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Source: *Strategic Management Journal*, Sep., 1995, Vol. 16, No. 6 (Sep., 1995), pp. 447-460

Published by: Wiley

Stable URL: <https://www.jstor.org/stable/2486788>

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## THE EFFECTS OF LEVERAGED BUYOUTS ON CORPORATE GROWTH AND DIVERSIFICATION IN LARGE FIRMS

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*This study investigates the effects of LBOs on corporate growth and diversification in large U.S. firms which underwent leveraged buyouts during the 1980s. Based on the analysis, this study found that revenue and employee growth are significantly lower in LBO firms than in control firms that remained public. Strategically, we find that LBO firms decreased the size of both their periphery and core businesses more than public control firms and that LBO firms divested a significantly higher volume of periphery and core businesses than control firms. These postbuyout differences between LBO and public firms are consistent with the argument that LBO firms provide managers with incentives to downsize and prune lines of business, resulting in reduction in overall firm size and diversification.*

One of the most controversial features of the takeover boom of the 1980s were leveraged buyouts, or LBOs. In an LBO, a new private corporation buys out the equity of the public stockholders, usually with dept financing. This transaction results in the formation of a new privately held firm which typically has a very high dept/equity ratio and whose equity is closely held by a group of managers and large outside investors. Between 1981 and 1989 more than 2540 publicly quoted firms with a market value of over \$297 billion underwent an LBO (House Committee on Energy and Commerce, 1989; *Mergerstat Review*, 1989); LBOs represented 7.5 percent of all mergers and takeovers by number and 17.0 percent of all

mergers and takeovers by value during this period. Moreover, many LBOs during the 1980s involved some of the largest firms in the U.S. economy, including Beatrice Co. (bought out in 1986 for \$6.25 billion), Safeway Stores Inc. (1986, \$5.34 billion), Owens-Illinois (1987, \$3.69 billion) and RJR-Nabisco (1989, \$24.8 billion). The use of LBOs to buy out such large and economically important firms during the 1980s has stimulated a stream of research into their causes and consequences. To date, this research shows that LBOs increase the market value of target firms (DeAngelo and DeAngelo, 1987; Lehn and Poulsen, 1989) and leads to increases in postbuyout operating profits (Kaplan, 1989; Smith, 1989; Opler, 1992).<sup>1</sup>

**Key words:** LBOs; post-buyout growth; post-buyout diversification

CCC 0143-2095/95/070447-14  
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<sup>1</sup> Not all observers agree that the empirical evidence supports the argument that leveraged buyouts increase firm efficiency. For example, Rappaport (1990) has argued that leveraged

*Received 3 September 1991  
Final revision received 12 October 1994*

Missing from this stream of research is any detailed investigation of the relationship between LBOs and corporate strategy. Yet Jensen (1986, 1989) has argued that the primary source of efficiency of LBO firms is that they stem the tendency of managers to invest in excessive growth and diversification. This conjecture is consistent with an extensive body of existing theory and empirical evidence which suggests that diversification strategy is an important determinant of firm performance.<sup>2</sup> It is also consistent with prior evidence that managerial incentives influence the growth and diversification decisions they make.<sup>3</sup>

This study investigates the effects of LBOs on corporate growth and diversification in a sample of large U.S. firms which underwent LBOs during the 1980s. A particular contribution of this study is that we supplement the use of standard aggregate measures of diversification strategy with a more detailed examination of postbuyout changes in the business portfolios of LBO firms. Our findings strongly suggest that LBOs reduce growth and diversification in large diversified firms.

## THEORY AND HYPOTHESES

It has been shown that LBOs increased the market value of target firms by 30–40 percent at the time of the buyout (DeAngelo and DeAngelo, 1987; Kaplan, 1989). Jensen (1986, 1989) attributes these increases in firm value to the governance structure of LBO firms which he argues provides more intense incentives for managers to increase value than is possible in public corporations. This argument is commonly known as ‘the incentive-intensity hypothesis.’ It is well established that public corporations do not provide strong incentives for managers to maximize firm value (Berle and Means, 1932; Baumol, 1959; Marris, 1964; Williamson, 1964; Jensen, 1986, 1989). First,

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buyouts institutionalize myopia because the high levels of debt involved create intense pressure for managers to squeeze cash from current operations.

<sup>2</sup> See, for example, the theoretical arguments of Penrose (1959), Teece (1980) and Wernerfelt (1984), and the empirical evidence presented by, for example, Rumelt (1974), Palepu (1985), Singh and Montgomery (1987), Lubatkin and Rogers (1989), Lubatkin and Chatterjee (1991) and Morck, Shleifer, and Vishny (1990).

<sup>3</sup> See, for example, Baumol (1959), and Hill and Snell (1988).

managers in public firms are typically not major shareholders, and tend to be rewarded on the basis of the size of the firm rather than its market value (Jensen and Murphy, 1990). As a result, managers have incentives to increase firm size and to reduce bankruptcy risk through diversification (Berle and Means, 1932; Baumol, 1959; Marris, 1964; Williamson, 1975; Jensen, 1986, 1989). Second, public corporations have many small shareholders with little wealth at stake. Consequently, shareholder oversight is attenuated (Berle and Means, 1932; Demsetz, 1983). Third, public corporations have weak constitutional mechanisms for limiting managers’ investment discretion: boards often exercise little control over managers’ actions and it is very costly to replace management through proxy fights or takeovers (Williamson, 1975). As a result of these factors, managers in public firms have discretion to invest in unprofitable ventures that reduce firm value. Jensen (1986) has called the losses in firm value which result ‘agency costs of free cash flow.’

The incentive-intensity hypothesis suggests that LBO firms are able to correct some of the deficiencies in the governance structure of the public corporation. First, managers in LBO firms typically own a greater percentage of equity than managers in public firms (Kaplan, 1989; Smith, 1989) so that their wealth depends more on the value of the firm and less on its size and bankruptcy risk. Second, LBO firms have only a few, very large shareholders, whose wealth can be greatly increased or diminished by managers’ strategic decisions; consequently they monitor managers’ decisions very closely. Third, LBO firms are highly leveraged, reducing the amount of ‘free’ cash available to managers to invest in unprofitable expansion and diversification (Grossman and Hart, 1986; Stulz, 1990). Consistent with the incentive-intensity hypothesis, Kaplan (1989), Smith (1989) and Opler (1992) found that LBO firms’ operating profits increase significantly post buyout. Singh (1990) found that a sample of refloated LBO and DBO (divisional buyout) firms had significantly higher profits than equivalent public firms prior to public offering. Kaplan (1989) and Smith (1989) also found that LBO firms cut back on capital expenditures post buyout, supporting the argument that LBOs serve to reduce agency costs from overinvestment.

Despite this body of evidence on the causes and consequences of LBOs, few studies have examined

the effects of LBOs on corporate strategy. Yet the incentive-intensity hypothesis suggests directly that LBOs increase firm value by reducing managers' incentives to invest in expansion and diversification. A recent study by Liebeskind, Wiersema, and Hansen (1992) found that large LBO firms undertook significantly more strategic restructuring post buyout than matched public firms. In this study we examine this issue in more detail.

### LBOs and firm growth

The rate of growth of the firm is an important determinant of its value. If managers underinvest in expansion, a firm may relinquish market share to rivals and forego economies of scale (Grant, 1989); if managers overinvest in expansion, a firm will lose value due to excess capacity. However, Baumol (1959), Marris (1964) and Jensen (1986, 1989) argue that the governance system in public corporations provides managers with incentives to invest in expansion regardless of its impact on firm value. In contrast, according to the incentive-intensity hypothesis, the governance structure of LBO firms discourages managers from investing in unprofitable expansion, and encourages them to correct for past unprofitable expansion by downsizing. Consistent with this argument, researchers have found that LBOs take place principally among firms in mature industries (Easterwood, Seth, and Singer, 1989), and that LBO firms reduce their rates of sales growth and employment growth (Kaplan, 1989; Smith, 1989). However, these latter studies examine longitudinal changes in LBO firms only. Consequently, their findings could be due to the fact that business conditions changed during the 1980s, rather than to intensified incentives in LBO firms as they argue. In this study we compare growth rates in LBO firms and in a matched sample of public firms to control for the effects of changes in the business environment on firms' growth strategies.

*Hypothesis 1: Post buyout, large LBO firms will have lower rates of growth than comparable (i.e., matched) public firms.*

### LBOs and diversification strategy

Diversification is a complex phenomenon; both theory and empirical evidence show that a

number of dimensions of diversification affect firm value. In order to provide a comprehensive analysis of the effects of LBOs on diversification, we examine change in three dimensions of LBO firms' diversification strategies as discussed below.

#### *Change in unrelated diversification*

A firm's value is based on its ability to sustain a competitive advantage relative to its rivals either by producing at lower cost, or by creating more valuable (differentiated) products (Rumelt, 1984; Porter, 1985; Grant, 1989). Related diversification can increase firm value in terms of both these sources of competitive advantage by sharing specific and extensible assets such as production capacity, proprietary technology, know-how, and brand name capital across lines of business (Penrose, 1959; Rumelt, 1974; Teece, 1980; Montgomery and Wernerfelt, 1988). In contrast to related diversification, unrelated diversification is by definition not based on shared technologies, production processes or customers (Rumelt, 1974). Because unrelated diversification does not increase the value of a firm's cost or differentiation advantages, it is unlikely to increase firm value. In addition, unrelated diversification will incur organization costs by consuming scarce managerial attention and by facilitating cross-subsidization (Williamson, 1964; Bhide, 1990).

A number of empirical studies show that the economic performance of unrelated diversified firms is lower than that of related diversified firms (Rumelt, 1974; Palepu, 1985; Lubatkin and Rogers, 1989; Lubatkin and Chatterjee, 1991). Other evidence shows that the value of the firm increases when unrelated businesses are divested (Montgomery, Thomas, and Kamath, 1984; Kaplan and Weisbach, 1992). Despite this evidence, managers in public firms may have incentives to invest in unrelated diversification because it increases the size of the firm and reduces its bankruptcy risk (Marris, 1964; Amihud and Lev, 1981). The incentive-intensity hypothesis argues that managers in LBO firms have stronger incentives to increase firm value than managers in public firms; consequently, they should be more willing to cut back on unrelated diversification:

*Hypothesis 2: Post buyout, large LBO firms will decrease their level of unrelated diversification more than comparable (matched) public firms.*

### *Change in the growth of periphery and core businesses*

Hypotheses based only on change in aggregate levels of diversification do not adequately measure change in diversification strategy; if managers downsize both core and periphery businesses, a firm's aggregate level of diversification may remain unchanged. However, downsizing periphery businesses can be expected to increase firm value, consistent with the evidence that unrelated diversification does not increase firm value, while downsizing core businesses may also increase firm value, if managers previously overexpanded these businesses. According to the incentive-intensity hypothesis, managers in LBO firms should be more willing to cut back on growth, or downsize, both core and periphery businesses than managers in public corporations.

*Hypothesis 3: Post buyout, large LBO firms will have lower rates of growth in their periphery and core businesses than comparable (matched) public firms.*

### *Change in the portfolio of periphery and core businesses*

An additional problem with aggregate measures of diversification is that they do not measure changes in the number and identity of periphery and core businesses. Managers may reduce the total number of core or periphery businesses or reconfigure them by divesting and/or adding different lines of business. These changes in the firm's portfolio of periphery and core businesses also represent changes in diversification strategy, even if aggregate measures of diversification do not change. Divesting peripheral businesses will increase a firm's value because unrelated businesses by definition generate no synergies and incur organization costs (Montgomery *et al.*, 1984; Montgomery and Singh, 1984). Concomitantly, adding peripheral businesses will reduce firm value (Morck, Shleifer, and Vishny, 1990; Kaplan and Weisbach, 1992). According to the incentive-intensity hypothesis managers in LBO firms have more intense incentives than managers in public firms to divest peripheral businesses and/or resist adding peripheral businesses.

*Hypothesis 4: Post buyout, large LBO firms will reduce the number of businesses in their*

*periphery portfolio more than comparable (matched) public firms.*

Firm value may also be increased by divesting core businesses. Evidence provided by Nayyar (1992) shows that many businesses classified as 'related' do not yield synergies. Consequently, divesting nonsynergistic core businesses may also increase firm value. The incentive-intensity hypothesis implies that managers in LBO firms will also be more willing to divest lines of business than managers in comparable public firms.

*Hypothesis 5: Post buyout, large LBO firms will reduce the number of businesses in their core portfolio more than comparable (matched) public firms.*

## METHODS

### Research design

Previous studies on the consequences of LBOs have tended to examine postbuyout operational changes using a longitudinal research design (see, for example, Kaplan, 1989; Smith, 1989; Opler, 1992; Seth and Easterwood, 1993). This is problematic, because changes in a firm's business environment may precipitate strategic change, regardless of changes in governance. This problem may have been particularly acute during the 1980s, which saw extensive changes in tax laws, corporate laws, regulation, and global competition, and which also saw extensive changes in the strategies of many public firms (Bowman and Singh, 1990; Shleifer and Vishny, 1991). To address these potential problems, two different analytical methods are used in this study. First, univariate differences in postbuyout changes in strategy are compared between LBO firms and a control sample of matched firms. Second, logistic regression analysis is used to examine whether postbuyout strategic change is significantly different between LBO and matched control firms. These analyses control for changes in the business environment, providing a more complete test of the effects of LBOs on corporate growth and diversification than longitudinal analysis.

### Samples

The sample contains all LBOs that occurred in the largest 1000 manufacturing firms between

1980 and 1986 for which line of business data is available—TRINET Inc.'s *Large Establishment Database* (called TRINET hereafter). LBOs were identified using delistings identified on COMPUSTAT and were confirmed using the *Wall Street Journal Index* and/or *Predicasts*. The identification of only 64 leveraged buyouts among the *Fortune 1000* firms illustrates the fact that, despite the high total number of firms that went private during the 1980s, LBOs among large firms were rare.<sup>4</sup>

Prior LBO studies have not controlled for firm size in the selection of their samples (Maupin, 1987; Kaplan, 1989; Smith, 1989; Singh, 1990). This raises the possibility that these studies captured other types of going private transactions in their samples, such as 'bootstrapping' buyouts which are 'small management buyouts and divisional spin-offs, characterized by an orderly progression of debt repayment out of the proceeds of the internal cash flow from growing operations' (House Committee on Energy and Commerce, 1989:6). This study instead examines only large LBO transactions: these are the LBOs that have triggered the attention and concern of legislators and other regulatory bodies.

Control firms were matched with LBO firms on the basis of three factors: firm size, the identity of the firm's largest business activity (core business), and total firm diversification. First, the core business activity of each LBO firm was classified in terms of its 4-digit SIC industry. From this sample of firms, we then eliminated those firms that were 50 percent larger than the LBO firm or 50 percent smaller than the LBO firm. The objective was to derive a control firm that not only had the same core business as the LBO firm, but also was somewhat similar in size. From the subset of firms that were now matched in terms of core business identity and size to the LBO firm, we then selected a single firm which most closely matched the LBO firm in terms of its diversification profile. The final selected control sample closely approximates the LBO firm sample in terms of

all three criteria. The LBO sample and matched control sample are listed in the Appendix.<sup>5</sup>

## Data

Data on diversification were provided by TRINET. This data base includes the number of establishments, employees, and revenues for each 4-digit SIC code that a firm participates in. Ideally, strategic change in LBO and control firms should be measured for a fixed number of years immediately following the LBO, when strategic change can be expected to be at its highest levels (Kaplan, 1989; Smith, 1989). However, TRINET data for this study were available for only 4 years: 1980, 1983, 1986, and 1989. Given this data limitation, this study utilized three postbuyout periods: 1980–83, 1983–86, and 1986–89. The LBO sample of firms was divided into these three time period depending on when the actual leveraged buyout occurred. For LBOs which took place during 1980 and 1981, the postbuyout period analyzed was 1980–83. For LBOs which took place during 1982–84, the postbuyout period analyzed was 1983–86. For LBOs which took place during 1985 and 1986, the postbuyout period analyzed was 1986–1989. By using this method the postbuyout period does not precede or follow the actual occurrence of the LBO by more than 1 year.<sup>6</sup>

<sup>5</sup> A prebuyout comparison of the LBO and control sample indicates no significant differences in firm size and total diversification as indicated below:

	<i>Mean characteristics</i>		
	<i>LBO</i>	<i>Control</i>	<i>t-statistic</i>
Sales (\$000s)	1,046	972	0.25
Employment	10,616	8,781	0.88
Total diversification	1.57	1.36	1.49

<sup>6</sup> The distribution of leveraged buyouts during the period 1980–86, together with the time period used to study postbuyout restructuring and its lag in relation to the buyout, is as follows:

<i>Year</i>	<i>Postbuyout period</i>	<i>Lag (years)</i>
1980	1980–83	0
1981	1980–83	-1
1982	1983–86	+1
1983	1983–86	0
1984	1983–86	-1
1985	1986–89	+1
1986	1986–89	0

<sup>4</sup> The sample of 64 LBO firms is similar in size to those analyzed by Maupin (1987: two samples of 54 and 43 LBO firms for two different time period); Kaplan (1989: 78 LBO firms); and Smith (1989: 58 LBO firms). Moreover, these studies did not control for firm size in selecting their samples.

In order to ensure that these lags had no systematic effect on the results of the analysis, dummy variables for the three different lags were added to the logistic regression analysis. The inclusion of the dummy variables was not significant and as a result they were dropped from the final results.

## Measures

Firm growth was measured using changes in firm revenues and number of employees during the 3-year postbuyout period.

Change in total and unrelated diversification was measured using the Jacquemin-Berry Entropy measure of diversification, one of the most widely used measures of diversification (Davis and Duhaime, 1992). This is estimated as follows:

$$\text{Entropy} = \sum_{i=1}^N P_i \ln (1/P_i)$$

where  $P_i$  is the share of total firm sales of the  $i$ th line of business. Following Palepu (1985), total diversification is measured using the 4-digit SIC lines of business of the firm to estimate  $P_i$ , and unrelated diversification is measured using the 2-digit SIC lines of business of the firm to estimate  $P_i$ . Change in total diversification and unrelated diversification is measured as absolute change during the 3-year postbuyout period.

The firm's 'core business' was defined as the largest 4-digit SIC business in terms of sales. The 'core business portfolio' was then defined as all 4-digit SIC activities that share the same 2-digit SIC as the core business. Numerous prior studies have used 2-digit SICs to distinguish related from unrelated activities within a firm (Palepu, 1985; Davis and Duhaime, 1992). The periphery business portfolio is therefore defined as those 4-digit SIC lines of business that are not in the same 2-digit SIC as the core business.

Data on sales, employment, and lines of business (number of 4-digit SICs) of core and periphery portfolios were estimated based on establishment-level data from TRINET. Changes in sales, employment, and number of lines of business were measured for the 3-year postbuyout period. Additions to (deletions from) the core and periphery business portfolios were measured

as 4-digit SICs that were added (dropped) during each 3-year postbuyout period.

## RESULTS

### Sample characteristics

The characteristics of LBO and control firms are shown in Tables 1(a) and 1(b) respectively. Table 1(a) shows that the average LBO firm in the sample had sales of \$1.046 million and about 10 600 employees prior to buyout. The median firm had sales of \$0.464 million and about 5500 employees. These statistics illustrate that there is considerable skew in size distribution of LBO firms (and, by implication, in matched control firms), so that it is important to compare medians as well as means in the univariate analyses which follow. The table also shows that the average LBO firm had 11 periphery lines of business (median number = 7) and four core lines of business (median number = 3).

Table 1(a) also shows that the median LBO firm downsized significantly in terms of the number of employees, and in terms of periphery and core business growth, in the 3 years following the buyout. Total diversification was reduced slightly and unrelated diversification increased, although neither of these changes was significant.

Table 1(b) shows the prebuyout characteristics of control firms, and strategic change in control firms during the three postbuyout years. In contrast to the LBO firms, control firms experienced significant total firm growth in terms of sales in the 3 years following the buyouts of the LBO firms to which they are matched. Control firms also experienced significant growth in their periphery and core businesses. Total and unrelated diversification in these firms also increased significantly. Finally, control firms experienced no change in their number of core or periphery businesses.

### Hypothesis testing: Univariate comparisons

Table 2 shows univariate comparisons of differences in growth, diversification, and periphery and core business portfolio changes between LBO and control firms. First, the table shows that LBO firms grew significantly less (or downsized significantly more) than control firms in terms of sales and number of employees

Table 1(a). Strategic change in LBO firms: Firms' sales, employment, diversification, core, and periphery business portfolios in the year preceding the LBO compared to 3 years after the LBO

	Means			Medians		
	Pre-buyout	Post-buyout	t-statistic	Pre-buyout	Post-buyout	Z-statistic <sup>a</sup>
<i>Firm growth</i>						
Sales (\$000s)	1046	917	0.5	464	500	1.08
Employment	10,615	7850	1.26	5476	4371	3.51***
<i>Diversification</i>						
Total Diversification	1.57	1.51	0.51	1.69	1.61	0.82
Unrelated Diversification	0.95	0.97	0.26	0.88	0.95	0.71
<i>Periphery business growth</i>						
Sales (\$000s)	409	347	0.48	126	183	0.86
Employment	5567	3540	1.15	2028	1586	3.64**
<i>Core business growth</i>						
Sales (\$000s)	638	522	0.75	181	252	1.76*
Employment	6238	4511	1.44	2875	1879	4.01***
<i>Periphery business portfolio</i>						
Number of Lines of Business	11	9	1.12	7	6	1.90*
<i>Core business portfolio</i>						
Number of Lines of Business	4	3	2.05**	3	2	3.76***

n = 64.

<sup>a</sup> Significance levels are based on two-tailed Wilcoxon signed rank tests.

\* p = 0.10; \*\* p = 0.05; \*\*\* p = 0.01

during the 3-year postbuyout period measured. LBO firms reduced their sales by a mean of \$0.13 million while control firms increased their sales by a mean of \$0.43 million. Similarly, LBO firms cut their employee numbers by a mean of 2937 while control firms added a mean of 163 employees during the same period. These results provide support for Hypothesis 1: postbuyout, large LBO firms will have lower rates of growth than comparable public firms.

Table 2 also shows that there were significant differences in postbuyout change in total diversification between LBO and control firms. However, there were no significant differences between LBO and control firms in postbuyout changes in unrelated diversification, providing no support for Hypothesis 2. Thus large LBO firms did not decrease their level of unrelated diversification more than comparable public firms.

The univariate comparison reveals significant differences between LBO and control firms in terms of strategic change in periphery and core

businesses. In LBO firms, periphery businesses were reduced by a mean of \$0.06 million in sales and a mean of 2027 employees. In control firms, by contrast, periphery businesses were expanded by a mean of \$0.25 million in sales, and a mean of 349 employees. In all these instances, differences in growth rates between LBO and control firms were significant. Differences in core business growth between LBO and control firms follow a similar pattern, although only two of the four univariate comparisons are significant, suggesting that fewer inefficiencies existed in the core businesses of LBO firms. These findings provide support for Hypothesis 3 which predicts that, postbuyout, LBO firms will have lower rates of growth in their periphery and core businesses than comparable public firms.

Finally, the univariate comparisons of postbuyout changes in the periphery and core business portfolios of LBO and control firms also reveal some significant differences. LBO firms reduced the mean number of their periphery businesses

Table 1(b). Strategic change in control firms: Firms' sales, employment, diversification, core, and periphery business portfolios in the year preceding the LBO compared to 3 years after the LBO

	Means			Medians		
	Pre-buyout	Post-buyout	t-statistic	Pre-buyout	Post-buyout	Z-statistic <sup>a</sup>
<i>Firm growth</i>						
Sales (\$000s)	972	1400	1.24	500	589	4.89***
Employment	8781	9021	0.13	4879	4413	0.64
<i>Diversification</i>						
Total Diversification	1.36	1.46	0.65	1.22	1.37	1.85*
Unrelated Diversification	0.76	0.85	0.93	0.69	0.84	1.98**
<i>Periphery business growth</i>						
Sales (\$000s)	295	545	1.57	119	163	3.71**
Employment	3592	3941	0.37	1616	1639	0.76
<i>Core business growth</i>						
Sales (\$000s)	700	809	0.44	303	289	0.27
Employment	6158	5527	0.40	2696	2120	2.96***
<i>Periphery business portfolio</i>						
Number of Lines of Business	9	9	0.09	6	6	1.07
<i>Core business portfolio</i>						
Number of Lines of Business	4	4	0.00	3	3	0.05

n = 64.

<sup>a</sup> Significance levels are based on two-tailed Wilcoxon signed rank tests.

\* p = 0.10; \*\* p = 0.05; \*\*\* p = 0.01

significantly more than control firms, supporting Hypothesis 4. However, no significant postbuyout differences between LBO and control firms were found in addition of new lines of business to the periphery portfolio—a finding which is inconsistent with Hypothesis 4. LBO firms deleted about twice the volume of business activities, in terms of sales and employment, from their periphery business portfolio than the control firms, consistent with Hypothesis 4. With regard to the core business portfolio, Table 2 shows that LBO firms reduced the mean number of their core businesses significantly more than control firms, providing support for Hypothesis 5. LBO firms also undertook significantly fewer additions to their core business portfolio than control firms, also supporting Hypothesis 5. However, there were no significant differences between LBO and control firms in the rate of deletion of business activities from the core business portfolio.

### Hypothesis testing: Multivariate analyses

Multivariate logistic regression analyses of differences in postbuyout strategic change between LBO and control firms are shown in Table 3. The dependent variable in these regressions is a dummy variable that has a value of 1 for LBO firms and a value of 0 for control firms. Consistent with the results of the univariate analyses, the regressions show that postbuyout growth and diversification are significant determinants of LBO or control group membership. Model 1 shows that total firm growth and total diversification are significant predictors of LBO firm status; differences in core and periphery growth and business portfolios are not significant predictors. Model 2 shows that differences in the addition of peripheral and core lines of business are also significant predictors of LBO firm status.

Table 2. Univariate comparisons: A univariate comparison of 3-year changes in firm growth, diversification, core and periphery business portfolio composition between 64 LBO firms and 64 matched control firms

	Means			Medians		
	LBO	Control	t-statistic	LBO	Control	Z-statistic <sup>a</sup>
<i>Firm growth</i>						
Change in sales (\$000s)	-129	428	2.44***	27	111	3.40***
% Change in sales	0.14	0.42	2.70***	0.09	0.32	2.90***
Change in employment	-2937	163	2.38***	-1030	-77	2.12**
% Change in employment	-0.02	0.11	0.68	-0.19	-0.02	1.91**
<i>Diversification</i>						
Change in total diversification	-0.06	0.10	1.80*	0	0.03	1.96**
Change in unrelated diversification	0.03	0.09	0.92	0.03	0.02	0.87
<i>Periphery business growth</i>						
Change in sales (\$000s)	-63	250	2.41**	0	46	2.34**
Change in employment	-2027	349	3.04***	-381	-34	2.08**
<i>Core business growth</i>						
Change in sales (\$000s)	-117	109	1.66*	-46	3	1.20
Change in employment	-1727	-631	1.25	-880	-301	1.73*
<i>Periphery business portfolio</i>						
Change in no. of lines of business	-3.0	-0.6	1.70*	-2.0	-1.0	1.32
<i>Business deletions</i>						
Sales (\$000s)	154	68	1.96**	35	17	1.49
Employment	2250	1225	1.94**	701	531	1.40
Number of lines of business	7.3	5.1	1.72*	3.0	2.0	1.59
<i>Business additions</i>						
Sales (\$000s)	120	142	0.46	39	22	114
Employment	1006	1151	0.43	355	259	0.96
Number of lines of business	4.4	4.5	0.10	4.0	3.5	0.62
<i>Core business portfolio</i>						
Change in no. of lines of business	-1.1	0	2.85***	-1	0	2.99***
<i>Business deletions</i>						
Sales (\$000s)	88	70	0.59	7.5	6.5	0.10
Employment	1008	597	1.10	75	52	0.36
Number of lines of business	1.5	1.2	1.13	1	1	0.82
<i>Business additions</i>						
Sales (\$000s)	53	70	0.47	0	6	2.86**
Employment	302	487	0.86	0	42	2.59**
Number of lines of business	0.5	1.2	3.29***	0	1	3.11***

n = 128

<sup>a</sup> Significance levels are based on two-tailed Wilcoxon signed rank tests.

\* p = 0.10; \*\* p = 0.05; \*\*\* p = 0.01

## DISCUSSION

The results of this study are generally consistent with the predictions of the incentive-intensity hypothesis and of the more detailed hypotheses

developed here. First, we find that growth rates are significantly lower in LBO firms than in control firms in terms of both sales growth and employee growth. Second, we find that LBO firms decreased the size of both their periphery

Table 3. Logistic regression analysis: Differences in postbuyout strategic change between LBO and matched control firms

	Model 1		Model 2	
	Coefficient	Standard error	Coefficient	Standard error
<i>Firm growth</i>	-0.71**	0.29	-1.82**	0.59
<i>Diversification</i>				
Total diversification	-0.50*	0.25	-1.02*	0.69
<i>Periphery business growth</i>	-0.09	0.23		
<i>Core business growth</i>	0.00	0.25		
<i>Periphery business portfolio</i>	1.22	0.87		
<i>Core business portfolio</i>	0.42	0.32		
<i>Periphery deletions</i>				
Sales (\$000s)			1.90	2.22
Number of lines of business			-0.03	0.05
<i>Periphery additions</i>				
Sales (\$000s)			3.33**	1.19
Number of lines of business			-0.02	0.05
<i>Core deletions</i>				
Sales (\$000s)			-1.53	1.18
Number of lines of business			0.12	0.13
<i>Core additions</i>				
Sales (\$000s)			1.19	1.20
Number of lines of business			-0.50**	0.24
Constant	0.03		0.28	
Logarithmic likelihood	-78.9		-70.9	
$\chi^2$	19.6*		35.6**	

*n* = 128\**p* = 0.05; \*\**p* = 0.01

and core businesses more than control firms. Third, we find that LBO firms divested a significantly higher volume of periphery and core businesses, and added a significantly lower volume of peripheral and core businesses than control firms. These postbuyout differences between LBO and public firms are consistent with the argument that LBO firms provide managers with incentives to downsize and prune lines of business, resulting in reductions in overall firm size and diversification. Although the analyses show no significant reduction in unrelated diversification in LBO firms, this result

reflects the fact that the LBO firms in our sample downsized and divested both peripheral and core businesses. Therefore, overall, their level of unrelated diversification did not change significantly. This finding is consistent with the argument that many core businesses may also, in fact, be 'unrelated', as shown in a recent study by Nayyar (1992). The results of Nayyar's study and of this study show the merit of moving beyond the conventional measures of related and unrelated diversification in studies of firm diversification.

The results of this study are consistent with

previous studies which have shown that LBOs increase operating profits (Kaplan, 1989; Smith, 1989; Opler, 1992). While we do not examine firm profits in this study, the evidence presented here strongly suggests that one source of increases in operating profits in LBO firms is cutting back on firm growth, and by pruning lines of business. Strategic planning models have long fostered the idea that some lines of business of a diversified firm may be sources of profits, while others may be 'sinks' which do not repay the cost of capital (see, for example, Henderson, 1974). The implication of the incentive-intensity hypothesis examined here, and one inference from the results of this study, is that managers in public firms may not be willing to divest such marginal operations, unless their incentives are transformed.

## CONCLUDING REMARKS

The incidence of large firms undergoing leveraged buyouts during the 1980s was one of the most controversial aspects of the 'restructuring boom.' A particular concern of legislators and regulators has been whether or not LBOs in large and economically important firms create or destroy economic value. The dominant explanation for LBOs, the incentive-intensity hypothesis put forward by Jensen (1989), suggests that LBOs increase firm value by attenuating managers' incentives to invest in profitless growth and diversification. The purpose of this study has been to examine whether LBOs do in fact lead to reductions, or even reversals, in corporate growth and diversification as the incentive-intensity hypothesis suggests. Using a matched sample design to control for industry membership, firm size and firm diversification, this study finds that LBO firms had significantly lower rates of growth and diversification than comparable public firms during the same time period. These results are generally consistent with the predictions of the incentive-intensity hypothesis.

## ACKNOWLEDGEMENT

We gratefully acknowledge Gary Hansen's assistance in the procurement of TRINET data for the sample of firms used in this study.

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## APPENDIX: LBO AND MATCHED CONTROL SAMPLES

LBO sample	Matched control
Allied Van Lines Inc.	Preston
Amalgamated Sugar Co.	American Crystal
Amerace Corp.	Augat
American Bakers	Lance Inc.
American Sterilizer Co.	C. R. Bard
Amstar Corp.	Conagra

Amsted Industries  
ARA Services  
Amstar Corp.  
Bell & Howell Co.  
Blue Bell Inc.  
Borg-Warner Corp.  
Burlington Industries  
CCI Corp.  
Ceco Inds. Inc  
Central Soya Co.  
Coca-Cola Bottling Co. of NY  
Conair Corp.  
Cone Mills Corp.  
Continental Group  
Cox Communications Ins.  
Dan River Inc.  
Dinner Bell Foods Inc.  
Easco Inc.  
Fruehauf  
Great American Industries  
Guardian Industries  
Harte-Hanks  
Hyatt Intl. Corp-CLA  
Intl. Controls Corp.  
Interstate Bakeries Corp.  
Joy Mfg. Co.  
Kane-Miller Co.  
Leslie Fay Inc.  
Levi-Strauss & Co.  
Macy (R. H.) & Co.  
Mary Kay Cosmetics  
Metromedia Inc.  
Mohawk Rubber  
National Gypsum Co.  
Norris Industries Inc.  
Palm Beach Inc.  
Papercraft Corp.  
Ponderosa Inc.  
Purex Industries Inc.  
Rapid-American Corp-De  
Reliance Group Holdings  
Research-Cottrell  
Revco D. S. Inc.  
Revere Copper  
Scholastic Inc.  
SFN Cos Inc.  
Signode Corp.  
Singer Co.  
Southland Corp.  
Sybron Corp.  
Triangle Pacific Corp.  
U.S. Sugar Corp.  
Nortek Inc.  
Sysco  
Courier Corp.  
General Binding  
VF Corp.  
Eaton Corp.  
DWG Corp.  
Manitowoc  
Harsco Corp.  
Dean Foods Co.  
Mei Corp.  
Alberto-Culver  
J. P. Stevens  
Crown Cork & Seal  
Media General  
West Point Pepperell  
Geo. Hormel  
Pall Corp.  
Federal Mogul Corp.  
Lancaster Colony  
AFG Industries  
Lee Enterprises  
Hilton Hotels  
Spartan Corp.  
Flowers Industries Inc.  
Smith Intl.  
Thorn-Apple Valley  
Kellwood  
Hartmarx  
May Department Store  
Helene Curtis Inds.  
Capital Cities/ABC  
Cooper Tire  
Lone Star Inds.  
Alleghany International  
Phillips Van Heusen  
NCH Corp.  
Morrison Inc.  
Proctor & Gamble  
Limited, Inc.  
Chubb Corp.  
Ampco-Pittsburgh  
Wallgreen Co.  
Handy & Harman  
Wiley (John) & Sons  
Houghton-Mifflin  
Barnes Group  
Storage Technology  
Winn Dixie Stores Inc.  
Schulman (A.) Inc.  
Louisiana Pacific Corp.  
Holly Sugar

Uniroyal Inc.  
Walter (Jim) Corp.  
Warnaco Inc.  
Williamhouse Regency Inc.  
Wometco Enterprises

Rohm & Haas Co.  
Tyler Corp.  
Tultex  
St. Joe Paper  
SCI Holdings

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