td>
<td>0.1</td>
<td>51</td>
</tr>
<tr>
<td>-3</td>
<td>26.8</td>
<td>2.1d</td>
<td>63c</td>
</tr>
<tr>
<td>-2</td>
<td>26.4</td>
<td>0.0</td>
<td>49</td>
</tr>
<tr>
<td>-1</td>
<td>25.4</td>
<td>1.2</td>
<td>54d</td>
</tr>
</tbody>
</table>

Median annual performance for years -5 to -1

<table>
<thead>
<tr>
<th>Year</th>
<th>Firm median</th>
<th>Industry-adjusted</th>
<th>Number of observations</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Median</td>
<td>% positive</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>21.5%</td>
<td>3.0%b</td>
<td>67%c</td>
</tr>
<tr>
<td>2</td>
<td>22.9</td>
<td>5.3b</td>
<td>79a</td>
</tr>
<tr>
<td>3</td>
<td>20.6</td>
<td>3.2c</td>
<td>70b</td>
</tr>
<tr>
<td>4</td>
<td>18.4</td>
<td>3.0d</td>
<td>68b</td>
</tr>
<tr>
<td>5</td>
<td>18.5</td>
<td>2.5</td>
<td>60</td>
</tr>
</tbody>
</table>

Median annual performance for years 1 to 5

<table>
<thead>
<tr>
<th>Year</th>
<th>Firm median</th>
<th>Industry-adjusted</th>
<th>Number of observations</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Median</td>
<td>% positive</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>20.5%</td>
<td>2.8%b</td>
<td>73%b</td>
</tr>
</tbody>
</table>

Panel B: Abnormal industry-adjusted postmerger operating cash flow returns (t-values in parentheses)

\[
LACR_{post,i} = 2.8 \% + 0.37 LACR_{pre,i}, \quad R^2 = 0.10, \quad F\text{-statistic} = 5.3^c, \quad N = 47
\]

aOperating cash flow return on assets is sales less cost of goods sold, less selling and administrative expenses, plus depreciation, divided by the market value of assets at the beginning of the year. Change in equity values of the target and acquiring firms at the merger announcement are excluded from the market values of assets in the postmerger years. Industry-adjusted cash flow returns are computed for each firm and year as the difference between the sample firm value in that year and median values for other firms in the same industry (as defined by Value Line in year -1). Premerger returns for the combined firm are weighted averages of target and acquirer returns, with the weights being the relative asset values of the two firms. Postmerger returns use data for the merged firms. Premerger industry returns are weighted averages of target and acquirer industry median returns, with the weights being the relative asset values of the acquirer and target firms each year. In the postmerger period the weights used to compute industry returns are the relative asset values of the acquirer and target firms in year -1. \(LACR_{post,i}\) and \(LACR_{pre,i}\) are the median annual industry-adjusted operating cash flow returns in the post- and premerger periods for firm \(i\).

bSignificantly different from zero at the 1% level, using a two-tailed test.

cSignificantly different from zero at the 5% level, using a two-tailed test.

dSignificantly different from zero at the 10% level, using a two-tailed test.
3.1.4. Abnormal industry-adjusted cash flows returns

Our measure of abnormal industry-adjusted returns extends the industry-adjusted return measure to incorporate the relation between pre- and post-merger industry-adjusted returns. Abnormal industry-adjusted cash flow returns are estimated using the following cross-sectional regression:

\[ IACR_{post,i} = \alpha + \beta IACR_{pre,i} + \epsilon_i, \]  

where \( IACR_{post,i} \) is the median annual industry-adjusted cash flow return for company \( i \) from the postmerger years and \( IACR_{pre,i} \) is the premerger median for the same company. Our measure of the abnormal industry-adjusted return is the intercept \( \alpha \) from (1). The slope coefficient \( \beta \) captures any correlation in cash flow returns between the pre- and postmerger years so that \( \beta IACR_{pre,i} \) measures the effect of the premerger performance on postmerger returns. The intercept \( \alpha \) is therefore independent of premerger returns.

As shown in panel B of table 2, for our sample, the estimate of \( \beta \) is 0.37, indicating that industry-adjusted cash flow returns tend to persist over time. The estimate of \( \alpha \) shows that there is a 2.8% per-year increase in postmerger cash flow returns after premerger performance is controlled for. This evidence indicates that there is a significant improvement in the merged firms' cash flow returns in the post-merger period.\(^\text{10}\)

3.2. Sensitivity analysis

3.2.1. Use of Value Line industry definitions

The industry-adjusted results are strikingly different from the operating cash flow returns before industry adjustment. The industry-adjusted results show a significant increase in postmerger performance and the unadjusted returns show a decrease. We think that industry-adjusted returns are a more reliable measure of performance, since they control for industry events unrelated to the merger. But, they are also sensitive to the definitions of industries used in the analysis. To test whether the industry-adjusted results are sensitive to the particular industry definitions employed by Value Line, we use a market performance benchmark. We estimate the market index each year as the median operating cash flow return for all firms on the Compustat Industrial and Research tapes. Median market-adjusted cash flow returns for the sample firms are 1.3% (statistically insignificant) in the

\(^{10}\) These results remain unchanged when we reestimate the model excluding outlier observations identified using Belsley, Kuh, and Welsch (1980) influence diagnostics. We also conduct specification tests for regression equation (1) to assess whether the residuals are homoskedastic [see White (1980)] and normally distributed. We cannot reject the hypotheses that the residuals are homoskedastic and normally distributed at the 5% level.
premerger period and 4.3% (statistically significant) in the postmerger years, confirming improvements in industry-adjusted performance. A reestimation of (1) using market-adjusted cash flow returns indicates that, on average, returns increase by 5.4% per year in the postmerger period after premerger performance is controlled for.

3.2.2. Change in market value of assets

Our measure of industry-adjusted returns can increase in the postmerger period if investors lower their assessment of merged firms' prospects in relation to their industries. Since we use the market value of equity in our computation of asset values, a postmerger decline in equity value will reduce our measure of asset values. If cash flows are held constant, such a decline in asset values would lead to an increase in cash flow returns, making the postmerger improvements documented in the previous section spurious. To examine this possibility, we compute the difference between annual stock returns for the sample firms and their industries in years surrounding the merger.

Summary statistics on equity returns in years surrounding the merger are reported in table 3. We compute both raw equity returns and industry-adjusted returns for years -5 to -1 and 1 to 5 using Compustat data. These same data are used to estimate the market value of assets to compute cash flow returns. Because daily data are not available on Compustat, we use CRSP returns to compute raw and industry-adjusted equity returns for three subperiods in year 0: the premerger period, the period from the merger announcement to completion, and the postmerger period.

Consistent with the evidence reported in the literature, the median returns in the preannouncement and announcement periods in year 0 are -3.0% and 7.7%, which are statistically significant. There is no evidence that the market value of equity for the sample firms declines in comparison with their industries in the postmerger period. Median industry-adjusted returns are insignificant in the postmerger period in years 0 to 4, and are significantly positive in year 5. Mean industry-adjusted returns, which are not reported here, are comparable to the sample medians. Therefore, the postmerger cash flow return improvements do not appear to be driven by a postmerger decline in equity value, which is used in the denominator of our return measure.

3.2.3. Use of market value of assets to compute returns

We also evaluate the sensitivity of the results to the use of the market value of equity in computing asset values by replicating the cash flow returns using an alternative asset measure. Market equity values incorporate investor's revaluations of firms' growth opportunities, as well as existing assets. We construct an alternative measure of equity values that excludes the effect of revisions in growth opportunities after the merger announcement.
Median industry-adjusted and raw stock returns for combined target and acquirer companies in the five years before the merger, and for the merged firm for five years after the merger, for mergers completed in the period 1979 to mid-1984.a

<table>
<thead>
<tr>
<th>Year relative to merger</th>
<th>Industry-adjusted returns</th>
<th>Raw returns</th>
<th>Number of observations</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-5</td>
<td>2.8%</td>
<td>17.9%</td>
<td>48</td>
</tr>
<tr>
<td>-4</td>
<td>5.3c</td>
<td>22.6</td>
<td>49</td>
</tr>
<tr>
<td>-3</td>
<td>0.9</td>
<td>19.2</td>
<td>49</td>
</tr>
<tr>
<td>-2</td>
<td>-0.1</td>
<td>10.9</td>
<td>49</td>
</tr>
<tr>
<td>-1</td>
<td>-2.6</td>
<td>10.9</td>
<td>45</td>
</tr>
<tr>
<td>Premerger</td>
<td>-3.0c</td>
<td>4.9</td>
<td>42</td>
</tr>
<tr>
<td>Year 0</td>
<td>Merger</td>
<td>7.7b</td>
<td>49</td>
</tr>
<tr>
<td>Postmerger</td>
<td>-3.8</td>
<td>4.7</td>
<td>46</td>
</tr>
<tr>
<td>1</td>
<td>0.1</td>
<td>10.0</td>
<td>48</td>
</tr>
<tr>
<td>2</td>
<td>0.8</td>
<td>18.5</td>
<td>48</td>
</tr>
<tr>
<td>3</td>
<td>0.8</td>
<td>10.0</td>
<td>46</td>
</tr>
<tr>
<td>4</td>
<td>-2.5</td>
<td>9.8</td>
<td>41</td>
</tr>
<tr>
<td>5</td>
<td>7.1c</td>
<td>14.4</td>
<td>40</td>
</tr>
</tbody>
</table>

"Returns in years -5 to -1 and 1 to 5 are taken from Compustat, consistent with the equity values reported in Table 1. Returns in year 0 are from CRSP. For target firms, the merger announcement period is the date from the first announcement of a takeover offer for the target to the date a merger is completed. For acquirers, the merger announcement period is the date from the first announcement of a takeover offer by the acquirer to the date a merger is completed. Premerger returns for the combined firm are weighted averages of target and acquirer values, with the weights being the relative equity values of the two firms. Postmerger performance measures use data for the merged firms. Industry-adjusted returns are computed for each firm and year as the difference between the sample-firm value in that year and median values for other firms in the same industry (as defined by Value Line in year -1). Premerger industry returns are weighted averages of target and acquirer industry median returns, with the weights being the relative equity values of the acquirer and target firms each year. In the postmerger period the weights used to compute industry returns are the relative equity values of the acquirer and target firms in year -1.

aSignificantly different from zero at the 1% level, using a two-tailed test.

"For firms that use purchase accounting, new debt or equity issued at the merger includes the merger premium for the target, whereas for firms that use the pooling method it does not. To make the measure comparable across firms, we deduct the target premium for the purchase accounting firms in computing the quasi-market values of equity.

To compute the value of equity for the combined firm at the beginning of year 1, we start with the total market equity value for the target and acquirer at the beginning of year -1. We then add year -1 and year 0 values of the merged firm's after tax cash from operations (net of interest expense, nonoperating income, and cash taxes) and cash from new share issues, and subtract cash dividends to common and preferred stockholders and cash used to acquire treasury stock. In each of years 2 through 5, we repeat this procedure using the estimated equity at the beginning of the prior year, and.
adding changes in equity cash flows for the merged firm during the prior year. The resulting quasi-market equity measure captures changes in equity available for reinvestment, but does not reflect revaluations of growth opportunities after the merger announcement.

To provide a benchmark for evaluating the postmerger returns, we also compute comparable equity values at the beginning of years -5 to -1. For year -1 we use the actual market value of assets at the beginning of the year. To compute the pro forma equity value for the combined firm at the beginning of year -2, we start with the total market value of equity for the target and acquirer at the beginning of year -1. We then subtract year -2 values of the target’s and acquirer’s after-tax cash from operations (net of interest expense, nonoperating income, and cash taxes) and cash from new share issues, and add cash dividends to common and preferred stockholders and cash used to acquire treasury stock. This procedure is repeated for years -3 to -5.

We estimate the quasi-market value of assets in each of the years -5 to +5 as the sum of the quasi-market value of equity estimated as above and the book value of net debt. We then compute the ratio of operating cash flow to the estimated quasi-market value of assets in each year to provide an alternative return measure.

The main advantage of the cash flow return on the quasi-market value of assets is that it excludes postmerger equity market revaluations from the asset base. The measure preserves some important features of the original measure: it is unaffected by the method of merger financing or asset write-ups, and reflects funds invested in the firm in each year. But, it is not without limitations. The measure does not take into account reductions in asset values from economic depreciation. This can lead to a significant overstatement of asset values in the postmerger period, leading in turn to an understatement of measured postmerger performance. Also, for firms that use purchase accounting, cash from operations for the target in year 0 is reflected in the acquirers’ records only from the date the merger is consummated. This leads to a small understatement of the postmerger asset values. Both these limitations are avoided by the market value of assets used in our original cash flow return measure.

Cash flow returns computed using the alternative measure of asset values are reported in table 4. The results are generally consistent with the findings reported in table 2. The merged firms continue to show higher cash flow returns on assets than their industries in the postmerger period. Median industry-adjusted pretax operating returns for the merged firms are 2.8% in year 1, 2.6% in year 2, and 2.1% in year 3, all significantly different from zero. The percentage of industry-adjusted returns that are positive is 67% in year 1, 62% in year 2, and 65% in year 3, all above the value expected by chance alone (50%). Overall, the annual median pretax return in the five postmerger years is 3.2%. 
Table 4
Median operating cash flow return on quasi-market value of assets for 50 combined target and acquirer firms in years surrounding mergers completed in the period 1979 to mid-1984.

<table>
<thead>
<tr>
<th>Year relative to merger</th>
<th>Firm median</th>
<th>Industry-adjusted median</th>
<th>% positive</th>
<th>Number of observations</th>
</tr>
</thead>
<tbody>
<tr>
<td>-5</td>
<td>31.7%</td>
<td>-2.5%</td>
<td>47%</td>
<td>43</td>
</tr>
<tr>
<td>-4</td>
<td>31.1</td>
<td>0.3</td>
<td>51</td>
<td>45</td>
</tr>
<tr>
<td>-3</td>
<td>32.5</td>
<td>2.7</td>
<td>59</td>
<td>46</td>
</tr>
<tr>
<td>-2</td>
<td>26.8</td>
<td>2.0</td>
<td>54</td>
<td>46</td>
</tr>
<tr>
<td>-1</td>
<td>25.4</td>
<td>1.2</td>
<td>54</td>
<td>46</td>
</tr>
</tbody>
</table>

Panel A: Pre- and postmerger operating cash flow returns

<table>
<thead>
<tr>
<th>Year relative to merger</th>
<th>Median annual performance for years -5 to -1</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>31.3%</td>
</tr>
<tr>
<td></td>
<td>2.1%</td>
</tr>
<tr>
<td></td>
<td>56%</td>
</tr>
<tr>
<td>1</td>
<td>23.9%</td>
</tr>
<tr>
<td></td>
<td>3.8%</td>
</tr>
<tr>
<td></td>
<td>67%</td>
</tr>
<tr>
<td>2</td>
<td>20.3</td>
</tr>
<tr>
<td></td>
<td>3.0c</td>
</tr>
<tr>
<td></td>
<td>62c</td>
</tr>
<tr>
<td>3</td>
<td>18.7</td>
</tr>
<tr>
<td></td>
<td>2.1d</td>
</tr>
<tr>
<td></td>
<td>65c</td>
</tr>
<tr>
<td>4</td>
<td>15.6</td>
</tr>
<tr>
<td></td>
<td>0.8</td>
</tr>
<tr>
<td></td>
<td>56</td>
</tr>
<tr>
<td>5</td>
<td>18.2</td>
</tr>
<tr>
<td></td>
<td>0.5</td>
</tr>
<tr>
<td></td>
<td>53</td>
</tr>
</tbody>
</table>

Median annual performance for years 1 to 5

<table>
<thead>
<tr>
<th>Year relative to merger</th>
<th>Median annual performance</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>17.9%</td>
</tr>
<tr>
<td></td>
<td>3.2%c</td>
</tr>
<tr>
<td></td>
<td>66%c</td>
</tr>
</tbody>
</table>

Panel B: Abnormal industry-adjusted postmerger operating cash flow returns (t-values in parentheses)

\[
IACR_{\text{post,i}} = 2.7\% + 0.18 \times IACR_{\text{pre,i}}, \quad R^2 = 0.05, \quad F\text{-statistic} = 2.3, \quad N = 46
\]

*Pretax operating cash flow return on assets is sales less cost of goods sold, less selling and administrative expenses, plus depreciation, divided by quasi-market value of assets at the beginning of the year. The computation of quasi-market value of assets begins with market values in year -1 and adjusts for changes in capital available for reinvestment in other years. Premerger returns for the combined firm are weighted averages of target and acquirer values, with the weights being the relative asset values of the two firms. Postmerger returns are for the merged firm. Industry-adjusted cash flow returns are computed for each firm and year as the difference between the sample-firm value in that year and median values for other firms in the same industry (as defined by Value Line in year -1). Premerger industry returns are weighted averages of target and acquirer industry median returns, with the weights being the relative asset values of the acquirer and target firms each year. In the postmerger period the weights used to compute industry returns are the relative asset values of the acquirer and target firms in year -1. \(IACR_{\text{post,i}}\) and \(IACR_{\text{pre,i}}\) are the median annual industry-adjusted pretax operating cash flow returns in the post- and premerger periods for firm \(i\).

\(a\)Significantly different from zero at the 1% level, using a two-tailed test.

\(b\)Significantly different from zero at the 5% level, using a two-tailed test.

\(c\)Significantly different from zero at the 10% level, using a two-tailed test.
In contrast to the postmerger performance, there is no strong evidence of superior industry-adjusted pretax operating cash flow returns in the premerger period. Median returns are not significantly different from zero in each of the five years. Also, the percentage of positive industry-adjusted returns is not significantly different from the value expected by chance in any of the five years before the merger. The overall median annual industry-adjusted return in the premerger period is 2.1%, which is statistically insignificant.

To examine whether there are abnormal postmerger industry-adjusted cash flow returns, we again estimate (1) using return on assets based on quasi-market equity values. The slope coefficient, which captures any persistence of performance between the pre- and postmerger years, is 0.18 and insignificant. The intercept, which captures postmerger performance controlling for premerger returns, is 2.7% and is statistically reliable. These results remain unchanged when we reestimate the model excluding outliers identified using Belsley, Kuh, and Welsch (1980) influence diagnostics.\(^{12}\)

In summary, the evidence presented in this section indicates that the postmerger performance improvements are not driven by the use of market equity values in computing assets.

3.3. Components of industry-adjusted cash flow returns

The improvements in cash flow returns in the postmerger period can arise from a variety of sources. These include improvements in operating margins, greater asset productivity, or lower labor costs. Alternatively, they may be achieved by focusing on short-term performance improvements at the expense of the long-term viability of the firm. In this section we provide evidence on which of these sources contribute to the sample firms’ postmerger cash flow return increases. The specific variables analyzed are italicized in the text and defined in table 5. The results are reported in table 6.

3.3.1. Operating performance changes

The operating cash flow return on assets can be decomposed into cash flow margin on sales and asset turnover. Cash flow margin on sales measures the pretax operating cash flows generated per sales dollar. Asset turnover measures the sales dollars generated from each dollar of investment in assets. The variables are defined so that their product equals the operating cash flow return on assets.

\(^{12}\)We again conduct specification tests for (1) to assess whether the residuals are homoskedastic [see White (1980)] and normally distributed. We cannot reject the hypotheses that the residuals are homoskedastic and normally distributed at the 5% level.
Table 5
Definitions of variables used to analyze actual performance of 50 targets and 50 acquirers in years surrounding mergers.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cash flow margin on sales</td>
<td>Earnings before depreciation, interest, and taxes as a percentage of sales</td>
</tr>
<tr>
<td>Asset turnover</td>
<td>Sales divided by market value of assets at the beginning of the year (the market value of common equity plus the book values of debt and preferred stock)</td>
</tr>
<tr>
<td>Employee growth rate</td>
<td>Change in number of employees as a percentage of number of employees in the previous year</td>
</tr>
<tr>
<td>Pension expense/employee</td>
<td>Pension expense per employee</td>
</tr>
</tbody>
</table>

(A) Operating characteristics

(B) Investment characteristics

The results in table 6 suggest that the increase in industry-adjusted operating returns is attributable to an increase in asset turnover, rather than an increase in operating margins. In years $-5$ to $-1$ the merged firms have industry-adjusted median asset turnover of $-0.2$, implying that they generated 20 cents less in sales than their competitors for each dollar of assets. In years 1 to 5 they close this gap as they achieve asset turnovers comparable to their industries'. The intercept in the cross-sectional regression of postmerger industry-adjusted asset turnover on premerger turnover is 0.2 and is statistically significant. The evidence thus indicates that there is a significant improvement in sample firms' asset turnover in the postmerger period.

The merged firms also have higher pretax operating margins on sales than their industries in the postmerger years. But these cannot be attributed to the merger itself, because they are also higher in the premerger period. Before the merger, the higher operating margins are primarily due to higher industry-adjusted margins for acquirers. Targets do not show higher operating
Table 6
Firm and industry-adjusted operating performance and investment policy measures for 50 combined target and acquirer firms in years surrounding mergers completed in the period 1979 to mid-1984.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Firm medians</th>
<th>Industry-adjusted medians</th>
<th>Abnormal industry-adjusted postmerger performance</th>
<th>Number of observations</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Premerger</td>
<td>Postmerger</td>
<td>Premerger</td>
<td>Postmerger</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operating characteristics</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cash flow margin on sales</td>
<td>14.3%</td>
<td>13.3%</td>
<td>1.4%</td>
<td>1.1%</td>
</tr>
<tr>
<td>Asset turnover</td>
<td>1.9x</td>
<td>1.9x</td>
<td>-0.2x</td>
<td>0.0x</td>
</tr>
<tr>
<td>Employee growth rate</td>
<td>3.0%</td>
<td>-3.0%</td>
<td>0.4%</td>
<td>-2.5%</td>
</tr>
<tr>
<td>Pension expense per employee</td>
<td>$796.3</td>
<td>$840.7</td>
<td>$101.1c</td>
<td>-$60.4</td>
</tr>
<tr>
<td>Investment characteristics</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Capital expenditure rate</td>
<td>14.4%</td>
<td>10.6%</td>
<td>1.0%</td>
<td>-0.1%</td>
</tr>
<tr>
<td>Asset sale rate – Cash value</td>
<td>0.6</td>
<td>0.6</td>
<td>0.0</td>
<td>0.1</td>
</tr>
<tr>
<td>Asset sale rate – Book value</td>
<td>0.9</td>
<td>1.3</td>
<td>0.1d</td>
<td>0.6c</td>
</tr>
<tr>
<td>R &amp; D rate</td>
<td>2.0</td>
<td>2.1</td>
<td>0.1</td>
<td>0.0</td>
</tr>
</tbody>
</table>

*Operating performance and investment policy measures are defined in table 5. Industry-adjusted values of these variables are computed for each firm and year as the difference between the firm value in that year and the median value for other firms in the same industry (as defined by Value Line in year – 1). Before the merger, performance measures for the merged firm are weighted averages of target and acquirer values, with the weights being the relative sizes of the two firms. Performance measures for the merged firm's industry in the premerger period are weighted averages of target industry and acquirer industry medians, with the weights being the relative sizes of the two test firms. Medians in the premerger (postmerger) period are the median values of the variables in years -5 to -1 (1 to 5).

*Postmerger industry-adjusted performance measures controlling for premerger performance are the estimated intercepts from regressing postmerger industry-adjusted performance on premerger values.

*Significantly different from zero at the 1% level, using a two-tailed test.

*dSignificantly different from zero at the 5% level, using a two-tailed test.

eSignificantly different from zero at the 10% level, using a two-tailed test.
margins than their industries in these years. When we control for premerger operating margins, there is no evidence of a significant change in margins after the merger. Rather, merged firms seem to use their assets more productively.

Mergers also give the acquirer an opportunity to renegotiate explicit and implicit labor contracts to lower labor costs and achieve a more efficient mix of capital and labor [see Shleifer and Summers (1988)]. Because we are unable to obtain sufficient data on wages directly, we examine employee growth rates and pension expense per employee to analyze changes in labor costs in years surrounding the mergers.

The median number of employees declines in each of the postmerger years. Overall, the industry-adjusted employee growth rate is negative after we control for the growth rate in the premerger period. There is also evidence of a decline in pension expense per employee after the merger. Before the merger the sample firms have a significantly higher pension expense per employee than their industries. After the merger the pension expense of the merged firms is reduced to the industry level. There are two ways to view these findings. One interpretation is that mergers are followed by improvements in operating efficiency achieved through reduced labor costs. Alternatively, mergers lead to a wealth redistribution between employees and stockholders through renegotiations of explicit and implicit employment contracts. Whatever the explanation, the labor cost reductions in the postmerger period do not appear to be large, since they do not lead to significant changes in postmerger operating margins.  

3.3.2. Investment policy changes

Since our analysis is limited to five years after the merger, we cannot provide direct evidence on cash flows beyond this period. To assess whether the merged firms focus on short-term performance improvements at the expense of long-term investments, we examine their capital outlays and research and development (R&D) expense. These expenditure patterns are reported in table 6. The median capital expenditures as a percentage of assets is 14.4% in the premerger period and 10.6% in the postmerger years. The median R&D expense is 2% of assets in years –5 to –1 and 2.1% in years 1 to 5. The capital expenditures and R&D of the sample firms are not significantly different from those of their industry counterparts in either the pre- or the postmerger period.

13 Pontiff, Shleifer, and Weisbach (1990) report that 11% of takeovers involve pension fund reversions, accounting for 10–13% of takeover premiums in these transactions. Thus for their sample as a whole pension fund reversions account for an average 1–2% of the takeover premium. Similarly, Rosett (1990) reports that labor union wealth changes in the six years following takeovers account for 1–2% of the premiums. Our conclusions are consistent with the results of both these studies.
Asset sales also reflect changes in merged firms' investment policies. It is possible that postmerger improvements in asset turnover arise from the sale of assets with low turnover. We therefore examine cash proceeds from asset sales and their book values in the pre- and postmerger years. Statistics on asset sales as a percentage of the market value of assets are reported in table 6. The median cash proceeds from asset sales for the merged firms is 0.6% of assets in both the pre- and postmerger periods, not significantly different from their industry level in either period. The book values of asset disposals before and after the merger are 0.9% and 1.3% of assets. Both of these rates are significantly higher than the rates for their industry counterparts. Further, controlling for the level of premerger book values of asset sales, there is an increase in asset sales in the postmerger period.

There are two potential explanations for the increase in book value of asset sales, but not in cash proceeds from disposals. First, the merged firms sell poorly performing assets after the merger. This could in part explain the improved asset productivity and the decline in employee growth rates. Second, the assets sold are written up at the merger to a value higher than their true market value. Managers have considerable discretion in allocating merger premiums to assets and goodwill, and have incentives to write up assets as high as possible to increase depreciation tax shields. If these assets are subsequently sold, cash proceeds from the sale are likely to be below the written-up book values. Whatever the explanation, the effect of asset sales on postmerger performance is unlikely to be significant, because disposals in all years are very small in relation to capital expenditures or the market value of total assets. This is confirmed by the insignificant correlation between asset sales and postmerger cash flow return improvements.

In summary, we find that improvements in cash flow operating returns in the five years following mergers arise from increased asset productivity. There is no evidence of decreased capital expenditures or R&D following mergers, indicating that the cash flow improvements do not come from policies that impede the long-term viability of the merged firms.

4. Relation between cash flow and stock price performance

Our postmerger data on cash flow performance are consistent with the hypothesis that the stock market revaluation of merging firms at merger announcements reflects expected future improvements in operations. A more powerful test of this hypothesis is to correlate the merger-related stock

14 Kaplan and Weisbach (1992) find that acquirers of firms in unrelated businesses are more likely to later divest their targets than acquirers of related businesses. They find no evidence, however, that divested businesses are systematically poor performers.

15 We reestimate (1) after including asset sales in the pre- and postmerger periods. The coefficients on both these variables are insignificant, and the intercept remains positive and significant.
Table 7

Unexpected equity and asset returns at merger announcements for target, acquirer, and combined firms, and tests of the relation between unexpected asset returns and ex post cash flow returns for 50 target and acquiring firms merging in the period 1979 to mid-1984.

Panel A: Distribution of unexpected equity returns at merger announcement

<table>
<thead>
<tr>
<th></th>
<th>Target</th>
<th>Acquirer</th>
<th>Combined</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>45.6%b</td>
<td>-2.2%</td>
<td>9.1%b</td>
</tr>
<tr>
<td>First quartile</td>
<td>21.2%</td>
<td>-16.6%</td>
<td>-2.9%</td>
</tr>
<tr>
<td>Median</td>
<td>41.8%b</td>
<td>-3.6%</td>
<td>6.6%b</td>
</tr>
<tr>
<td>Third quartile</td>
<td>64.1%</td>
<td>3.4%</td>
<td>16.7%</td>
</tr>
</tbody>
</table>

Panel B: Distribution of unexpected asset returns at merger announcement

<table>
<thead>
<tr>
<th></th>
<th>Target</th>
<th>Acquirer</th>
<th>Combined</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>40.6%b</td>
<td>0.6%</td>
<td>8.8%b</td>
</tr>
<tr>
<td>First quartile</td>
<td>19.9%</td>
<td>-9.3%</td>
<td>-2.3%</td>
</tr>
<tr>
<td>Median</td>
<td>32.5%b</td>
<td>-2.2%</td>
<td>5.2%b</td>
</tr>
<tr>
<td>Third quartile</td>
<td>55.0%</td>
<td>6.1%</td>
<td>15.1%</td>
</tr>
</tbody>
</table>

Panel C: Relation between median postmerger industry-adjusted cash flow returns and unexpected asset returns at merger announcement (t-values in parentheses)

\[
\begin{align*}
IACR_{post,i} &= 1.9% + 0.26 IACR_{pre,i} + 0.24 (\Delta V/V') \\
&= (1.6) (1.7) (3.4) \\
R^2 &= 0.30, \\
F\text{-statistic} &= 8.5^b, \\
N &= 42
\end{align*}
\]

aUnexpected merger announcement equity returns are the sum of market-adjusted changes in equity values for the target and acquirer firms in the merger announcement period as a percentage of the sum of the premerger equity values for the two firms. Unexpected merger announcement asset returns (\(\Delta V/V')\) are unlevered market-adjusted equity returns. \(IACR_{post}\) and \(IACR_{pre}\) are median industry-adjusted cash flow returns for each firm in the five years after and the five years before the merger.

bSignificantly different from zero at the 1% level, using a two-tailed test.

Significantly different from zero at the 10% level, using a two-tailed test.

4.1. Stock returns at merger announcements

Market-adjusted stock returns for the target and acquirer at the announcement of the merger are reported in panel A of table 7. Returns for the target are measured from five days before the first offer is announced (not

Risk-adjusted returns, computed using premerger market model estimates, are similar to the market-adjusted returns reported in the paper.
necessarily by the ultimate acquirer) to the date the target is delisted from trading on public exchanges. Returns for the acquirer are measured from five days before its first offer is announced to the date the target is delisted from trading on public exchanges. Much as earlier studies have found, target shareholders earn large positive returns from mergers (mean 45.6% and median 41.8%), and acquiring stockholders earn insignificant returns.

We also compute the aggregate market-adjusted return for the two firms in the merger announcement period. This return is the weighted average of the market-adjusted returns for the target and acquirer, where the weights are the relative market values of equity of the two firms before the merger announcement period. The mean aggregate return, reported in panel A of table 7, is 9.1%, and the median is 6.6%. Both these values are significantly different from zero. These findings are consistent with those of Bradley, Desai, and Kim (1988).

4.2. Asset returns at merger announcements

Our tests examine whether the change in equity values at merger announcements can be explained by cash flow return improvements in the postmerger period. In section 3 we measured postmerger performance using cash flow return on assets, whereas the merger announcement returns computed above are returns on equity. Therefore, before we correlate merger announcement returns and postmerger cash flow improvements, we compute asset returns at merger announcements from equity returns to ensure that the anticipated gains from mergers and the measured gains are comparable.

Asset returns at the merger announcement \( \Delta V/V \) are weighted averages of returns to equity \( \Delta E/E \) and debt \( \Delta D/D \):

\[
\frac{\Delta V}{V} = \frac{\Delta E}{E} \frac{E}{V} + \frac{\Delta D}{D} \frac{D}{V}.
\]

(2)

Assuming that the value of debt does not change at takeover announcements, asset returns equal the equity announcement returns multiplied by the equity-to-assets ratio \( E/V \).\textsuperscript{17} We use leverage at the beginning of the year of the takeover announcement to compute the equity-to-assets ratio. We use the book value of debt and the market value of equity to measure leverage.

Summary statistics on the estimated asset returns at the announcement of the merger for the target firms, acquiring firms, and combined firms are reported in panel B of table 7. The mean and median asset returns for the

\textsuperscript{17}A number of studies, including Asquith and Kim (1982), report evidence consistent with this assumption.
targets are 40.6% and 32.5% and for the combined firms 8.8% and 5.2%. The asset returns for the bidding firm are insignificant.

4.3. Relation between announcement returns and postmerger cash flow improvements

The hypothesis that merger-induced abnormal returns reflect the capitalized value of future cash flow improvements implies:

$$\Delta V = \frac{\Delta CF}{\Theta},$$

where $\Delta V$ is the change in the market value of assets at the merger announcement, $1/\Theta$ is the present value operator, and $\Delta CF$ is the vector of cash flow improvements. Transposing (3) and dividing both sides by $V$, to express both sides as returns:

$$\frac{\Delta CF}{V} = \frac{\Theta}{V} \Delta V.$$

We measure $\Delta CF/V$ as abnormal industry-adjusted cash flow returns [(1) in section 3]:

$$\frac{\Delta CF}{V} = \alpha = IACR_{post,i} - \beta IACR_{pre,i} - \epsilon_i,$$

where $IACR_{post,i}$ and $IACR_{pre,i}$ are the median annual industry-adjusted operating cash flow returns in the post- and premerger periods for firm $i$. We measure asset returns, $\Delta V/V$, as unlevered market-adjusted stock returns for the combined target and acquirer firms at the merger announcement, discussed in section 4.2. Substituting these two measures for variables in (4) and rearranging yields:

$$IACR_{post,i} = \beta IACR_{pre,i} + \frac{\Theta}{V} \Delta V + \epsilon_i.$$

Eq. (6) forms the basis for our tests of the relationship between ex post cash flow improvements and the anticipated gains represented by merger announcement returns. Since $\Delta V/V$ is the capitalized value of future cash flow return improvements and $IACR_{post}$ is the pretax cash flow return improvement per year, the coefficient $\Theta$ in (6) equals the pretax capitalization rate. For example, if the cash flow return improvements are permanent and the pretax capitalization rate is 20%, the coefficient $\Theta$ would be 0.20.
Although (6) does not have a constant, we estimate a regression equation with an intercept and test whether it is zero.

The regression results are shown in panel C of table 7. The estimated model has an $R^2$ of 30%. The estimated slope coefficient on asset returns at the merger announcement is 0.24 and is statistically reliable, implying that if cash flow return improvements are permanent, the pretax discount rate for the sample firms is 24%. This estimated discount rate is economically plausible, although it exceeds the pretax cost of capital for our sample firms assuming a 10% pretax risk-free rate and an 8% risk premium. Consistent with findings reported earlier, the estimated coefficient on premerger performance is positive and statistically significant. Finally, as predicted by (6), the intercept is insignificant.\textsuperscript{18}

As an alternative specification, we estimate a regression equation with merger announcement returns, $\Delta V/V$, as the dependent variable and abnormal industry-adjusted cash flow returns from (1), $\Delta CF/V$, as the independent variable. The estimated coefficient for the abnormal industry-adjusted cash flow returns is 1.01 and is statistically significant with a $t$-statistic of 3.2. The implied capitalization rate from this specification is 100%. Since this specification, as well as the specification in (6), suffers from potential errors-in-variables problems, the actual rate at which the market capitalizes postmerger cash flow improvements is likely to be between 24% and 100%.

There are two interpretations of the statistically and economically significant relation between our measure of postmerger performance improvements and the market’s revaluation of the merged firms’ equity at the merger announcement. First, if equity markets are efficient, the findings indicate that our estimates of postmerger performance are reasonable. Alternatively, the findings can be viewed as evidence that the stock price gains at the merger announcement are related to expectations of subsequent cash flow improvements.

5. Discussion

Our finding that there are postmerger cash flow increases advances the debate on mergers from whether there are cash flow changes after these transactions to why these cash flow improvements occur. The improvements in sample firms’ cash flow returns are primarily a result of increased asset

\textsuperscript{18}Specification tests are conducted for (6) to assess whether the residuals are homoskedastic [see White (1980)] and normally distributed. We cannot reject the hypotheses that the residuals are homoskedastic and normally distributed at the 5% level. We also reestimated the regression excluding observations more than two standard deviations from the mean for each variable. The results are very similar to those reported. Finally, we estimate Spearman rank correlation coefficients between the median annual postmerger industry-adjusted cash flow return and unexpected asset returns at the merger announcement. The correlation is 0.41 and is significant at the 1% level.
productivity. The reported postmerger gains cannot be attributed to tax benefits, since the cash flow returns are pretax. Although there is some evidence that gains come at the expense of labor, reduced labor costs do not significantly increase sample firms' cash flows. Finally, there is no decrease in capital outlays and R&D expenditures after the merger, indicating that merged firms do not reduce their long-term investments.

Our findings raise two interesting questions. First, are the increases in cash flow returns and asset productivity caused by the merger, or would they have occurred without it? Mergers can lead to increased asset productivity if suboptimal policies pursued by the target or the acquirer before the merger are eliminated, or if they provide new opportunities to use existing resources of the merging firms. In contrast, if mergers arise from undervaluation of the target firms by the stock market, cash flow returns will improve whether or not there is a merger. Managers who anticipate the cash flow improvements will pay a premium to acquire the targets.

Our findings also raise another question: what economic factors explain the cross-sectional variation in postmerger cash flow changes? Although cash flow performance improves on average, a quarter of the sample firms have negative postmerger cash flow changes. These firms may have performed poorly because of bad luck. Alternatively, systematic business and managerial reasons may have led to these outcomes.

These questions, which have important managerial and public policy implications, can be answered only through development of structural models of how mergers improve cash flows. We do not attempt to undertake such an ambitious exercise in this paper, but, we do provide some preliminary evidence and suggest directions for future research.

5.1. Business overlap of merging firms and postmerger performance

One popular hypothesis on how mergers improve cash flows is that they provide opportunities for economies of scale and scope, synergy, or product market power. This implies that mergers by firms that have overlapping businesses will show greater cash flow improvements than mergers between firms with no overlap. We examine this proposition by classifying our sample mergers as those with high, medium, and low business overlap between the target and acquiring firms. This classification is made by reading the line of business discussion in the merging firms' annual reports, merger prospectuses, Value Line reports, and Moody's Industrial Manuals.

The following cases illustrate our classifications. The combination of Best Products and Modern Merchandising, both of which are catalog showroom retailers, is classified as a high overlap transaction. The merger between Holiday Inns and Harrahs is treated as a transaction with medium overlap because Holiday Inns operates a hotel chain and Harrahs operates casinos
and associated hotels. Exxon Corp's acquisition of Reliance Electric is an unrelated transaction: Exxon is an oil company and Reliance Electric is a producer of industrial equipment. Classification of the degree of business overlap of each of the sample transactions is reported in the appendix, where we describe our sample mergers in detail.

To evaluate whether postmerger performance improvements differ by the degree of business overlap, we estimate the following regression:

\[ IACR_{post,i} = \alpha + \beta IACR_{pre,i} + \theta MEDIUM_i + \psi HIGH_i + \epsilon_i, \]  

where \( IACR_{post,i} \) and \( IACR_{pre,i} \) are the median annual industry-adjusted cash flow returns in the post- and premerger periods for firm \( i \), \( HIGH \) is a dummy variable that is one if the target and acquirers are in highly overlapping businesses and zero otherwise, and \( MEDIUM \) is a dummy variable that is one if there is a medium overlap between the target and acquiring firms' businesses and zero otherwise. The intercept coefficient (\( \alpha \)) represents the postmerger abnormal cash flow returns for firms in nonoverlapping businesses, whereas the coefficients \( \theta \) and \( \psi \) show the differential postmerger returns of firms in medium and high overlapping businesses. As in (1), the variable \( IACR_{pre} \) is included in the model to control for premerger performance.

The results are reported in panel A of table 8. The estimated coefficient on \( IACR_{pre} \) is positive and significant, similar to that reported in earlier regressions. The estimated intercept and coefficients on \( MEDIUM \) and \( HIGH \) are not significant, indicating that the degree of business overlap has no impact on postmerger performance improvements. These results, however, are sensitive to two extreme observations identified using Belsley, Kuh, and Welsh (1980) outlier diagnostics. We reestimate the model excluding these observations and report the results in panel B of table 8. The intercept and the coefficient of \( MEDIUM \) remain insignificant, indicating that there is no performance improvement associated with mergers between firms with little or medium business overlap. Transactions with a high business overlap, however, have 5.1\% improvements in postmerger performance. Mergers with a high business overlap, therefore, show significant postmerger improvement, whereas other types of mergers do not.

The two outliers in the above analysis are the LTV–Republic Steel merger and Penn Central's acquisition of G.K. Technologies. LTV and Republic Steel have highly overlapping businesses, yet the combination performed very poorly. In contrast, there is little overlap between the businesses of Penn Central and G.K. Technologies, yet the merger was followed by excellent performance. These two observations are obviously exceptions to the conclusion above, indicating that the relation between the merging firms' businesses is not the sole determinant of postmerger performance.
Table 8
Comparison of postmerger performance for mergers between firms whose industries have high, medium, and low overlap for 50 target and acquiring firms merging in the period 1979 to mid-1984.a

<table>
<thead>
<tr>
<th>Panel A: Full sample (t-values in parentheses)</th>
</tr>
</thead>
<tbody>
<tr>
<td>$IACFR_{post,i} = 0.018 + 0.005 MEDIUM_i + 0.033 HIGH_i + 0.35 IACR_{pre,i}$</td>
</tr>
<tr>
<td>$R^2 = 0.13, \quad F$-statistic $= 2.2,^{d} \quad N = 47$</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Panel B: Sample excluding outliersb (t-values in parentheses)</th>
</tr>
</thead>
<tbody>
<tr>
<td>$IACFR_{post,i} = 0.006 + 0.016 MEDIUM_i + 0.051 HIGH_i + 0.33 IACR_{pre,i}$</td>
</tr>
<tr>
<td>$R^2 = 0.17, \quad F$-statistic $= 2.9^{c} \quad N = 45$</td>
</tr>
</tbody>
</table>

a$IACR_{post}$ and $IACR_{pre}$ are median industry-adjusted cash flow returns for each firm in the five years after and the five years before the merger. $MEDIUM$ and $HIGH$ are dummy variables that take the value one if the merger is between two firms whose product markets have medium and high overlap.

bThis sample excludes two observations identified as influential outliers using Belsey, Kuh, and Welsch (1980) diagnostics. These transactions are the LTV–Republic Steel and the Penn Central–GK Technologies mergers.

cSignificantly different from zero at the 5% level, using a two-tailed test.

dSignificantly different from zero at the 10% level, using a two-tailed test.

5.2. Transaction characteristics of merging firms and postmerger performance

Transaction characteristics, such as the form of financing, whether the transaction is hostile or friendly, and the size of the target firm, are frequently cited as important to the ultimate success of mergers. We use postmerger cash flow returns for different types of transactions to examine each of the hypotheses associated with these characteristics. We estimate a cross-sectional regression similar to (7) with dummy variables representing the form of financing and find no significant postmerger performance differences between transactions financed with equity, cash, or a mixture of securities. We also do not find any relation between the merger-related abnormal stock returns for the combined firm and the form of financing.19

A similar approach is used to test whether postmerger performance differs for hostile and friendly transactions. Using the information from Wall Street Journal articles that discuss the initial offer, we classify transactions as hostile, friendly, white knight, and indeterminate. We do not find any

19Previous studies examine the relation between stock returns and the form of financing for acquiring and target firms separately. See Huang and Walkling (1987) and Asquith, Bruner, and Mullins (1990).
evidence of postmerger cash flow performance or merger-related abnormal stock return differences among any of these transaction types.

Finally, we examine whether size of the acquisition influences postmerger performance. Two variables are used in this analysis: the log of target assets and the ratio of target assets to acquirer's assets, both one year prior to the acquisition. Neither variable explains cross-sectional variation in postmerger performance.

In summary, while there is some evidence that the degree of business overlap between merging firms influences postmerger performance, there is little evidence that transaction characteristics have a significant impact.20 We view our analysis on the determinants of postmerger performance as preliminary, however, since our study is designed to examine whether performance improves after a merger.

Given the complexity and heterogeneity of reasons for mergers, we believe that large-sample studies will provide limited new insights into factors that influence the outcomes of mergers. A promising approach is to examine a smaller number of mergers in greater detail. These clinical studies can provide valuable evidence on the mechanisms through which mergers increase cash flows, and are likely to be fruitful avenues for future research.21

6. Summary

This paper examines the post-acquisition operating performance of merged firms using a sample of the 50 largest mergers between U.S. public industrial firms completed in the period 1979 to mid-1984. We develop a methodology to deal with a number of measurement issues that arise in studying the consequences of takeovers. Further, we integrate accounting and stock return data in a consistent fashion to permit richer tests of corporate control theories. This general approach has been adopted by several recent studies to examine mergers and acquisitions – Tehranian and Cornett (1991) and Linder and Crane (1991) analyze performance in bank mergers, and Jarrell (1991) investigates postmerger performance using analysts’ forecasts of sales margins.

Our findings indicate that merged firms have significant improvements in operating cash flow returns after the merger, resulting from increases in asset productivity relative to their industries. These improvements are particularly strong for transactions involving firms in overlapping businesses. Postmerger cash flow improvements do not come at the expense of long-term perfor-

20 The findings on the relation between transaction characteristics and postmerger performance are not sensitive to outliers.

mance, since sample firms maintain their capital expenditure and R&D rates relative to their industries after the merger. Finally, there is a strong positive relation between postmerger increases in operating cash flows and abnormal stock returns at merger announcements, indicating that expectations of economic improvements explain a significant portion of the equity revaluations of the merging firms.

Appendix

Acquiring / target firms and their industries

This appendix provides a detailed description of the sample used in the analysis. The business descriptions and industry classifications of acquirer and target firms are based on Value Line reports before the merger. The relation between the firms is a subjective classification by the authors of the degree of overlap between the target’s and acquirer’s businesses. Relative size of the target is the ratio of the target’s assets to acquirer’s assets one year before the merger. Assets are measured as the market value of common equity plus the book values of preferred stock and net debt. Acquisition date is the date the merger was completed and the target was delisted from the public exchange. Target equity values are the market value of common equity one year before the merger. Acquirer stock return is the market-adjusted stock return from five days before the acquirer’s offer announcement to the merger completion. Target stock return is the market-adjusted stock return from five days before the first offer announcement (not necessarily by the ultimate acquirer) to the merger completion.

1. American Medical International / Lifemark (Acquirer / Target)
American Medical owns and operates proprietary hospitals and other health-care businesses (94% of revenue in 1982) and offers medical–technical support. Lifemark owns and manages general hospitals (90% of 1982 revenues) and provides cardiopulmonary, physical therapy, pharmacy, and clinical laboratory services.

<table>
<thead>
<tr>
<th>Acquirer industry:</th>
<th>Medical services</th>
<th>Target industry:</th>
<th>Medical services</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acquisition date:</td>
<td>Jan. 20 1984</td>
<td>Relation between firms:</td>
<td>High overlap</td>
</tr>
<tr>
<td>Target equity value:</td>
<td>$808.0 million</td>
<td>Relative size of target:</td>
<td>34%</td>
</tr>
<tr>
<td>Acquirer stock return:</td>
<td>-16.0%</td>
<td>Target stock return:</td>
<td>55.1%</td>
</tr>
</tbody>
</table>

2. Anheuser-Busch Companies / Campbell Taggart Inc.
Anheuser-Busch is the world’s largest brewer of beer. Campbell Taggart’s business is baking and distributing bread, rolls, crackers, cake and other sweet products, and food products.

<table>
<thead>
<tr>
<th>Acquirer industry:</th>
<th>Brewing</th>
<th>Target industry:</th>
<th>Food processing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acquisition date:</td>
<td>Nov. 2 1982</td>
<td>Relation between firms:</td>
<td>Low overlap</td>
</tr>
<tr>
<td>Target equity value:</td>
<td>$536.3 million</td>
<td>Relative size of target:</td>
<td>15.8%</td>
</tr>
<tr>
<td>Acquirer stock return:</td>
<td>-3.0%</td>
<td>Target stock return:</td>
<td>-4.8%</td>
</tr>
</tbody>
</table>
3. Associated Dry Goods / Caldor Inc.
Associated Dry Goods operates general department stores in 25 states. Caldor operates 65 promotional discount department stores in five states.

<table>
<thead>
<tr>
<th>Acquirer industry:</th>
<th>Retail stores</th>
<th>Target industry:</th>
<th>Retail stores</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acquisition date:</td>
<td>May 27 1981</td>
<td>Relation between firms:</td>
<td>High overlap</td>
</tr>
<tr>
<td>Target equity value:</td>
<td>$309.5 million</td>
<td>Relative size of target:</td>
<td>47.5%</td>
</tr>
<tr>
<td>Acquirer stock return:</td>
<td>9.3%</td>
<td>Target stock return:</td>
<td>36.7%</td>
</tr>
</tbody>
</table>

4. Avon Products Inc. / Mallinckrodt
Avon is the world’s largest manufacturer of cosmetics and toiletries, and also sells costume jewelry and ceramics. Mallinckrodt develops and manufactures fine chemicals, drugs and other health care products, and chemicals for the food, cosmetics, laboratory, petrochemical, and printing industries.

<table>
<thead>
<tr>
<th>Acquirer industry:</th>
<th>Toiletries/cosmetics</th>
<th>Target industry:</th>
<th>Specialty chemical</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acquisition date:</td>
<td>March 8 1982</td>
<td>Relation between firms:</td>
<td>Low overlap</td>
</tr>
<tr>
<td>Target equity value:</td>
<td>$574.6 million</td>
<td>Relative size of target:</td>
<td>31.2%</td>
</tr>
<tr>
<td>Acquirer stock return:</td>
<td>-5.9%</td>
<td>Target stock return:</td>
<td>18.3%</td>
</tr>
</tbody>
</table>

5. Best Products / Modern Merchandising Inc.
Best Products and Modern Merchandising sell general merchandise through catalog showrooms.

<table>
<thead>
<tr>
<th>Acquirer industry:</th>
<th>Retail-special lines</th>
<th>Target industry:</th>
<th>Retail-special lines</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acquisition date:</td>
<td>Sept. 15 1982</td>
<td>Relation between firms:</td>
<td>High overlap</td>
</tr>
<tr>
<td>Target equity value:</td>
<td>$114.3 million</td>
<td>Relative size of target:</td>
<td>55.6%</td>
</tr>
<tr>
<td>Acquirer stock return:</td>
<td>-16.7%</td>
<td>Target stock return:</td>
<td>15.7%</td>
</tr>
</tbody>
</table>

Brown-Forman manufactures a wide variety of alcoholic beverages. Lenox produces home furnishings (including china and crystal) and personal-use products (including jewelry and luggage).

<table>
<thead>
<tr>
<th>Acquirer industry:</th>
<th>Distilling and tobacco</th>
<th>Target industry:</th>
<th>Household products</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acquisition date:</td>
<td>July 21 1983</td>
<td>Relation between firms:</td>
<td>Low overlap</td>
</tr>
<tr>
<td>Target equity value:</td>
<td>$407.0 million</td>
<td>Relative size of target:</td>
<td>19.1%</td>
</tr>
<tr>
<td>Acquirer stock return:</td>
<td>-7.7%</td>
<td>Target stock return:</td>
<td>55.7%</td>
</tr>
</tbody>
</table>

7. Burroughs Corp. / Memorex Corp.
Burroughs is a major participant in the data processing and business computer equipment industry. Memorex develops, manufactures, markets, and services a wide range of computer peripheral equipment systems, and products employed in the recording, retrieval, communication, and storage of information.

<table>
<thead>
<tr>
<th>Acquirer industry:</th>
<th>Computer/data processing products</th>
<th>Target industry:</th>
<th>Computer/data processing products</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acquisition date:</td>
<td>Dec. 3 1981</td>
<td>Relation between firms:</td>
<td>High overlap</td>
</tr>
<tr>
<td>Target equity value:</td>
<td>$98.8 million</td>
<td>Relative size of target:</td>
<td>10.4%</td>
</tr>
<tr>
<td>Acquirer stock return:</td>
<td>-2.7%</td>
<td>Target stock return:</td>
<td>52.9%</td>
</tr>
</tbody>
</table>

8. Coca Cola Co./ Columbia Pictures Industries Inc.
Coca Cola is the largest manufacturer and distributor of soft drink concentrates and syrups in the world. The company also manufactures citrus, coffee, tea, wine, and plastic products. Columbia Pictures produces and distributes theatrical motion pictures, television series and features, amusement games, and commercials.

<table>
<thead>
<tr>
<th>Acquirer industry:</th>
<th>Soft drinks</th>
<th>Target industry:</th>
<th>Recreation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acquisition date:</td>
<td>June 21 1982</td>
<td>Relation between firms:</td>
<td>Low overlap</td>
</tr>
<tr>
<td>Target equity value:</td>
<td>$704.3 million</td>
<td>Relative size of target:</td>
<td>11.4%</td>
</tr>
<tr>
<td>Acquirer stock return:</td>
<td>2.2%</td>
<td>Target stock return:</td>
<td>78.2%</td>
</tr>
</tbody>
</table>

9. Con Agra Inc. / Peavey Co.
Con Agra is a diversified food processor engaged in agriculture (agricultural chemicals, formula feed, and fertilizers), grain (flour, by-products, and grain and feed merchandising), and food
(frozen foods, broiler chicken, eggs, seafood, and pet products) industries. Peavey is also a diversified food processor and retailer engaged in grain merchandising, food processing (flour, bakery mixes, and jams), and the operation of specialty retail stores.

Acquirer industry: Food processing  
Target industry: Food processing  
Acquisition date: July 20, 1982  
Target equity value: $186.5 million  
Acquirer stock return: 2.7%  
Relation between firms: High overlap  
Relative size of target: 71.9%  
Target stock return: 58.1%

10. Cooper Industries / Gardner-Denver
Cooper is a diversified, international corporation that produces consumer and industrial tools, aircraft services, mining and construction, and energy services. Gardner-Denver makes portable and stationary air compressors, drilling equipment for above- and underground, and air-operated tools. Drilling equipment for mining, petroleum, and construction industries makes up 67% of sales.

Acquirer industry: Machinery  
Target industry: Construction and mining machinery  
Acquisition date: April 30, 1979  
Target equity value: $605.5 million  
Acquirer stock return: -5.2%  
Relation between firms: Medium overlap  
Relative size of target: 66.7%  
Target stock return: 49.7%

11. Dart Industries / Kraft Inc.
Dart is a diversified company that manufactures and markets consumer products (including Tupperware containers, Duracell batteries, and West Bend appliances), chemicals, plastics, and packaging products. Kraft manufactures food products and markets them to retail, industrial, and food service customers.

Acquirer industry: Household products  
Target industry: Food processing  
Acquisition date: Sept. 25, 1980  
Target equity value: $1,099.4 million  
Acquirer stock return: -17.0%  
Relation between firms: Low overlap  
Relative size of target: 78.7%  
Target stock return: -6.6%

12. Diamond Shamrock / Natomas Co.
Diamond Shamrock is a domestic integrated oil and gas company with interests in coal and chemicals. Natomas is principally engaged in petroleum exploration and production. Its operations also include ocean shipping, coal, real estate, and geothermal energy.

Acquirer industry: Integr. petroleum  
Target industry: Integr. petroleum  
Acquisition date: Aug. 31, 1983  
Target equity value: $1,610.0 million  
Acquirer stock return: -1.6%  
Relation between firms: High overlap  
Relative size of target: 80.2%  
Target stock return: 66.7%

13. E. I. Du Pont de Nemours / Conoco Inc.
Du Pont manufactures diversified lines of chemicals, plastics, specialty products, and fibers. Conoco is engaged in the exploration, production, and transportation of crude oil, coal, and natural gas; petroleum refining; and the production, processing, and transportation of chemicals.

Acquirer industry: Basic chemicals  
Target industry: Integr. petroleum  
Acquisition date: Sept. 30, 1981  
Target equity value: $5,524.9 million  
Acquirer stock return: 16.5%  
Relation between firms: Low overlap  
Relative size of target: 82.7%  
Target stock return: 33.1%

Eaton is engaged in areas of transportation, materials handling, industrial automation, security, construction, agriculture, and consumer durables. Cutler-Hammer designs and manufactures electronic and electrical components and systems for industrial, aerospace, air traffic control, semiconductor, housing, and consumer markets.

Acquirer industry: Replacement auto parts  
Target industry: Electrical equipment  
Acquisition date: Jan. 2, 1979  
Target equity value: $382.7 million  
Acquirer stock return: -8.4%  
Relation between firms: Low overlap  
Relative size of target: 19.7%  
Target stock return: 60.7%
15. Exxon Corp./Reliance Electric Co.
Exxon is engaged in the exploration, production, and transportation of crude oil and natural gas, and in the production and transportation of petroleum and chemicals. Reliance develops, manufactures, and services a broad line of industrial equipment, including electric motors and drives, mechanical power transmission components, industrial and retail scales and weighting systems, and telecommunications equipment.

Acquirer industry: Integr. petroleum
Acquisition date: Dec. 27 1979
Target industry: Electrical equipment
Target equity value: $1,133.2 million
Acquirer stock return: 1.2%
Relation between firms: Low overlap
Relative size of target: 2.5%
Target stock return: 97.9%

16. Fairchild Industries /VSI Corp.
Fairchild produces military aircraft and parts, commercial aircraft and parts, spacecraft and parts, and domestic communications systems. VSI is a diversified manufacturer of a wide range of precision metal products, including fastening systems for aircraft and missiles, steel mold bases for the plastics industry, door knobs, stainless steel cabinets, and building hardware.

Acquirer industry: Diversified aerospace
Acquisition date: Nov. 7 1980
Target industry: Machinery
Target equity value: $279.1 million
Acquirer stock return: 19.1%
Relation between firms: Medium overlap
Relative size of target: 87.3%
Target stock return: 71.2%

17. Fluor Corp./St. Joe Minerals Corp.
Fluor designs, engineers, procures, and constructs complex manufacturing plants, processing plants, and related facilities for energy, natural resources, and industrial clients. St. Joe is a diversified producer of natural resources (principally lead, gold, zinc, silver, coal, oil and gas, and iron ore).

Acquirer industry: Building
Acquisition date: Aug. 3 1981
Target industry: Lead, zinc & minor metals
Target equity value: $2,011.7 million
Acquirer stock return: -19.3%
Relation between firms: Low overlap
Relative size of target: 86.0%
Target stock return: 60.9%

18. Fort Howard Paper Co./Maryland Cup Corp.
Fort Howard manufactures a broad line of disposable sanitary paper products, principally table napkins, paper towels, toilet tissue, industrial and automotive wipes, and boxed facial tissues. Maryland Cup manufactures a variety of single-use paper and plastic products for food and beverage service, including plates, cups, bowls, cutlery, drinking straws, and toothpicks. Maryland Cup markets its products to major fast-food chains, restaurants, vending operators, soft drink bottlers, contract feeders, and dairy and other food packagers.

Acquirer industry: Paper and forest products
Acquisition date: Aug. 31 1983
Target industry: Packaging and container
Target equity value: $554.8 million
Acquirer stock return: -9.5%
Relation between firms: Medium overlap
Relative size of target: 25.9%
Target stock return: 30.4%

19. Freeport Minerals Co./McMorran Oil & Gas Co.
Freeport Minerals is a diversified company engaged in exploration and development of natural resources, including agricultural minerals, uranium, oxide and kaolin, and oil and gas. (Oil and gas account for 3% of Freeport's sales.) McMorran is engaged in the acquisition, exploration, and development of oil and gas properties, and the production and sale of oil and natural gas.

Acquirer industry: Metals and mining
Acquisition date: April 7 1981
Target industry: Oil and gas
Target equity value: $455.1 million
Acquirer stock return: 14.7%
Relation between firms: Medium overlap
Relative size of target: 22.5%
Target stock return: 27.4%
20. Gannett Co. Inc./Combined Communications Corp.
Gannett and its subsidiaries publish daily newspapers. Combined Communications Corporation is engaged in outdoor advertising (45% of revenues), television and radio broadcasting (30% of revenues), and newspaper publishing (25% of revenues).

<table>
<thead>
<tr>
<th>Acquirer industry:</th>
<th>Newspaper</th>
<th>Target industry:</th>
<th>Broadcasting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acquisition date:</td>
<td>June 7 1979</td>
<td>Relation between firms:</td>
<td>Medium overlap</td>
</tr>
<tr>
<td>Target equity value:</td>
<td>$309.6 million</td>
<td>Relative size of target:</td>
<td>30.8%</td>
</tr>
<tr>
<td>Acquirer stock return:</td>
<td>−1.4%</td>
<td>Target stock return:</td>
<td>−5.0%</td>
</tr>
</tbody>
</table>


<table>
<thead>
<tr>
<th>Acquirer industry:</th>
<th>Food processing</th>
<th>Target industry:</th>
<th>Food processing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acquisition date:</td>
<td>May 5 1981</td>
<td>Relation between firms:</td>
<td>High overlap</td>
</tr>
<tr>
<td>Target equity value:</td>
<td>$460.8 million</td>
<td>Relative size of target:</td>
<td>16.7%</td>
</tr>
<tr>
<td>Acquirer stock return:</td>
<td>5.6%</td>
<td>Target stock return:</td>
<td>66.2%</td>
</tr>
</tbody>
</table>

22. Genstar Ltd./Flintkote Co.
Genstar manufactures building materials and cement (31% of revenues), and is engaged in housing and land development (36% of sales), construction (10% of sales), marine transportation, financial services, and venture capital investment. Flintkote is engaged in mining, and manufactures various building and construction materials, including gypsum wallboard, floor tile, sand and gravel products, concrete, cement, and various lime products.

<table>
<thead>
<tr>
<th>Acquirer industry:</th>
<th>Building</th>
<th>Target industry:</th>
<th>Building</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acquisition date:</td>
<td>Jan. 3 1980</td>
<td>Relation between firms:</td>
<td>High overlap</td>
</tr>
<tr>
<td>Target equity value:</td>
<td>$400.1 million</td>
<td>Relative size of target:</td>
<td>38.7%</td>
</tr>
<tr>
<td>Acquirer stock return:</td>
<td>−23.8%</td>
<td>Target stock return:</td>
<td>47.6%</td>
</tr>
</tbody>
</table>

23. Gulf & Western Industries/Simmons Co.
Gulf & Western is a conglomerate with interests in the manufacture of automotive and air-conditioning components, paper products, leisure, financial services, automotive replacement parts, consumer products, sugar growing and processing, citrus farming, natural resources, and apparel. Simmons produces furnishings for home, commercial, and institutional customers.

<table>
<thead>
<tr>
<th>Acquirer industry:</th>
<th>Conglomerate</th>
<th>Target industry:</th>
<th>Building</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acquisition date:</td>
<td>Jan. 5 1979</td>
<td>Relation between firms:</td>
<td>Low overlap</td>
</tr>
<tr>
<td>Target equity value:</td>
<td>$134.3 million</td>
<td>Relative size of target:</td>
<td>9.0%</td>
</tr>
<tr>
<td>Acquirer stock return:</td>
<td>−2.5%</td>
<td>Target stock return:</td>
<td>38.6%</td>
</tr>
</tbody>
</table>

24. Harris Corp./Lanier Business Products Inc.
Harris designs and produces voice and video communication, and information processing systems, equipment, and components. Lanier develops, manufactures, and services a broad line of dictating equipment, several models of video-display text-editing typewriters, and small-business computers.

<table>
<thead>
<tr>
<th>Acquirer industry:</th>
<th>Electronics</th>
<th>Target industry:</th>
<th>Office equipment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acquisition date:</td>
<td>Oct. 28 1983</td>
<td>Relation between firms:</td>
<td>Medium overlap</td>
</tr>
<tr>
<td>Target equity value:</td>
<td>$275.3 million</td>
<td>Relative size of target:</td>
<td>22.5%</td>
</tr>
<tr>
<td>Acquirer stock return:</td>
<td>0.4%</td>
<td>Target stock return:</td>
<td>30.4%</td>
</tr>
</tbody>
</table>

25. Holiday Inns Inc./Harrahs
Holiday Inns owns and operates hotels throughout the world. Harrahs operates two luxury casinos.

<table>
<thead>
<tr>
<th>Acquirer industry:</th>
<th>Travel services</th>
<th>Target industry:</th>
<th>Recreation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acquisition date:</td>
<td>Feb. 28 1980</td>
<td>Relation between firms:</td>
<td>Medium overlap</td>
</tr>
<tr>
<td>Target equity value:</td>
<td>$315.1 million</td>
<td>Relative size of target:</td>
<td>25.6%</td>
</tr>
<tr>
<td>Acquirer stock return:</td>
<td>−14.3%</td>
<td>Target stock return:</td>
<td>67.8%</td>
</tr>
</tbody>
</table>

26. Internorth Inc./Belco Petroleum Corp.
Internorth owns and operates natural gas businesses, produces, transports, and markets liquid fuels and petrochemicals; and is involved in the exploration and production of oil and gas. Belco
is engaged in the exploration and production of crude oil and natural gas and in the production of coal.

<table>
<thead>
<tr>
<th>Acquirer industry:</th>
<th>Natural gas</th>
<th>Target industry:</th>
<th>Integr. petroleum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acquisition date:</td>
<td>July 29 1983</td>
<td>Relation between firms:</td>
<td>High overlap</td>
</tr>
<tr>
<td>Target equity value:</td>
<td>$803.2 million</td>
<td>Relative size of target:</td>
<td>30.0%</td>
</tr>
<tr>
<td>Acquirer stock return:</td>
<td>50.4%</td>
<td>Target stock return:</td>
<td>17.1%</td>
</tr>
</tbody>
</table>

27. Kroger Inc./Dillon Companies Inc.
Kroger operates the country's second largest supermarket chain, manufactures and processes food for sale by these supermarkets, and operates one of the country's largest drugstore chains. Dillon distributes retail food through supermarkets and convenience stores.

<table>
<thead>
<tr>
<th>Acquirer industry:</th>
<th>Grocery store</th>
<th>Target industry:</th>
<th>Grocery store</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acquisition date:</td>
<td>Jan. 25 1983</td>
<td>Relation between firms:</td>
<td>High overlap</td>
</tr>
<tr>
<td>Target equity value:</td>
<td>$593.9 million</td>
<td>Relative size of target:</td>
<td>42.6%</td>
</tr>
<tr>
<td>Acquirer stock return:</td>
<td>-17.3%</td>
<td>Target stock return:</td>
<td>21.4%</td>
</tr>
</tbody>
</table>

28. Litton Industries /Itek Corp.
Litton industries is a conglomerate. Its businesses include production of office equipment, material handling equipment, machine tools, microwave cookers, medical equipment, and oil drilling equipment. Litton is also engaged in geophysical exploration, ship building, and production of advanced electronics products for defense, industrial automation, and geophysical markets. Itek develops and manufactures a variety of aerial reconnaissance and surveillance products based on optical and electronic technologies.

<table>
<thead>
<tr>
<th>Acquirer industry:</th>
<th>Conglomerate</th>
<th>Target industry:</th>
<th>Precision instruments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acquisition date:</td>
<td>Feb. 15 1983</td>
<td>Relation between firms:</td>
<td>Medium overlap</td>
</tr>
<tr>
<td>Target equity value:</td>
<td>$196.2 million</td>
<td>Relative size of target:</td>
<td>14.0%</td>
</tr>
<tr>
<td>Acquirer stock return:</td>
<td>8.5%</td>
<td>Target stock return:</td>
<td>40.9%</td>
</tr>
</tbody>
</table>

29. LTV Group /Republic Steel
LTV is the nation's third largest steel producer. In addition, the company manufactures oil field equipment and commercial aerospace and defense products. Republic Steel is the nation's seventh largest steel producer. Republic Steel also produces coal that is used in its steel operations.

<table>
<thead>
<tr>
<th>Acquirer industry:</th>
<th>Integrated steel</th>
<th>Target industry:</th>
<th>Integrated steel</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acquisition date:</td>
<td>June 29 1984</td>
<td>Relation between firms:</td>
<td>High overlap</td>
</tr>
<tr>
<td>Target equity value:</td>
<td>$408.7 million</td>
<td>Relative size of target:</td>
<td>58.4%</td>
</tr>
<tr>
<td>Acquirer stock return:</td>
<td>-23.5%</td>
<td>Target stock return:</td>
<td>-3.0%</td>
</tr>
</tbody>
</table>

30. Mapco Inc./Earth Resources Company
Mapco is a diversified energy company principally engaged in the exploration and production of coal, oil, natural gas, and natural gas liquids; pipeline transportation of natural gas liquids and anhydrous ammonia; and marketing of natural gas liquids, refined petroleum products, domestic and foreign crude oil, and liquid fertilizers. Earth Resources is a diversified energy and resources development company engaged primarily in refining, transporting, and marketing petroleum products.

<table>
<thead>
<tr>
<th>Acquirer industry:</th>
<th>Coal/uranium/geothermal</th>
<th>Target industry:</th>
<th>Integr. petroleum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acquisition date:</td>
<td>Feb. 9 1981</td>
<td>Relation between firms:</td>
<td>Medium overlap</td>
</tr>
<tr>
<td>Target equity value:</td>
<td>$369.7 million</td>
<td>Relative size of target:</td>
<td>24.6%</td>
</tr>
<tr>
<td>Acquirer stock return:</td>
<td>-4.1%</td>
<td>Target stock return:</td>
<td>35.3%</td>
</tr>
</tbody>
</table>

McGraw-Edison manufactures and distributes electrical appliances, tools, and other products for the consumer market; power-system and related equipment for electrical utilities and industry; and a wide range of services and equipment for industrial and commercial uses. Studebaker
Worthington has diversified business operations that deal with the manufacture of process equipment and industrial products.

**32. Motorola Inc./Four-Phase Systems Inc.**
Motorola produces data communication equipment and systems, semiconductors, and other high-technology electronic equipment. Four-Phase produces clustered video display systems for distributed data processing applications.

**33. Morton-Norwich Products /Thiokol Corporation**
Morton-Norwich produces ethical and proprietary drugs, salt for domestic and industrial uses, household cleaning and laundry products, and specialty chemicals. Thiokol manufactures specialty chemical products (44% of revenues), and propulsion and ordnance products and services for the government.

**34. Occidental Petroleum /Cities Service Company**
Occidental produces and markets crude oil and coal, and manufactures industrial chemicals and plastics, metal finishes, agricultural chemicals, and fertilizers. Oil and gas business accounts for 70% of the company's sales. Cities Service is an integrated oil company.

**35. Pan Am Corp./National Airlines Inc.**
Pan Am is primarily an international commercial air carrier providing services to 73 cities in 43 foreign countries. National Airlines is a domestic air carrier with routes extending from its hub in Miami to New York, San Francisco, and Los Angeles. Although the company also has transatlantic service to London, Paris, Frankfurt, and Amsterdam, 96% of its revenues are derived from domestic routes.

**36. Penn Central Corp./GK Technologies Inc.**
Penn Central is a diversified company whose primary businesses include oil refining, the transportation and marketing of refined petroleum products and crude, real estate development, operation of amusement parks, and production of offshore drilling rigs. GK Technologies produces wire and cable, primarily for the telecommunications industry, and electronic components, and provides engineering services for weapons systems and environmental products.
37. Phillips Petroleum/General American Oil of Texas

Phillips Petroleum is a fully integrated oil company engaged in petroleum exploration, production, and refining. General American is primarily engaged in oil and gas production and exploration.

<table>
<thead>
<tr>
<th>Acquirer industry:</th>
<th>Integr. petroleum</th>
<th>Target industry:</th>
<th>Petroleum production</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acquisition date:</td>
<td>March 8 1983</td>
<td>Relation between firms:</td>
<td>High overlap</td>
</tr>
<tr>
<td>Target equity value:</td>
<td>$572.0 million</td>
<td>Relative size of target:</td>
<td>14.0%</td>
</tr>
<tr>
<td>Acquirer stock return:</td>
<td>-8.1%</td>
<td>Target stock return:</td>
<td>20.1%</td>
</tr>
</tbody>
</table>

38. Raytheon Corp./Beech Aircraft Corp.

Raytheon develops and manufactures electronic systems for government and commercial use. Raytheon also supplies energy services, manufactures major home appliances, designs and manufactures heavy construction equipment, and publishes textbooks. Beech Aircraft designs, manufactures, and sells airplanes for the general aviation market. Beech is also a substantial aerospace contractor producing a variety of military aircraft, missile targets, and cryogenics systems for aerospace vehicles.

<table>
<thead>
<tr>
<th>Acquirer industry:</th>
<th>Electrical equipment</th>
<th>Target industry:</th>
<th>Aerospace/ diversified</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acquisition date:</td>
<td>Feb. 8 1980</td>
<td>Relation between firms:</td>
<td>Medium overlap</td>
</tr>
<tr>
<td>Target equity value:</td>
<td>$740.7 million</td>
<td>Relative size of target:</td>
<td>42.1%</td>
</tr>
<tr>
<td>Acquirer stock return:</td>
<td>25.5%</td>
<td>Target stock return:</td>
<td>110.4%</td>
</tr>
</tbody>
</table>

39. Revlon Inc./Technicon Corp.

Revlon is in the beauty products (65% of revenues) and health products and service business (35% of revenues). Technicon designs and produces automated testing systems for blood and other biological fluids, chemical reagents and consumables, industrial analytical instruments, and medical information systems.

<table>
<thead>
<tr>
<th>Acquirer industry:</th>
<th>Toiletries/cosmetics</th>
<th>Target industry:</th>
<th>Health care/ hospital supplies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acquisition date:</td>
<td>May 2 1980</td>
<td>Relation between firms:</td>
<td>Medium overlap</td>
</tr>
<tr>
<td>Target equity value:</td>
<td>$392.7 million</td>
<td>Relative size of target:</td>
<td>19.8%</td>
</tr>
<tr>
<td>Acquirer stock return:</td>
<td>-10.2%</td>
<td>Target stock return:</td>
<td>34.9%</td>
</tr>
</tbody>
</table>

40. R.J. Reynolds Corp./Del Monte Corp.

R.J. Reynolds's lines of business are the domestic and international manufacture and sale of tobacco products (64% of revenues), transportation (14% of revenues), energy (15% of revenues), food and beverage products (5% of revenues), and aluminum products and packaging (2% of revenues). Del Monte's principal business is in food products (primarily processed foods and fresh fruit) and related services (including transportation and institutional services).

<table>
<thead>
<tr>
<th>Acquirer industry:</th>
<th>Tobacco</th>
<th>Target industry:</th>
<th>Food processing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acquisition date:</td>
<td>Feb. 2 1979</td>
<td>Relation between firms:</td>
<td>Low overlap</td>
</tr>
<tr>
<td>Target equity value:</td>
<td>$583.0 million</td>
<td>Relative size of target:</td>
<td>13.5%</td>
</tr>
<tr>
<td>Acquirer stock return:</td>
<td>4.2%</td>
<td>Target stock return:</td>
<td>63.3%</td>
</tr>
</tbody>
</table>

41. Signal Companies/Wheelabrator Frye Inc.

Signal is a diversified, technology-based company that manufactures aerospace equipment, professional audio-video systems, and heavy trucks. Wheelabrator Frye's products and services include environmental, energy, and engineered products and services, and chemical and Specialty products.

<table>
<thead>
<tr>
<th>Acquirer industry:</th>
<th>Auto and trucks</th>
<th>Target industry:</th>
<th>Machinery</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acquisition date:</td>
<td>Feb. 1 1983</td>
<td>Relation between firms:</td>
<td>Low overlap</td>
</tr>
<tr>
<td>Target equity value:</td>
<td>$904.7 million</td>
<td>Relative size of target:</td>
<td>36.3%</td>
</tr>
<tr>
<td>Acquirer stock return:</td>
<td>8.5%</td>
<td>Target stock return:</td>
<td>15.6%</td>
</tr>
</tbody>
</table>

42. SmithKline Corp./Beckman Instruments Inc.

SmithKline researches, develops, manufactures, and markets ethical drugs, proprietary medicines, animal health products, ethical and proprietary eye care products, and ultrasonic and electronic instruments. Beckman is an international manufacturer of laboratory analytical instruments and
related chemical products that are used widely in medicine and science and in a broad range of industrial applications.

<table>
<thead>
<tr>
<th>Acquirer industry</th>
<th>Ethical drugs</th>
<th>Target industry</th>
<th>Precision instruments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acquisition date:</td>
<td>March 4 1982</td>
<td>Relation between firms:</td>
<td>Medium overlap</td>
</tr>
<tr>
<td>Target equity value:</td>
<td>$1,000.8 million</td>
<td>Relative size of target:</td>
<td>15.5%</td>
</tr>
<tr>
<td>Acquirer stock return:</td>
<td>3.1%</td>
<td>Target stock return:</td>
<td>85.4%</td>
</tr>
</tbody>
</table>

43. Sohio / Kennecott Corp.
Sohio is an integrated petroleum company engaged in all phases of the petroleum business. Kennecott produces copper, gold, silver, molybdenum, and lead; manufactures industrial abrasive and resistant materials; manufactures and markets industrial engineered systems; and owns two-thirds of a Canadian producer of titanium dioxide slag, high-purity iron, and iron powders.

<table>
<thead>
<tr>
<th>Acquirer industry</th>
<th>Integr. petroleum</th>
<th>Target industry</th>
<th>General metals and mining</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acquisition date:</td>
<td>June 3 1981</td>
<td>Relation between firms:</td>
<td>Low overlap</td>
</tr>
<tr>
<td>Target equity value:</td>
<td>$1,760.4 million</td>
<td>Relative size of target:</td>
<td>11.5%</td>
</tr>
<tr>
<td>Acquirer stock return:</td>
<td>-21.4%</td>
<td>Target stock return:</td>
<td>140.3%</td>
</tr>
</tbody>
</table>

44. Standard Brands / Nabisco Inc.
Standard Brands is a manufacturer, processor, and distributor of food and related products. Nabisco is a manufacturer and marketer of food products (specializing in cookies and crackers, which account for 60% of total sales), toiletries, pharmaceuticals, and household accessories.

<table>
<thead>
<tr>
<th>Acquirer industry</th>
<th>Food processing</th>
<th>Target industry</th>
<th>Food processing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acquisition date:</td>
<td>July 2 1981</td>
<td>Relation between firms:</td>
<td>High overlap</td>
</tr>
<tr>
<td>Target equity value:</td>
<td>$929.0 million</td>
<td>Relative size of target:</td>
<td>81.4%</td>
</tr>
<tr>
<td>Acquirer stock return:</td>
<td>1.0%</td>
<td>Target stock return:</td>
<td>-5.7%</td>
</tr>
</tbody>
</table>

45. Tenneco / Houston Oil & Minerals Corp.
Tenneco is a diversified company. Its major businesses include natural gas, petrochemicals, construction and farm equipment, automotive components, shipbuilding, chemicals, packaging, agriculture and land management, and life insurance. The recent business emphasis of Houston Oil & Minerals has been on exploration for oil and natural gas on undeveloped properties, and the development of production upon discovery. In 1980, the breakdown of revenues was oil 21%, gas 61%, and pipeline and other 21%.

<table>
<thead>
<tr>
<th>Acquirer industry</th>
<th>Natural gas</th>
<th>Target industry</th>
<th>Petroleum producing industry</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acquisition date:</td>
<td>April 23 1981</td>
<td>Relation between firms:</td>
<td>Medium overlap</td>
</tr>
<tr>
<td>Target equity value:</td>
<td>$1,447.0 million</td>
<td>Relative size of target:</td>
<td>13.9%</td>
</tr>
<tr>
<td>Acquirer stock return:</td>
<td>-21.4%</td>
<td>Target stock return:</td>
<td>-3.4%</td>
</tr>
</tbody>
</table>

46. Tosco Corp. / AZL Resources Inc.
Tosco owns and operates petroleum refineries and related wholesale distribution facilities. Prior to the merger AZL had been in the process of changing its focus from agricultural-based businesses to oil and gas exploration and production.

<table>
<thead>
<tr>
<th>Acquirer industry</th>
<th>Integr. petroleum</th>
<th>Target industry</th>
<th>Agricultural products</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acquisition date:</td>
<td>Dec. 31 1982</td>
<td>Relation between firms:</td>
<td>Low overlap</td>
</tr>
<tr>
<td>Target equity value:</td>
<td>$77.9 million</td>
<td>Relative size of target:</td>
<td>42.8%</td>
</tr>
<tr>
<td>Acquirer stock return:</td>
<td>-29.0%</td>
<td>Target stock return:</td>
<td>30.8%</td>
</tr>
</tbody>
</table>

47. U.S. Steel / Marathon Oil Co.
U.S. Steel's principal businesses include steel, chemicals, resource development, fabricating and engineering, and transportation. Marathon is an integrated petroleum company engaged in the production, refining, and transportation of crude oil, natural gas, and petroleum products.

<table>
<thead>
<tr>
<th>Acquirer industry</th>
<th>Integr. steel</th>
<th>Target industry</th>
<th>Integr. petroleum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acquisition date:</td>
<td>March 11 1982</td>
<td>Relation between firms:</td>
<td>Low overlap</td>
</tr>
<tr>
<td>Target equity value:</td>
<td>$4,438.3 million</td>
<td>Relative size of target:</td>
<td>145.0%</td>
</tr>
<tr>
<td>Acquirer stock return:</td>
<td>21.4%</td>
<td>Target stock return:</td>
<td>29.0%</td>
</tr>
</tbody>
</table>
48. United Technologies / Carrier Corp.
United Technologies designs and produces high-technology power systems, flight systems, and industrial products and services. Carrier's principal business is the manufacture and sale of air conditioning equipment.

<table>
<thead>
<tr>
<th>Acquirer industry:</th>
<th>Aerospace/diversified</th>
<th>Target industry:</th>
<th>Building</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acquisition date:</td>
<td>July 6 1979</td>
<td>Relation between firms:</td>
<td>Low overlap</td>
</tr>
<tr>
<td>Target equity value:</td>
<td>$757.1 million</td>
<td>Relative size of target:</td>
<td>42.8%</td>
</tr>
<tr>
<td>Acquirer stock return:</td>
<td>-21.3%</td>
<td>Target stock return:</td>
<td>44.7%</td>
</tr>
</tbody>
</table>

49. Westinghouse Electric / Teleprompter Corp.
Westinghouse Electric is a diversified corporation primarily engaged in the manufacture and sale of electrical equipment. Westinghouse’s wholly owned subsidiary WBC operates six TV stations, 12 radio stations, and cable television systems. Teleprompter is the nation's largest cable television company and owns MUZAC, the leading supplier of music to offices and other commercial establishments.

<table>
<thead>
<tr>
<th>Acquirer industry:</th>
<th>Electrical equipment</th>
<th>Target industry:</th>
<th>Broadcasting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acquisition date:</td>
<td>Aug. 18 1981</td>
<td>Relation between firms:</td>
<td>Medium overlap</td>
</tr>
<tr>
<td>Target equity value:</td>
<td>$642.7 million</td>
<td>Relative size of target:</td>
<td>41.8%</td>
</tr>
<tr>
<td>Acquirer stock return:</td>
<td>4.8%</td>
<td>Target stock return:</td>
<td>44.5%</td>
</tr>
</tbody>
</table>

50. Williams Companies / Northwest Energy Company
Williams is primarily engaged in the chemical fertilizer (49% of revenues), natural gas (27% of sales), and metals (24% of sales) businesses. Northwest is primarily engaged in interstate natural gas transmission, oil and gas exploration, and the marketing of natural gas liquids.

<table>
<thead>
<tr>
<th>Acquirer industry:</th>
<th>Chemical/diversified</th>
<th>Target industry:</th>
<th>Natural gas</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acquisition date:</td>
<td>Nov. 30, 1983</td>
<td>Relation between firms:</td>
<td>Medium overlap</td>
</tr>
<tr>
<td>Target equity value:</td>
<td>$721.2 million</td>
<td>Relative size of target:</td>
<td>61.1%</td>
</tr>
<tr>
<td>Acquirer stock return:</td>
<td>-5.6%</td>
<td>Target stock return:</td>
<td>42.6%</td>
</tr>
</tbody>
</table>

References


Jarrell, Sherry, 1991, Do takeovers generate value? Evidence on the capital market's ability to assess takeovers, Working paper (Southern Methodist University, Dallas, TX).


