



The Effects of Downsizing on Operating Performance

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Abstract. We examine the performance of 118 firms that downsized between 1989–1993. We find that downsizing firms experience declines in operating performance prior to the downsizing announcement. Operating performance improves significantly following the downsizing. These firms are able to reduce the cost of sales, labor cost, capital expenditures and R&D expenditures. We also find that firms that perform poorly in their industries prior to the downsizing and have increases in assets following the downsizing have larger improvements in performance. There is some evidence that the improvements are greater for firms that increase their focus.

Key words: downsizing, layoffs, operating performance, corporate reorganization, cost control

JEL Classification: G14, G20

I. Introduction

“Downsizing,” defined as reducing the scale of a firm’s operations by laying off employees and/or selling assets, has become an integral part of corporate strategy. During the period 1990–1995, U.S. corporations laid off 3.19 million workers annually (*New York Times*, 1996). Jensen (1993) argues that industries and organizations have phases of growth and contraction, and that few organizations have learned to manage the contraction stage efficiently. In most industries with excess capacity, managers ignore the realities. They continue to invest until performance deteriorates severely and outsiders have to be called in to manage the reduction in firm size. Prior research, e.g., Palmon et al. (1997) and Chatrath et al. (1995), documents a positive stock-price reaction to the announcement of downsizings intended to reduce costs.

While supporters of downsizing consider it essential to staying competitive, critics view it as a gimmick intended to placate shareholders. For example, former Secretary of Labor Robert Reich argues that the market overreacts to downsizing announcements, and that downsizing does not bring about any fundamental change in the firm’s performance (Reich, 1996). Other critics argue that downsizing actually leads to losses in morale and

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declines in productivity (American Management Association Survey, 1993). In spite of its importance, there is no empirical evidence available on the reasons for and long-term consequences of downsizing strategies.

This study examines the operating performance of 118 large corporations over the eight-year period around their downsizing announcements, and provides evidence on the effectiveness of downsizing strategies. Our measure of operating performance is pretax operating cash flows scaled by the book value of lagged total assets. We use three benchmarks to evaluate the effectiveness of downsizing strategies: the firm's own past performance, industry medians, and the performance of a matched (control) sample of firms. We then try to determine the sources of improvements in operating performance by examining select accounting ratios and by analyzing the changes in the operating and cost structure of these firms. In addition, we develop a regression model to identify the factors that contribute to a successful downsizing.

Managers frequently cite poor industry conditions or weak demand as a reason for downsizing. Consistent with this we find that downsizing firms have poor operating performance prior to the announcement of the downsizing. They perform below their matched (control) counterparts in the four-year period prior to and including the year of downsizing announcement and below their industry medians in the year of the downsizing announcement.

Operating performance improves following the downsizing. These changes are significant even after controlling for industry effects. Following the downsizing, resources tied to working capital are reduced. There are also significant declines in the cost of sales, labor cost, and capital expenditures. Our regression results indicate that the improvements in performance are greater for firms that have poor performance (relative to their industries) prior to the downsizing and that have increases in asset size following the downsizing. There is some evidence indicating that firms that increase their focus have larger increases in operating performance.

The paper is organized as follows. Section II discusses background and related papers. The sample selection process and methodology are described in Section III. Section IV presents the results of the empirical tests on operating performance. Section V summarizes and concludes.

II. Background

As we stated in the Introduction, Jensen (1993) argues that industries and organizations have phases of growth and contraction, and that few organizations have learned to manage the contraction stage efficiently. In most industries with excess capacity, managers ignore the realities and continue to invest until performance deteriorates severely and outsiders have to be called in to manage the reduction in firm size. This happens because managerial compensation and benefits tend to increase with firm size (e.g., Stulz (1990) or Jensen and Murphy (1990)). For example, in the tire industry, the introduction of radial tires greatly reduced the demand for tires because radial tires last over three times longer than the bias-ply tires they replaced. But, in spite of this shrinking demand, tire companies continued to invest in increased production capacity.

However, when managerial interests are aligned with those of shareholders (through efficient compensation design for example) they take decisions that maximize firm value. In a clinical study, Dial and Murphy (1995) examine downsizing at General Dynamics (GD), a defense contractor in a declining industry. They find that by recognizing excess capacity, the management at GD was able to maximize shareholder value by restructuring through downsizing and partial liquidation while other firms in the defense industry were still consolidating or diversifying through acquisitions. GD shareholders realized a three-year return of 553% during the 1991–1993 period, outperforming the 110% return of the industry and the 55% return of the S&P 500 Index during the same period.

Most previous work in finance has examined the stock market reaction to the downsizing announcement. Sun and Tang (1997) find that the market reacts positively to layoff announcements that are used to reduce costs, and negatively to layoff announcements that are due to adverse market conditions. They also find an association between future performance measures and the reasons cited for the layoff announcement. Linn and Rozeff (1993) find that on average the stock-price reaction to the announcement of layoffs is negative. They argue that this is consistent with the argument that firms announce layoffs when there is decreased demand for their products. Blackwell et al. (1990) and Gombola and Tsetsekos (1992) find that plant-closing announcements are usually associated with negative stock returns. Chatrath et al. (1995) examine the stock market reaction to the downsizing announcement and find that stock prices react positively. Statman and Sepe (1989) examine the stock market reaction to project termination announcements and find a positive price reaction to these announcements. John et al. (1992) examine the restructuring activities of firms that had a decline in performance. They find that these firms reduce their work force and increase their focus. They report that managers blame poor economic conditions and foreign competition for the decline in performance.

Several studies in the management literature have examined layoffs. Cascio et al. (1997) examine the changes in employment for S&P 500 firms between 1980–1994. They find that firms that have pure reduction in employees did not have higher return on assets or stock returns than other firms in their industries. Firms that combined reduction in employees and asset restructuring had higher return on assets and stock returns when compared to other firms in their own industry. Worrell et al. (1991) examine the announcement period returns for firms that announced downsizing between 1979–1987. They find that the announcement period returns are negative (-2%) and significant for the whole sample. Firms that announced financial trouble as a reason for the layoffs had a return of -5.6% during the announcement period and firms that announced layoffs as a part of corporate restructuring had a return of $+3.6\%$ during the announcement period.

III. Experimental design

This section discusses the selection of the sample of downsizing firms and a matched (control) sample, and provides some descriptive data on the two samples. It also describes the methodology used to evaluate the effects of downsizing and the variables used.

A. Data and sample construction

The sample comprises firms that downsized between 1989 and 1993. We do not continue our sample past 1993 since we examine the operating and stock-price performance of these firms over an eight-year period: three years before and four years following the downsizing. We impose the following criteria:

- (1) The firm's downsizing announcement must be reported in the *Wall Street Journal* or the *New York Times*.
- (2) The announcement must be the first announcement by the firm over the eight-year period of analysis, and the firm must not have engaged in downsizing during the three years prior to the announcement.
- (3) Financial data must be available from the annual Compustat data files.

Criterion one excludes firms that engaged in downsizing but whose downsizings were not announced. Criterion two ensures that pre-downsizing performance and the change in performance from pre- to post-downsizing, the main purpose of our study, are not affected by previous downsizing, whether announced or not. Finally, criterion three ensures data availability.

The original sample consists of 152 firms. To control for economy- and industry-wide effects on performance of downsizing firms, we construct a matched (control) sample of firms that do not announce, nor engage in, any downsizing during the four-year period up to and including the announcement year. For example, the matching firm for a firm that announces downsizing in 1989, has not announced or downsized over the period 1986 to 1989. Given that the asset and employee bases of firm's change over time through normal attrition and retirements, we consider a decline of more than two percent in either total assets or number of employees as indication of downsizing.

Our measure of operating performance is pretax operating cash flows scaled by the book value of lagged total assets. We define pretax operating cash flows as net sales, less cost of goods sold, less selling and administrative expenses before deducting depreciation and amortization expense (Compustat item #13). The book value of total assets is the total value of assets (liabilities and net worth) from the balance sheet (Compustat item #6).

We use pretax operating cash flows to measure operating performance, rather than earnings, for two reasons. First, earnings include interest expense, income taxes, and special items that can obscure operating performance, the focus of our research. Second, operating cash flows represent the economic benefits generated by the firm, and as a pretax measure, operating cash flows are unaffected by the changes in capital structure or tax rates that can accompany downsizing (Barber and Lyon, 1996). Since the level of these economic benefits depends on the total value of the firm's assets, we scale cash flows by the book value of lagged total assets. This gives us a performance measure that can be compared across firms and through time (henceforth, "operating performance").

We select a matching firm for each downsizing firm by using a procedure similar to that suggested by Barber and Lyon (1996). The matching procedure is performed as of the year before the announcement of downsizing. In particular, when possible, we select a matching firm by using the following three-step algorithm. First, we select as potential

match-ups all non-downsizing firms that have financial data available and the same two-digit SIC code as the downsizing firm. Second, we screen potential matches for size and eliminate all those that are not within 70% to 130% of the book value of the total assets of the downsizing firm. Third, from this group we select a matching firm that has operating performance closest to that of the downsizing firm. We require that the operating performance of the matching firm be within 80% to 120% of the downsizing firms.

If this algorithm does not result in a matching firm, we relax the size requirement to 30% to 170%, operating performance to within 70% to 130%, and the SIC to a one-digit code. We match 47 firms using the original algorithm; 52 firms by relaxing the size requirement; and 19 firms by relaxing size, SIC code and operating performance requirements. We could not find matches for the remaining 34 firms. Our final sample of 118 firms operate in 26 different industries, based on Compustat two-digit SIC codes.

We match firms on operating performance for two reasons. First, matching on operating performance controls for potential mean reversion in earnings and other operating ratios that have been documented in prior studies (Fama and French, 1995; Penman, 1991). Second, Barber and Lyon (1996) conclude that tests using control firms that are not matched on cash flow performance are mis-specified if the event firms have either particularly good or especially poor prior operating performance. Because downsizing firms have large decreases in operating performance prior to the downsizing announcement, our tests would be misspecified if we did not control for operating performance.

Table 1 shows summary statistics for the sample of downsized firms and their matched counterparts. Unless otherwise stated, all values reported are for the year prior to the downsizing announcement.

The downsizing firms have a mean book value of assets of \$15,728 million, and a median value of \$6,207 million. Comparable values for the control firms are \$8,891 and \$1,343 million. The matching firms are smaller than are the downsizing firms. The mean and median book values of equity for the downsizing firms are \$4,049 and \$1,912 million, respectively. Palmon et al. (1997) report mean and median values of \$6,287 and \$2,862 million for their sample of efficiency-enhancing firms.

On average, downsizing firms have 65,790 employees in the year prior to the downsizing; this number decreases to 63,530 by the end of the year of downsizing announcement. An average of 2,260 employees is discharged in the year of the announcement, representing 3.44% of the total employment. This is smaller than the 4.88% decline in employment reported by Palmon, Sun, and Tang (1997) and the 5.66% decline reported by John et al. (1992) in their study on how firms react to poor earnings. The control firms have 35,230 employees in Year - 1, and this increases to 36,620 employees in the year of the downsizing.

Table 2 reports the descriptive statistics for the downsizing firms and their matched counterparts over the period of the study. The median downsizing firm has assets of \$5,245 million in Year - 3; this increases to \$6,573 million in the year of the downsizing announcement. The assets of the median downsizing firm actually increases following the downsizing. The median firm has assets of \$9,562 million in Year + 4. The assets of the control firms exhibit a similar pattern. There are significant differences between the size of assets for the downsizing and the control firms in all the years. This arises because

Table 1. Sample characteristics

Characteristics of a sample of 118 firms that downsized between 1989 and 1993 and a matched (control) sample. List of downsized (test) firms is prepared from *Wall Street Journal* and *New York Times* indices. We match firms based on industry, size, and operating performance as of Year -1 , where 0 is the fiscal year of downsizing announcement. In particular, we require matched (control) firms to have the same two-digit SIC code as, total assets of between 70% and 130% of, and operating performance of between 80% and 120% of, the downsized firms. If no match is found, we relax the size requirement to 30% to 170%, operating performance to within 70% to 130%, and the SIC to a one-digit code. Operating performance is measured by the ratio of operating cash flows to the book value of lagged total assets

Panel A: Downsized firms characteristics

Characteristic Variable ^a	Mean	Median	Std. Dev.
Total assets end of Year -1 (millions)	15,728	6,207	30,095
Total assets end of Year 0 (millions)	16,774	6,573	31,864
Common equity end of Year -1 (millions)	4,049	1,912	6,391
No. of employees end of Year -1 (thousands)	65.79	38.10	99.17
No. of employees end of Year 0 (thousands)	63.53	35.00	96.79
Percentage change in employees	-5.83	-5.00	15.11
Herfindahl index for Year -1	0.66	0.62	0.28
Herfindahl index for Year 0	0.68	0.67	0.29

Panel B: Control firms characteristics

Characteristic Variable ^a	Mean	Median	Std. Dev.
Total assets end of Year -1 (millions)	8,891	1,343	15,984
Total assets end of Year 0 (millions)	9,984	1,595	18,023
Common equity end of Year -1 (millions)	3,041	486	5,695
No. of employees end of Year -1 (thousands)	35.23	7.58	66.82
No. of employees end of Year 0 (thousands)	36.62	8.86	68.18
Percentage change in employees	14.24	6.08	34.46
Herfindahl index for Year -1	0.73	1.00	0.31
Herfindahl index for Year 0	0.72	0.96	0.32

Notes: ^aTotal assets is the book value of total assets (Compustat item 6); common equity is the book value of total common equity (Compustat item 60); and the Herfindahl index is the sum of segments' sales squared divided by total sales squared.

downsizing firms happen to be very large firms, and we control for industry and then for operating performance and size.

The downsizing firms have significantly higher sales than do the control firms from Year -3 to Year $+4$. They have more employees than the control firms, and the differences are significant in all of the years. There are significant differences in percentage changes in assets between the test and control firms in all the years. The control firms have larger increases in assets when compared to the test sample.

The percentage changes in employees indicate that the downsizing firms have large decreases in the number of employees: the median decline is 5.00% in Year 0, 4.45% in Year $+1$, and 3.57% in Year $+2$. The differences between the test and control samples are significant in all the years. This indicates that layoffs are implemented over a period of time, and that some firms have more layoff announcements.

Table 2. Descriptive statistics for the downsized firms and their matched counterparts over Years -3 to +3 relative to the fiscal year of downsizing

Median values for level and change data for a sample of 118 firms that downsized between 1989 and 1993, and a matched (control) sample, over Years -3 to +4, where 0 is the fiscal year of downsizing announcement. We match firms based on industry, size, and operating performance as of Year -1, where 0 is the fiscal year of downsizing announcement. In particular, we require matched (control) firms to have the same two-digit SIC code as, total assets of between 70% and 130% of, and operating performance of between 80% and 120% of, the downsized firms. If no match is found, we relax the size requirement to 30% to 170%, operating performance to within 70% to 130%, and the SIC to a one-digit code. Operating performance is measured by the ratio of operating cash flows to the book value of lagged total assets. Sample sizes reported are for the downsizing sample (those for control sample are similar and are not reported). Significance levels are based on Wilcoxon rank-sum tests*

	Yr - 3	Yr - 2	Yr - 1	Yr 0	Yr + 1	Yr + 2	Yr + 3	Yr + 4
Total assets (millions):								
Downsizing firms	5,245	5,819	6,207	6,573	7,258	7,509	8,891	9,562
Control firms	929 ^a	1,109 ^a	1,343 ^a	1,595 ^a	1,648 ^a	1,860 ^a	2,172 ^a	2,631 ^a
Sample size	118	118	118	115	113	111	110	106
Total sales (millions):								
Downsizing firms	5,307	5,785	6,217	6,742	6,847	7,040	7,860	8,708
Control firms	749 ^a	901 ^a	1,051 ^a	1,157 ^a	1,284 ^a	1,547 ^a	1,701 ^a	2,032 ^a
Sample size	118	118	118	115	113	111	110	106
No. of employees (000):								
Downsizing firms	34.05	37.95	38.10	35.00	31.00	30.02	30.50	31.10
Control firms	6.31 ^a	7.06 ^a	7.58 ^a	8.86 ^a	8.89 ^a	9.93 ^a	10.70 ^a	10.92 ^a
Sample size	118	118	118	115	111	107	107	103
Herfindahl index:								
Downsizing firms	1.00	0.70	0.62	0.67	0.71	0.70	0.71	0.74
Control firms	1.00	1.00 ^c	1.00 ^c	0.96	1.00	1.00	0.94	0.92
Sample size	19	54	77	93	98	98	109	95
% change in assets:								
Downsizing firms	9.97	5.56	4.19	1.83	1.53	1.59	1.83	2.68
Control firms	16.82 ^a	10.63 ^a	15.80 ^a	11.02 ^a	8.92 ^a	9.72 ^a	7.46 ^a	7.79 ^b
Sample size	117	118	118	115	113	111	105	106
% change in employees								
Downsizing firms	0.89	0.00	-0.85	-5.00	-4.45	-3.57	-1.87	0.00
Control firms	8.70 ^a	7.60 ^a	7.37 ^a	6.08 ^a	2.98 ^a	2.12 ^a	3.01 ^a	4.19 ^a
Sample size	117	118	118	115	111	107	105	103

Notes: ^a, ^b, and ^c denote significant differences between the two samples at the 1%, 5%, and 10% level.

B. Methodology

We examine the operating performance of the downsizing firms over an eight-year period around the announcement year. This period covers the announcement year (designated Year 0), the three-year period before the announcement (Years -1, -2, and -3), and the four-year period following the downsizing announcement (Years +1, +2, +3 and +4). We also examine the changes in operating performance over various intervals around the downsizing. Our measure of operating performance, as explained before, is pretax operating cash flows scaled by the book value of lagged total assets.

We evaluate both the levels and changes in the operating performance in raw form, and also as adjusted by the performance of the median firm in the industry and that of the matching firm. We determine industry-adjusted performance by subtracting the median of the operating performance of all firms with the same two-digit SIC code from the sample firm's operating performance, Kaplan (1989), John and Ofek (1995), McLaughlin et al. (1996), and others have used this measure. We obtain matching-firm-adjusted performance in the same way, subtracting the operating performance of the matching firm from the sample firm's operating performance. Although we report raw, industry-adjusted, and matching-firm-adjusted measures of performance, we focus on matching-firm-adjusted measures in our comparisons because that is the best measure of operating performance (Barber and Lyon, 1996).

To test for the statistical significance of the levels and changes in operating performance, we conduct Wilcoxon signed-rank tests and parametric *t*-tests. We do not report the significance for raw operating performance (Panel A of Table 3) since no information is conveyed. Barber and Lyon (1996) demonstrate that because extreme observations in the distribution of operating performance exist, non-parametric Wilcoxon signed-rank-tests are uniformly more powerful than parametric *t*-tests. We report both test statistics for completeness, but emphasize the non-parametric tests.

Because there are improvements in operating performance following the downsizing, we examine selected accounting ratios of the test and control samples and analyze the changes in the operating and cost structure for the downsizing sample to determine the sources of the improvements. We use Wilcoxon rank-sum tests to differentiate between the test and control firms.

In addition, we test to identify the factors that can affect the success of the downsizing. We do this by regressing changes in raw operating performance against several independent variables. The independent variables we use in the regressions are as follows:

Size	= Natural logarithm of total assets
ChgEmploy	= Percentage change in employees
ChgSeg	= Percentage change in the number of lines of business
Chgaset	= Percentage change in total assets
Preiacfp	= Industry-adjusted performance of the downsized firm in the year prior to the announcement of downsizing

We measure size as of the beginning of the year of downsizing announcement. We measure changes in the dependent and independent variables over varying periods from the year before and the announcement year, since they are the lowest points in the time series of operating performance. Further, any improvement in performance as a result of downsizing most likely occurs in the year following the downsizing announcement. The reasons for the choice of these variables and the expected association signs are explained below and in Section IVC.

If, as Jensen (1993) argues, firms downsize after they grow beyond their optimal size and experience deterioration in performance, the size of a firm right before downsizing should be associated with the change in the firm's performance after downsizing. In particular, we expect larger firms to have greater increases in performance when they

Table 3. Performance of the downsized firms

Summary statistics for performance of a sample of 118 firms that downsized between 1989 and 1993 over Years -3 to $+4$, where 0 is the fiscal year of downsizing announcement. For each firm, we measure performance by the ratio of operating cash flows to the book value of lagged total assets. Data are presented in raw form and as adjusted by industry performance (proxied by two-digit SIC code) and the performance of its matched counterpart. We match firms based on industry, size, and operating performance as of Year -1 , where 0 is the fiscal year of downsizing announcement. In particular, we require matched (control) firms to have the same two-digit SIC code as, total assets of between 70% and 130% of, and operating performance of between 80% and 120% of, the downsized firms. If no match is found, we relax the size requirement to 30% to 170%, operating performance to within 70% to 130%, and the SIC to a one-digit code. Sample sizes for some years are lower due to missing values. Nonparametric and parametric significance levels are based on Wilcoxon signed-rank tests and t -tests*

Panel A: Raw Operating Performance

	Yr - 3	Yr - 2	Yr - 1	Yr 0	Yr + 1	Yr + 2	Yr + 3	Yr + 4
Median	11.10	10.55	8.55	6.65	8.00	8.55	8.90	10.00
Mean	10.11	9.18	4.18	5.30	6.19	7.34	8.68	8.71
Sample size	118	118	114	112	112	110	108	105

Panel B: Industry-adjusted performance

	Yr - 3	Yr - 2	Yr - 1	Yr 0	Yr + 1	Yr + 2	Yr + 3	Yr + 4
Median	0.90 ^a	0.80 ^b	-0.18	-0.85	0.33	-0.08	0.03	0.55 ^c
Mean	0.86	0.43	-3.62	-2.03 ^b	-1.19	-0.89	0.47	0.80
Sample size	118	118	114	112	112	110	108	105

Panel C: Matched-firm-adjusted performance

	Yr - 3	Yr - 2	Yr - 1	Yr 0	Yr + 1	Yr + 2	Yr + 3	Yr + 4
Median	-1.30 ^a	-1.01 ^a	-1.40 ^a	-2.40 ^a	-1.40 ^a	-0.40	-0.25	0.35
Mean	-2.49 ^b	-2.36 ^a	-4.43 ^c	-3.65 ^a	-2.63 ^b	-1.00	-1.19	0.63
Sample size	118	118	114	112	112	110	108	105

Notes: ^a, ^b, and ^c denote significance at the 1%, 5%, and 10% level, respectively.

downsize. Our measure of size is the natural logarithm of the book value of the lagged total assets.

The second independent variable is the percentage change in the number of employees, controlling for size. We expect firms that lay off a higher percentage of their employees have greater increases in performance. These firms will have greater reduction in their cost of labor and cost of sales. This should lead to improvements in performance. However, large cuts in employees can demoralize the survivors and lead to losses in productivity (Brockner, 1988). This could hamper or even reverse the effect of cost savings. Hence we do not make any predictions regarding the coefficient of this variable.

John and Ofek (1995) and Comment and Jarrell (1995) find that the stock market reacts positively to the announcement of focus-increasing divestitures. John and Ofek also find that firms that sell assets and narrow their focus experience improvements in operating

performance following the assets sale. These improvements in performance could result from higher synergies within the existing lines of business and better allocation of resources. Our measure of firm's focus is the number of business segments. We assume that firms that decrease their number of business segments focus more on their core lines of business. Like John and Ofek (1995), we also use the Herfindahl Index as an alternative measure of focus. The results are similar and thus are not reported here.

The next independent variable is the percentage change in total assets. Changes in assets can affect performance differently. On the one hand, sale of assets intended to narrow the firm's focus (e.g., sale of an unprofitable segment) is expected to result in improvement in performance. On the other hand, a substantial investment in the core business, especially when accompanied by narrowing the firm's focus (e.g., sale of an unprofitable segment), could also result in improvement in performance due to higher synergies and economies of scale. We suspect that most managers reinvest proceeds from sale of assets in their core business to improve their position within their industry, and thus expect to observe a positive association between change in assets and change in performance.

The literature suggests that firms may downsize because of poor performance (e.g., see John et al., 1992). If poor performance is the result of inefficient expansion, then poor performers should experience greater benefits from downsizing. Thus, we expect a negative association between poor performance prior to downsizing and change in performance. We use industry-adjusted operating performance in the year prior to the announcement of downsizing to measure pre-downsizing performance.

IV. Results

This section discusses results for the operating performance and certain cost elements and accounting ratios of the sample of downsizing firms and their matched counterparts. It also discusses the results for the factors that affect a successful downsizing.

A. Operating performance for the sample of downsizing firms

Table 3 reports three measures of operating performance: raw, industry-adjusted, and matching-firm-adjusted. Although we present results and significance levels for both medians and means, we base our analysis on the medians. This is common practice in the literature due to the skewness of accounting ratios (see Kaplan, 1989; Jain and Kini, 1994; and McLaughlin et al., 1996). For the medians we base significance levels on Wilcoxon signed-rank tests. For the means, we report parametric *t*-tests.

The median raw operating performance is positive during the entire period of our analysis. The median is 11.10% in Year - 3, this decreases to 6.65% in Year 0. The 6.65% operating performance in Year 0 is almost sixty percent of this ratio (11.10%) in Year - 3. Following the downsizing, the operating performance improves and the median value reaches 10.00% in Year + 4. However, this performance is still below the Year - 3 level.

Industry-adjusted performance is reported in Panel B. Industry-adjusted performance is the performance of the downsizing firm minus the median performance of all firms with

the same two-digit SIC code. In Years -3 and -2 , the median industry-adjusted operating performance are 0.90% and 0.80% (significantly different from zero at the 1% and 5% level respectively). The performance declines to -0.18% in Year -1 and to -0.85% in Year 0. However, these values are not significantly different from zero at the conventional levels. Following the downsizing, the industry-adjusted operating performance shows improvements. The median is 0.55% in Year $+4$, which is significantly different from zero at the 10% level of significance.

Panel C reports matching-firm-adjusted performance. We define matching-firm-adjusted performance as the performance of the downsizing firm minus the performance of its matching firm. The matching-firm-adjusted performance for the median firm is negative for the Year -3 to Year $+1$ period (-1.30% , -1.01% , -1.40% , -2.40% , and -1.40%) and significantly different from zero at the 1% level of significance. Following the downsizing, the matching-firm-adjusted performance does show some improvement. There are no differences in operating performance between the test and control samples in any of the years following Year $+1$.

Table 4 reports the changes in the raw, industry-adjusted, and matching-firm-adjusted cash flow performance. Panel A reports the raw cash flow performance changes. The median cash flow declines by 1.45% from Year -2 to Year -1 , and by 1.00% from Year -1 to Year 0. The declines are significantly different from zero at the 1% level. Following the downsizing, the operating performance shows improvements. The performance changes from Year -1 to Year $+3$, and Year $+4$ are 1.00% and 2.60%, respectively. The changes from Year 0 to Year $+3$ and Year 0 to Year $+4$ are positive and significant at the 1% level.

Panel B of Table 4 reports the industry-adjusted operating performance changes. The median change from Year -2 to Year -1 is -0.60% , significantly different from zero. The change from Year -1 to Year 0 is also negative and significantly different from zero. During the period following the downsizing, median changes from Year 0 to Years $+3$ and $+4$ are positive (1.33% and 2.25%) and significantly different from zero at the 1% level of significance.

Panel C reports the changes in matching-firm-adjusted performance. The median change from Year -1 to Year 0 is negative (-0.40%) and significantly different from zero at the 10% level of significance. The changes from Year 0 to Years $+3$ and $+4$ are 2.25%, and 2.70% and significant at the 1% level.

Overall, our analysis indicates that downsizing leads to improvements in operating performance. These improvements persist even after controlling for economy and industry factors.

B. Changes in working capital, investment, R&D, and advertising

In the previous section we show that there are some improvements in performance following the downsizing. Further, the Wilcoxon rank-sum tests (reported on the Control Sample row of Panel A of Table 5) indicate that changes in operating performance of the downsizing firms from pre- to post-downsizing period are significantly higher than those for the control firms. Therefore, in this section, we examine the median changes in certain elements of costs to determine the sources of these improvements.

Table 4. Changes in performance of the downsized firms

Summary statistics for changes in performance of a sample of 118 firms that downsized between 1989 and 1993. For each firm, we measure performance by the ratio of operating cash flows to the book value of lagged total assets. We measure changes over various intervals, where 0 is the fiscal year of downsizing announcement. Data are presented in raw form and as adjusted by corresponding changes in industry performance (proxied by two-digit SIC code) and those of its matched counterpart. We match firms based on industry, size, and operating performance as of Year -1 , where 0 is the fiscal year of downsizing announcement. In particular, we require matched (control) firms to have the same two-digit SIC code as, total assets of between 70% and 130% of, and operating performance of between 80% and 120% of, the downsized firms. If no match is found, we relax the size requirement to 30% to 170%, operating performance to within 70% to 130%, and the SIC to a one-digit code. Sample sizes for some years are lower due to missing values. Nonparametric and parametric significance levels are based on Wilcoxon signed-rank tests and t -tests*

Panel A: Change in Raw Operating performance

	- 2 to - 1	- 1 to 0	- 1 to 3	- 1 to 4	0 to 3	0 to 4
Median	- 1.45 ^a	- 1.00 ^a	1.00 ^a	2.60 ^a	2.20 ^a	3.80 ^a
Mean	- 5.00 ^b	0.57	3.81 ^c	3.97	3.17 ^a	3.68 ^a
Sample size	118	114	108	105	108	104

Panel B: Change in industry-adjusted performance

	- 2 to - 1	- 1 to 0	- 1 to 3	- 1 to 4	0 to 3	0 to 4
Median	- 0.60 ^a	- 0.50 ^b	0.75 ^b	1.55 ^a	1.33 ^a	2.25 ^a
Mean	- 4.05 ^b	1.05	3.61	3.86	2.48 ^a	3.04 ^a
Sample size	118	114	108	105	108	104

Panel C: Change in matched-firm-adjusted performance

	- 2 to - 1	- 1 to 0	- 1 to 3	- 1 to 4	0 to 3	0 to 4
Median	- 0.50	- 0.40 ^c	1.60 ^b	1.80 ^a	2.25 ^a	2.70 ^a
Mean	- 2.07	0.87	3.64 ^c	5.53 ^b	2.38 ^b	4.26 ^a
Sample size	118	114	108	105	108	104

Notes: *^a, ^b, and ^c denote significance at the 1%, 5%, and 10% level, respectively.

Recall that we defined downsizing as reducing the scale of a firm's operation by laying off employees and/or selling assets. Layoffs are intended to improve efficiency. Thus, they should reduce labor cost and cost of sales as a percentage of sales. Similarly, sale of existing assets should reduce depreciation expense and thus cost of sales as a percentage of sales. The cost of sales divided by sales measures the cost of generating sales. Labor cost divided by sales measures the labor cost of generating sales. John et al. (1992) report the same measures in their study on firms experiencing performance declines. Panel B of Table 5 reports the change in cost of sales as a percentage of sales. There is a significant median (0.60%) increase in the cost of sales from Year -2 to Year -1 . Following downsizing, the cost of sales as a percentage of sales declines. The median declines from Year 0 to Years $+3$ and $+4$ are -1.60% and -2.7% respectively. These are significant

Table 5. Changes in efficiency of the downsized firms

Median values of select variables on changes in efficiency for a sample of 118 firms that downsized between 1989 and 1993, and a matched (control) sample, over varying period. Changes are measured over various intervals, using 0 as the fiscal year of downsizing announcement. We match firms based on industry, size, and operating performance as of Year -1 , where 0 is the fiscal year of downsizing announcement. In particular, we require matched (control) firms to have the same two-digit SIC code as, total assets of between 70% and 130% of, and operating performance of between 80% and 120% of, the downsized firms. If no match is found, we relax the size requirement to 30% to 170%, operating performance to within 70% to 130%, and the SIC to a one-digit code. Sample sizes reported are for the downsizing sample (those for control sample are similar and are not reported). Significance levels for differences between samples (reported on control firms' rows) are based on Wilcoxon rank-sum tests; those for differences from zero (reported on downsizing firms' rows) are based on Wilcoxon signed-rank tests*

Panel A: Change in Raw Operating Performance

Firms:	-2 to -1	-1 to 0	-1 to 3	-1 to 4	0 to 3	0 to 4
Downsizing	-1.45 ^a	-1.00 ^a	1.00 ^a	2.60 ^a	2.20 ^a	3.80 ^a
Control	-0.90	-0.40	-0.55 ^b	-0.40 ^a	-0.15 ^a	0.20 ^a
Sample size	118	114	108	105	108	104

Panel B: Change in cost of sales as a % of sales

Firms:	-2 to -1	-1 to 0	-1 to 3	-1 to 4	0 to 3	0 to 4
Downsizing	0.60 ^a	0.25	-1.75 ^a	-2.55 ^a	-1.60 ^a	-2.70 ^a
Control	0.10 ^b	-0.20	1.10 ^a	0.80 ^a	0.70 ^a	1.00 ^a
Sample size	116	112	108	104	107	103

Panel C: Change in labor cost as a % of sales

Firms:	-2 to -1	-1 to 0	-1 to 3	-1 to 4	0 to 3	0 to 4
Downsizing	0.45 ^c	0.50	-0.65 ^c	-2.40 ^a	-1.55 ^a	-2.80 ^a
Control	0.10	0.80	-0.00	-0.55 ^c	-0.35	-1.35
Sample size	40	39	32	29	32	29

Panel D: Change in capital expenditures as a % of sales

Firms:	-2 to -1	-1 to 0	-1 to 3	-1 to 4	0 to 3	0 to 4
Downsizing	0.10	-1.31 ^a	-1.10 ^a	-0.90 ^a	-0.50 ^c	-0.30
Control	0.30	-0.10	-1.40	-1.50	-0.60	-1.15 ^c
Sample size	115	110	104	100	103	99

Panel E: Change in research and development expenditures as a % of sales

Firms:	-2 to -1	-1 to 0	-1 to 3	-1 to 4	0 to 3	0 to 4
Downsizing	0.00	0.00	-0.30 ^a	-0.30 ^a	-0.20 ^a	-0.30 ^a
Control	0.00	0.00	0.00 ^a	0.00 ^a	0.00 ^a	0.00 ^a
Sample size	86	83	77	75	77	75

Table 5. (Continued)

Panel F: Percentage change in operating cycle						
Firms:	- 2 to - 1	- 1 to 0	- 1 to 3	- 1 to 4	0 to 3	0 to 4
Downsizing	- 0.11	- 0.67	- 9.85 ^a	- 13.58 ^a	- 12.01 ^a	- 9.04 ^a
Control	3.33	- 1.12	2.41 ^a	1.86 ^a	- 0.59 ^a	- 1.28 ^a
Sample size	115	110	103	100	104	99

Notes: ^a, ^b, and ^c denote significance at the 1%, 5%, and 10% level, respectively.

at the 1% level of significance. Further, the differences between the downsizing and control samples in the percentage change in cost of sales from pre- to post-downsizing period are significant at the 1% level of significance.

Panel C reports the labor cost changes. The median labor cost over sales increases by 0.45% of sales from Year - 2 to Year - 1 to Year 0. Following the downsizing, the median declines from Year 0 to Years +3 and +4 are -1.55% and -2.8%, respectively. These are significant at the 1% level. The cost data indicates that these firms were able to reduce their costs very quickly. The differences between the downsizing and control samples in the percentage change in labor cost from pre- to post-downsizing period are also significant at the 1% level of significance.

Panels D and E report the changes in the discretionary expenditures (R&D and capital expenditures) as a percentage of sales. A decline in R&D expenditures will improve cash flow performance in the short-run; long-run performance can be adversely affected by a decline in both R&D and capital expenditures for firms in industries with growth prospects such as the computer industry or the software industry. A decline in R&D expenditure and capital expenditures would be good for firms that are in declining industries with no growth prospects such as the tobacco industry or the arms industry.

The median capital expenditures decline by 1.31% from Year - 1 to Year 0, and by 0.50% from Year 0 to Year + 3. R&D expenditures decline by 0.20% from Year 0 to Year + 3. The declines in R&D expenditures from pre- to post-downsizing for the downsizing firms are significantly greater than the declines for the control firms.

Our measure of working capital management is the change in operating cycle. The operating cycle represents the number of days between payment to suppliers and receipt of cash from the customers. We estimate this as the sum of the inventory holding period and accounts receivable collection period minus the accounts payable period. Panel F of Table 5 reports the changes in the operating cycle period. Following the downsizing, the median operating cycle declines by 12.01 and 9.04 days during the periods from Year 0 to Years + 3 and + 4. The control firms have declines of - 0.59 and - 1.28 days over the same periods. Downsizing firms show a tighter management of working capital following the downsizing.

The analysis of changes in cost elements and working capital management indicates efficiency gains due to a reduction in cost of sales, labor costs, and operating cycle. The analysis also indicates that some of the efficiency gains might be attributable to a decline in discretionary expenditures.

Table 6 reports select ratios on asset management, liquidity, and profitability. We use assets turnover (sales over total assets) as our measure of asset management. The assets turnover for the downsizing firms is 1.07 in Year - 3 and 0.98 in Year 0. Following the downsizing, the assets turnover goes down to 0.98 in Year + 2, and then increases slightly to 1.02 in Year + 4. The assets turnover ratio for the control firms follows the same pattern.

The current ratio and quick ratio (not reported), the traditional measures of liquidity, indicate that the control firms are significantly more liquid than the downsizing firms in all years. The interest coverage ratio, which is traditionally used as a measure of the firm's ability to make debt payments, also shows significant differences with the control sample, from Year - 3 to Year + 2, but not afterward.

The final two measures we report are two profitability measures, the return on assets and the return on equity. Like cash flow performance, these profitability measures decline prior to downsizing and improve subsequently. The return on assets for the sample firms is

Table 6. Select accounting ratios of downsized firms and their matched counterparts

Median values of select ratios for a sample of 118 firms that downsized between 1989 and 1993, and a matched (control) sample, over Years - 3 to + 4, where 0 is the fiscal year of downsizing. We match firms based on industry, size, and operating performance as of Year - 1, where 0 is the fiscal year of downsizing announcement. In particular, we require matched (control) firms to have the same two-digit SIC code as, total assets of between 70% and 130% of, and operating performance of between 80% and 120% of, the downsized firms. If no match is found, we relax the size requirement to 30% to 170%, operating performance to within 70% to 130%, and the SIC to a one-digit code. Sample sizes reported are for the downsizing sample (those for control sample are similar and are not reported). Nonparametric significance levels are based on a Wilcoxon rank-sum test*

	Yr - 3	Yr - 2	Yr - 1	Yr 0	Yr + 1	Yr + 2	Yr + 3	Yr + 4
Total assets turnover:								
Downsizing firms	1.07	1.03	1.02	0.98	0.99	0.98	1.00	1.02
Control firms	1.06	1.07	1.01	0.96	0.92	0.93	0.96	0.95
Sample size	118	118	118	115	113	111	109	106
Current ratio:								
Downsizing firms	1.51	1.50	1.42	1.34	1.37	1.28	1.38	1.33
Control firms	1.91 ^a	1.80 ^a	1.82 ^a	1.75 ^a	1.77 ^a	1.67 ^a	1.72 ^a	1.68 ^a
Sample size	107	104	104	100	99	97	96	95
Interest coverage:								
Downsizing firms	3.76	3.47	2.36	1.87	2.87	3.18	4.22	4.59
Control firms	5.02 ^a	5.01 ^a	4.28 ^a	4.02 ^a	4.10 ^a	4.31 ^b	4.44	4.76
Sample size	116	117	117	112	110	108	107	102
Return on assets:								
Downsizing firms	4.27	4.09	2.89	1.26	2.30	3.11	3.58	4.27
Control firms	5.90 ^b	5.34 ^a	3.78 ^b	3.54 ^a	3.27 ^b	3.20	2.76	3.69
Sample size	118	118	118	115	113	111	110	106
Return on equity:								
Downsizing firms	12.90	11.77	7.78	5.55	9.16	12.90	13.82	15.53
Control firms	13.75	12.67 ^c	10.20 ^c	10.63 ^a	9.60	10.16 ^c	8.71 ^a	10.77 ^a
Sample size	118	118	118	115	113	111	110	106

Notes: ^a, ^b, and ^c denote significance at the 1%, 5%, and 10% level, respectively.

significantly lower than that for the control firms in Years -3 to $+1$. The return on equity for the sample firms is significantly lower than that for the control firms in Years -2 to Year 0, but significantly higher in Years $+2$ to $+4$.

We compare our results with previous studies that have used similar variables. While we find decreases in capital expenditures, John et al. (1992) find that their sample firms increase capital expenditures. Kaplan (1989) finds that leveraged buyout firms reduce capital expenditures following the LBO. Palmon et al. (1997) report the return on equity, return on assets, and profit margins for their sample of downsizing firms. They find that their sub-sample of firms that downsize because of declining industry conditions have declines in these ratios. Firms that downsize with the objective of increasing efficiency have mixed results.

C. Determinants of the change in performance

Here, we examine whether the change in operating performance can be attributed to size, extent of downsizing, changes in focus, managerial changes, and performance prior to downsizing. We measure changes in both dependent and independent variables relative to the year of downsizing announcement. Size is measured as of the beginning of the announcement year, and pre-downsizing performance as of the year before.

We control for firm size because, as Jensen (1993) argues, firms normally downsize after they grow beyond their optimal size and experience deterioration in performance. Our measure of size is the natural logarithm of the book value of total assets. We expect larger firms to have greater increases in performance.

The second independent variable is the percentage change in the number of employees. Firms with greater layoffs should have larger decreases in the labor cost and cost of sales. This would lead to greater improvements in performance. However, large cuts in employees can demoralize the survivors and lead to losses in productivity (Brockner, 1988). Hence we do not make any predictions regarding the coefficient of this variable.

Our measure of focus is the number of business segments. The focus hypothesis implies that firms that sharpen focus by divesting unrelated segments should have better performance for their remaining segments. We expect to find a negative coefficient for this variable. Like John and Ofek (1995), we also use the Herfindahl index as an alternative measure of focus. The results are similar and thus are not reported here.

The next variable we use is the change in the assets. Firms that reduce the number of segments and expand their assets should have improvements in performance because they benefit from higher synergies and economies of scale. We expect a positive coefficient for this variable.

If poor performance is the result of excessive expansion, poor performers should benefit from the downsizing to a greater extent. To measure poor performance, we use the industry-adjusted cash flow in Year -1 . We expect to find a negative coefficient for this variable.

Table 7 reports the results of our analysis. In Column 3, we regress the change in raw operating performance over the period from Year -1 to Year $+3$ against the independent variables. The coefficient of the change in segments is negative (-0.041) and significant

at the 10% level, indicating that firms that increased focus and downsized had improved performance following the downsizing. The coefficient of the change in assets is positive and significant at the 1% level. This is also consistent with our hypothesis. Firms that were able to reduce costs by reducing the number of employees and increased their asset base had improvements in performance following the downsizing. The coefficient of the industry-adjusted cash flow in Year – 1 is negative (–0.0739) and significant at the 1% level. Firms that had poor performance prior to the downsizing had larger improvements following the downsizing.

Column 4 reports the regressions with the dependent variable as the change in operating performance from Year – 1 to + 3 and the same independent variables except the change in segments. We do not include the change in the number of segments because we lose a substantial number of firms when we include this variable. The results are similar to those when we include the number of segments. Both the change in assets (positive coefficient) and the pre-industry adjusted cash flow (negative) are significant at the 1% level.

Column 5 reports the results when the change in dependent variable, and independent variables representing changes, are measured from Year – 1 to Year + 4. The coefficient

Table 7. Factors influencing a successful downsizing

Estimates of two sets of cross-sectional regressions of changes in operating cash flow performance (changes in raw operating performance) on firm variables for a sample of 118 firms that downsized between 1989 and 1993. Changes in operating cash flows for each downsized firm are measured over varying periods relative to the fiscal year of downsizing announcement*

Variable*	Expected Sign	– 1 to + 3	– 1 to + 3	– 1 to + 4	– 1 to + 4
Intercept	?	3.863	2.449	– 11.692	– 6.369
<i>t</i> -statistic		(1.09)	(0.72)	(– 1.71) ^c	(– 1.16)
Size	+	– 0.276	– 0.232	1.290	0.689
<i>t</i> -statistic		(– 0.68)	(– 0.59)	(1.67) ^c	(1.09)
ChgEmploy	?	– 0.013	– 0.008	– 0.011	– 0.014
<i>t</i> -statistic		(– 1.03)	(– 0.62)	(– 0.47)	(– 0.66)
Chgseg	–	– 0.041		– 0.008	
<i>t</i> -statistic		(– 1.87) ^c		(– 0.21)	
Chgaset	+	0.049	0.055	0.065	0.064
<i>t</i> -statistic		(2.55) ^a	(3.14) ^a	(3.08) ^a	(3.44) ^a
Preiacfp	–	– 0.739	– 0.746	– 0.831	– 0.822
<i>t</i> -statistic		(– 6.83) ^a	(– 9.17) ^a	(– 5.88) ^a	(– 6.40) ^a
F-Statistic		22.93	15.41	16.67	12.03
Adjusted R ²		0.45	0.41	0.37	0.35
Durbin Watson		2.12	2.04	1.89	2.11
No. of observations		76	106	74	103

Notes: *‘‘Size’’ is the natural log of the book value of the firm’s assets at the beginning of the year of the downsizing announcement. ‘‘ChgEmploy’’ is the percentage change in the number of employees. ‘‘Chgseg’’ is the percentage change in the number of business segments. ‘‘Chgaset’’ is the percentage change in total assets. All change variables are calculated over the measurement period. ‘‘Preiacfp’’ is the industry adjusted cash flow performance in Year – 1.

^a, ^b, and ^c denote significance at the 1%, 5%, and 10% level, respectively.

of the size variable (1.290) is positive and significant at the 10% level, indicating that larger firms that downsized had improved performance following the downsizing. This is consistent with our expectations. The coefficient of the change in assets is positive (0.065) and significant at the 1% level. This is also consistent with our expectations. The coefficient of the industry-adjusted cash flow in Year -1 is negative (-0.831) and significant at the 1% level, indicating that firms that performed poorly in their industries prior to the downsizing announcement had larger improvements following the announcement.

Column 6 reports the regressions with the dependent variable as the change in operating performance from Year -1 to $+4$ and the same independent variables except the change in the number of segments. The results are similar to that when we include the number of segments. Both the change in assets (0.064) and the pre industry-adjusted cash flow (-0.822) are significant at the 1% level.

Overall, our results strongly suggest that downsizing tends to be more successful for firms that were performing poorly in their industries prior to the downsizing and those that increased their asset base following the downsizing. There is some evidence indicating that firms that narrowed their focus and larger firms had larger improvements in operating performance following the downsizing.

V. Summary and conclusions

Downsizing has become an integral part of “Corporate America”. Supporters of downsizing consider it necessary to staying competitive. Critics view it as a gimmick intended to please shareholders. In spite of its importance, there is scant empirical evidence available on the causes and long-term consequences of downsizing strategies. This study examines the operating performance of 118 large corporations around their downsizing announcements and provides preliminary evidence on the effectiveness of downsizing strategies.

We examine the operating performance of these firms during an eight-year period around the downsizing announcement. This includes the three year period prior to the downsizing and the four year period following the downsizing, designated as Years -3 to $+4$. We use three benchmarks to determine the effectiveness of downsizing: past performance, industry medians, and matched (control) firms.

Firms that downsize perform significantly better than their industry medians in Years -3 and -2 and worse than their industry medians in Years -1 and 0. They perform significantly worse than their matched (control) counterparts in Years -3 to $+1$. Operating performance improves following the downsizing.

Resources tied to working capital are reduced following the downsizing and cost of sales and labor cost as a percentage of sales show significant declines. R&D and capital expenditures as a percentage of sales also decrease following the downsizing. Downsizing is more effective for firms that increase their asset size and for firms that perform poorly in their industries prior to the announcement of downsizing. We also find that the improvements are greater for firms that increase their focus.

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