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Restructuring's Effect on Related and Unrelated Diversification Among Top Food Manufacturing Firms in the 1980s

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Abstract

Corporate restructuring during the 1980s is argued to have focused on improving firm performance by increasing related and decreasing unrelated diversification. The restructuring patterns of top food manufacturing firms do not support this; instead, much of the restructuring appears to have been driven by the pursuit of stronger market positions.

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1. Introduction

The 1980s are likely to be remembered as the "Decade of the Deal" as a large number of firms were actively engaged in major corporate restructuring through mergers, acquisitions, leveraged and management buyouts, and selloffs. By the end of the decade, an estimated $1.3 trillion had been spent on shuffling assets [O'Neal, 1990], with food and tobacco manufacturers among the most active participants. They were involved in five of the twenty largest mergers, acquisitions, and leveraged buyouts (LBOs) made between 1980 and 1989. The LBO of RJR Nabisco in 1989 holds the record price tag of $26.4 billion.

Observers have argued that the key difference between corporate restructuring in the 1980s and that attendant to the 1960s merger wave was in its effect on firm diversification or the degree of relatedness between the acquiring and acquired firms' lines of business [e.g., Shleifer and Vishny, 1990, 1991; Bhagat, Shleifer, and Vishny, 1990]. The earlier wave was more conglomerate in nature with firms making large numbers of acquisitions in lines of business not closely related and, in some cases, totally unrelated to their core lines. Much of the conglomerate expansion of the 1960s and 1970s was undertaken to exploit efficiency or market power opportunities that supposedly exist in diversified firms [Hall and Weiss, 1967; Shepherd, 1972; Greer, 1984]. However, studies have shown that this strategy largely failed. Morck *et al.* [1990] suggest that much of the unrelated expansion of the previous decade was motivated by the personal ambitions of corporate managers that were often at odds with maximizing stockholder wealth.

Even when intentions were good, most diversification attempts failed because the newly added lines were either structurally incompatible with the firm's existing businesses or the transactions capitalized all potential future benefits [Porter, 1987]. For this reason, restructuring in the 1980s is

believed to be associated with firms selling off unrelated and acquiring more closely related business lines as a result of their reassessment of the expansion strategies of the late 1960s and 1970s. In fact, the 1980s wave is said to be largely concerned with undoing the results of the earlier one [Porter, 1987]. Despite this widely held view, there is little empirical evidence to suggest that the overriding objective of the latest wave of restructuring activities was to reduce unrelated diversification and increase related diversification. We test this common view by analyzing the effects of restructuring on related and unrelated diversification among top food and tobacco manufacturing companies. We address whether firms in the food/tobacco manufacturing industries have significantly increased the relatedness of their business lines through restructuring. Specifically, we test whether:

> Between 1981 and 1989, total diversification and unrelated diversification decreased while related diversification increased among a sample of top food & tobacco manufacturing companies.

The sample is constructed from the top 100 firms listed in *Food Processing's* annual Top 100 Food Companies Report. The ranking is based on the firms' 1990 food sales rather than total sales. This list was checked against USDA's top 50 list [Handy and Henderson, 1990] for omissions. Five more firms were added to the top 100 list: Agway, Cargill, Mars Inc., Perdue Inc., and Stroh Breweries. Of these 105 firms, 89 are listed on the 1981 Trinet database, 94 are listed on the 1989 Trinet database, and 83 firms are listed in both 1981 and 1989. These 83 firms were included in the sample. The Trinet data report annual sales volume for each plant location. For public companies, the sales figures for the individual locations are based on reported company sales and the number of employees at each establishment for each SIC code. For private companies, the sales figures are based on shipments per employee in their particular industries. For this study, establishment sales are aggregated to arrive at total company sales and subtotals for each 4-digit SIC segment and 2-digit SIC group within each company. There are two reasons the top 100 were chosen as the starting point in sample construction:

1) They represent a significant portion of total production of the food/tobacco manufacturing sector. The 83 firms in the Trinet sample collectively account for about 50 percent of all food/tobacco sales reported by Trinet.

2) Most of the restructuring activities were carried out by large firms and these activities likely have a significant impact on the structure and performance of the food/tobacco manufacturing industries.

2. Measuring Restructuring Activity and Changes in Diversification

Several studies [MacDonald, 1985; Palepu, 1985] of diversification have employed the "entropy measure of diversification" first proposed by Jacquemin and Berry [1979]. The entropy index measures firm-level diversification, where there are several industry groups and within each industry group there are several industry segments [MacDonald, 1985; Palepu, 1985]. For this study, an industry group is defined as a 2-digit SIC major group and an industry segment as a 4-digit SIC industry. If a firm operates in a total of N 4-digit industries in all the 2-digit major groups, then the firm's total diversification (DT) can be measured as:

$$DT = \sum_{i=1}^{N} P_i \cdot Ln(1/P_i)$$

where P_i is the share of a firm's sales from the i^{th} 4-digit industry. If we classify the N industry segments into M industry groups, then DR_j is a measure of the firm's diversification among 4-digit industries in the j^{th} 2-digit major group:

$$DR_j = \sum_{i \in j} P_i^j \cdot Ln(1/P_i^j)$$

where P_i^j is the share of the i^{th} 4-digit industry of the j^{th} major group in the firm's total sales in the major group. For a firm that operates across more than one 2-digit major group, its 4-digit level diversification can be defined as a weighted sum of the DR_js, where P^j is the share of the j^{th} major group in the total sales of the firm:

$$DR = \sum_{j=1}^{M} DR_j \cdot P^j.$$

Note that DR measures the relatedness of diversification within ALL the different 2-digit major groups. It does not assume a home major group. Since this is an industry study and all sample firms

derive most of their sales from food and tobacco, SICs 20 and 21 are treated as the home industry group. In all indices presented, we treat SICs 20 and 21 as in the same major group because they involve the processing of agricultural products; use similar production and packaging technologies; sell through similar distribution channels; and use similar marketing skills. Thus $DR_{20/21}$ is measured as:

$$DR_{20/21} = \sum_{i \in 20/21} P_i^{20/21} \cdot Ln(1/P_i^{20/21}).$$

It is weighted by $P^{20/21}$, the share of the firm's sales from the food/tobacco group, to yield a measure of the share of related diversification that is within the home major group:

$$DR^*_{20/21} = DR_{20/21} \cdot P^{20/21}.$$

Let DU be diversification across 2-digit major groups, then according to the definition of the index:

$$DU = \sum_{j=1}^{M} P^j \cdot Ln(1/P^j)$$

All indices have a theoretical lower limit of zero when the firm is not diversified. They do not have a meaningful upper limit so that whether a firm is more or less diversified can only be ascertained by comparison with other firms or with itself over time. The focus of this study is on $DR^*_{20/21}$ which measures related diversification across 4-digit segments within food and tobacco manufacturing, and DU which measures unrelated diversification across 2-digit industry groups. We use these indices to analyze changes in diversification among top food companies in the 1980s.

3. Diversification Patterns

This section presents diversification indices for sample firms based on the Trinet data. Nonparametric tests are conducted to see if changes in diversification indices are statistically significant. Sample firms are classified into several restructuring categories according to net changes in their related and unrelated diversification. The related diversification hypothesis is then analyzed on the basis of these different restructuring patterns.

Related, unrelated and total diversification indices for the sample firms are summarized in Table 1. These indices provide a good overall picture of the extent and direction of firm diversification in the food/tobacco manufacturing industries. To ascertain whether changes in diversification indices between 1981 and 1989 are statistically significant, several test procedures were considered. Instead of the traditional parametric tests of two population means, nonparametric tests were conducted to see if there have been significant changes in the average levels of related and unrelated diversification between 1981 and 1989. Nonparametric tests were chosen over parametric tests for two reasons. First, traditional parametric tests of two population means involve assumptions about the distributions of the populations sampled. These assumptions are too restrictive in many situations because the exact underlying population distributions are not known to the researcher. Many nonparametric tests get around this problem by focusing on the *ranks* or *order* rather than the numerical values of the observations. Second, entropy diversification indices are ordinal measures as opposed to cardinal measures in the sense that they measure ordering instead of magnitude. Since there is no meaningful upper limit, an index of 1.5 is more diversified than an index of 1, but not necessarily by 50%. All that we are concerned about is whether the difference between the two is statistically significant. Many nonparametric tests serve this purpose well. More specifically, the Wilcoxon matched-pairs signed rank test was used. This test is analogous to the parametric *t* test for paired observations. The advantage of the signed rank test is that it does not make restrictive assumptions about the underlying population distributions and does not rely on the numerical

Table 1. Summary of Diversification Indices for Sample Firms

	NAME	N	MEAN	ST. DEV	VARIANCE	MIN	MAX
1981	$DR^*_{20/21}$	83	0.575	0.472	0.223	0.000	1.735
	DU	83	0.678	0.551	0.304	0.000	2.344
	DT	83	1.375	0.859	0.739	0.000	3.560
1989	$DR^*_{20/21}$	83	0.592	0.515	0.265	0.000	1.974
	DU	83	0.683	0.586	0.344	0.000	2.476
	DT	83	1.403	0.917	0.841	0.000	3.709

values of the sample elements. The results of the tests are presented in Table 2. For the sample as a whole, neither related, unrelated or total diversification indices have changed significantly between 1981 and 1989. These results contradict the relatedness hypothesis which predicts movements away from unrelated and toward related diversification.

Equally important to overall averages are individual firms' experiences. The average measures of diversification tend to mask a lot of movement at the individual firm level. Many firms have undertaken extensive restructuring during the 1980s. While some firms have continued to become more diversified in the related or unrelated direction or both, other firms have retrenched by focusing on their core businesses. There are several distinct patterns of restructuring in the sample, each representing a different set of restructuring strategies. Understanding these different patterns of restructuring is crucial to understanding the driving force behind restructuring activities in the 1980s.

Sample firms can be grouped into nine restructuring categories according to net changes in $DR^*_{20/21}$ and DU, as shown in Table 3. The cells are labelled in parentheses 1 through 9 followed by the number of firms in the category. A zero in related or unrelated diversification is assigned to firms with no net change in the level of these diversification indices. Only the 24 firms in Cell 7 truly fit the hypothesis, with increased related and decreased unrelated diversification. The two adjacent cells (Cells 4 and 8) are to some extent consistent with the hypothesis, but the 39 firms in the first row appear to contradict the hypothesis in that all have experienced positive net changes in unrelated diversification. Of these 39, 18 also had increases in related diversification and the remaining experienced zero or negative change in related diversification. The 2 firms in Cell 5 ended where they started with no net change in either measure. The 17 firms in Cells 6 and 9 became more specialized by retreating into their core businesses.

Of most interest are the 76 firms in the four corner cells (Cells 1, 3, 7 and 9) since they represent four distinct patterns of restructuring. These include Cell 7, where restructuring activities are consistent with the hypothesis, Cell 9 which is partially consistent with the hypothesis, and two cells that contradict

Table 2. The Wilcoxon Matched-Pairs Ranked Sign Tests

Wilcoxon Scores (Rank Sums)
Classified by Variable YEAR

For $DR^*_{20/21}$:

YEAR	N	Sum of Scores	Expected Under H_0	Std Dev Under H_0	Mean Score
1989	83	6941.0	6930.50	308.96	83.63
1981	83	6920.0	6930.50	308.96	83.37

S = 6941.00 Z = 0.032366 Prob > |Z| = 0.9742
T-Test approx. Significance = 0.9742
Kruskal-Wallis Test (Chi-Square Approximation)
CHISQ = 0.00115 DF = 1 Prob > CHISQ = 0.9729

For DU:

YEAR	N	Sum of Scores	Expected Under H_0	Std Dev Under H_0	Mean Score
1989	83	6887.50	6930.50	309.49	82.98
1981	83	6973.50	6930.50	309.49	84.02

S = 6887.50 Z = -.137321 Prob > |Z| = 0.8908
T-Test approx. Significance = 0.8909
Kruskal-Wallis Test (Chi-Square Approximation)
CHISQ = 0.01930 DF = 1 Prob > CHISQ = 0.8895

For DT:

YEAR	N	Sum of Scores	Expected Under H_0	Std Dev Under H_0	Mean Score
1989	83	6991.0	6930.50	309.56	84.23
1981	83	6870.0	6930.50	309.56	82.77

S = 6991.00 Z = 0.193825 Prob > |Z| = 0.8463
T-Test approx. Significance = 0.8466
Kruskal-Wallis Test (Chi-Square Approximation)
CHISQ = 0.03820 DF= 1 Prob > CHISQ = 0.8450

Average Scores were used for Ties
Wilcoxon 2-Sample Test (Normal Approximation)
(with Continuity Correction of .5)

it, Cells 1 and 3. As indicated by this classification, the restructuring activities of the majority of the sample firms do not support the hypothesis. In fact, the average level of diversification by sample firms increased between 1981 and 1989. This increase in overall diversification was accompanied by different patterns of restructuring by individual firms in the sample. There was no clear indication that related diversification was the driving force behind restructuring in the food and tobacco manufacturing industries.

Table 3. Distribution of Sample Firms Among Restructuring Categories

NET CHANGE IN DU	NET CHANGE IN $DR^*_{20/21}$		
	+	0	-
+	(1) 18 NO	(2) 3 NO	(3) 18 NO
0	(4) 0 MAYBE	(5) 2 ?	(6) 1 NO
-	(7) 24 YES	(8) 1 MAYBE	(9) 16 ?

While most firms with high levels of diversification in 1981 remained highly diversified in 1989, the underlying patterns of diversification have changed. Two tobacco firms (Philip Morris and American Brands) and two beer companies (Adolph Coors and Anheuser Busch) became more diversified by branching out into other food products or nonfood/tobacco products to reduce their dependence on alcohol and tobacco. Some of the more specialized firms expanded their food lines (Quaker Oats, Pepsico) while

others diversified into nonfood products (Ralston Purina, Perdue). ConAgra and Archer-Daniels-Midland, while continuing to expand their presence in agricultural commodities processing [Marion and Kim, 1991], made significant expansions into branded consumer food products and nonfood products to reduce their reliance on primary agricultural commodities. Some of the firms with high levels of unrelated diversification shed some unrelated lines to focus on their core businesses within the food/tobacco manufacturing sector. These include Pepsico, Sara Lee, Philip Morris and Hershey.

Historically, food manufacturing companies have experienced less cyclical fluctuations in sales and profitability than firms in other sectors. These cycles may be among the major reasons for diversification attempts. As a result, during the 1960s and 1970s food manufacturing companies tended to be the targets of acquisitions by diversifying firms rather than the initiators of such activities. Most food companies remained relatively focused on food products throughout the wave of mergers and acquisitions during the 1960s and 1970s and were not extensively diversified at the beginning of the 1980s. Because of this, there was not much room for diversification to decrease. Therefore while some of the large food/tobacco manufacturers were busy unloading some of their unrelated lines during the 1980s, other more specialized firms were becoming more diversified by expanding into nonfood/tobacco lines as well as other food products. Although $DR^*_{20/21}$ did not register any significant overall changes, firms did appear to be converging on the center of the diversification continuum.

4. Market Position as an Alternative Explanation of Corporate Restructuring

While there was substantial reshuffling of assets by sample firms during the 1980s, the pursuit of related diversification did not seem to be the driving force behind the restructuring activities of large food/tobacco manufacturing firms in the 1980s. Instead, something in addition to the relatedness of diversification may have played a role in the latest round of restructuring. One such objective may have been improving the firm's competitive position in the industries in which it operates. A firm's competitive position can be measured by the market shares of its business lines and the growth rates of the industries in which these lines are based.

This study incorporates the Boston Consulting Group (BCG) matrix which measures a business line's competitive position as a function of its market share and industry growth rate. According to the BCG matrix, all business lines can be classified into four categories based on each business line's market share and the growth rate of the industry in which it operates. These categories are:

Stars Lines that have a high relative market share and are based in industries that have high growth potentials. High industry growth potential and strong competitive position mean that these lines have excellent long-term profit and growth opportunities. They will generate sufficient profits to finance their own expansion and contribute to the firm's overall cash flows.

Cash cows Lines that have a high relative market share but are based in low-growth industries. Low growth means that the industry has limited opportunities for future expansion but strong competitive positions mean that these lines can generate substantial positive cash flows without significant need for further investments. The firm's best strategy is therefore to milk the maximum amount of profits out of these lines before the industries go under.

Question marks These are lines that are based in high growth industries but have low relative market shares. These lines have good opportunities for future growth and expansion to become a **star** but may require substantial short-term capital infusion to get there. Therefore a decision has to be made on whether the long-term pay-off will be sufficient to cover the short-term cash outlays.

Dogs These are definite losers. These lines have low relative market shares and are based in low growth industries. They have weak competitive positions and have no potential for future growth and expansion. Trying to gain market share and therefore turning it into a cash cow in a stagnating industry can be very costly and risky. They may require substantial investments simply to maintain their current positions but will not generate significant profits to cover these outlays.

A graphical representation of the BCG matrix is presented in Figure 1. The vertical scale represents industry growth rate, and the horizontal scale measures the business line's relative market share. Each circle represents a line of business. The center of each circle represents the position of that line on the matrix and the size of each line measures the importance of each line in terms of its revenue-generating capacity relative to the firm's overall portfolio of business lines.

In the course of corporate restructuring, a rational decision maker would nurture the stars, keep the cash cows and eliminate the dogs. The treatment of the question marks is more difficult because it depends on the firm's evaluations of the lines' potential pay-offs against their short-term capital

requirements. Based on this analysis, we expect that most of the acquired lines are either stars or cash cows, maybe some question marks, while most of the divested lines are dogs and some question marks. Relatedness is only relevant when combined with stars and cash cows. Thus, we tested an alternative hypothesis that:

> Between 1981 and 1989, sample firms improved their competitive positions by deleting dogs, and adding stars and cash cows.

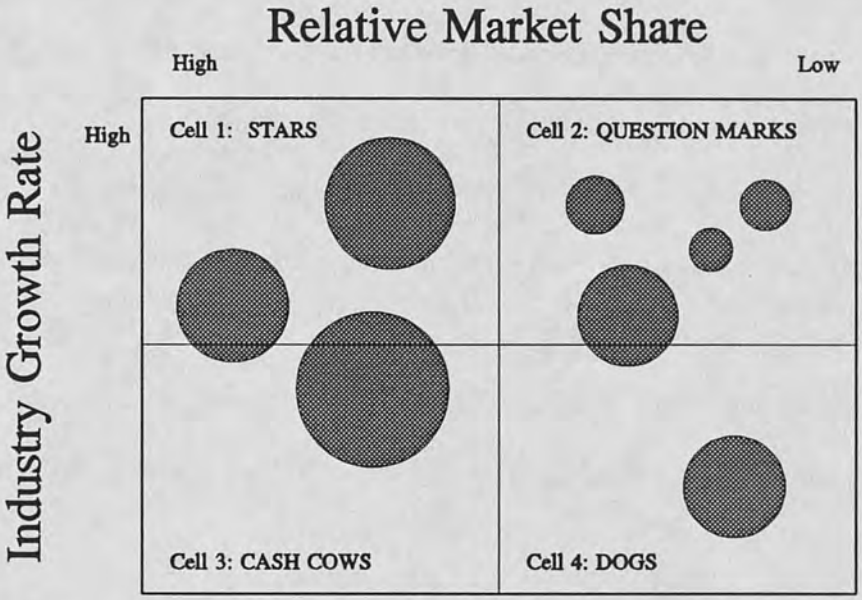

Figure 1. The BCG Matrix [Source: Hill and Jones, 1989]

Based on the BCG matrix, lines added and deleted by sample firms during the 1980s are classified into the four categories. Figure 2 shows the number and percentage of added and deleted lines in each category. Lines are classified into the High share group if they have at least 5% relative market shares, while those with lower than 5% relative market shares are classified into the Low share group. Industries are separated into two groups: those with positive growth rates (the High group) between 1981 and 1989, and the those with negative growth rates (the Low group). Almost 40% of the added lines are either stars or cash cows and only 6% of the deleted lines are stars or cash cows. By contrast, 63% of the deleted lines are dogs and only 20% of the added lines are dogs. By far the largest group of added lines (42%) are question marks. These lines have relatively low market shares but are in growing industries. As a

result, they represent good investment opportunities. With the right strategy and capital, they can be turned into stars. To achieve that objective, they also require substantial capital infusion and managerial attention. Therefore, there is a high rate of failure as evidenced by the fact that 31% of the deleted lines are question marks. Overall, sample firms showed a strong preference for stars and cash cows which represent strong market positions and good cash flows. Their dislike for dogs is also clear. The question marks deserve more analysis. In restructuring their portfolio of business lines, firms are faced with a dilemma. Stars and cash cows are everyone's favorites and are constantly in high demand. But high demand for these lines may bid the selling price so high that premiums firms have to pay for these lines would wipe out potential future gains. This may partially explain why more stars and cash cows were not acquired. One solution to this problem is to acquire lines that are not stars but have a good chance of becoming stars. The question marks are good candidates. These lines have good potential and are often available at bargain prices [Weston and Chung, 1990]. However, success is not guaranteed. The high turnover rate for this group is predicted by the Boston Consulting Group and is evidenced by data shown here.

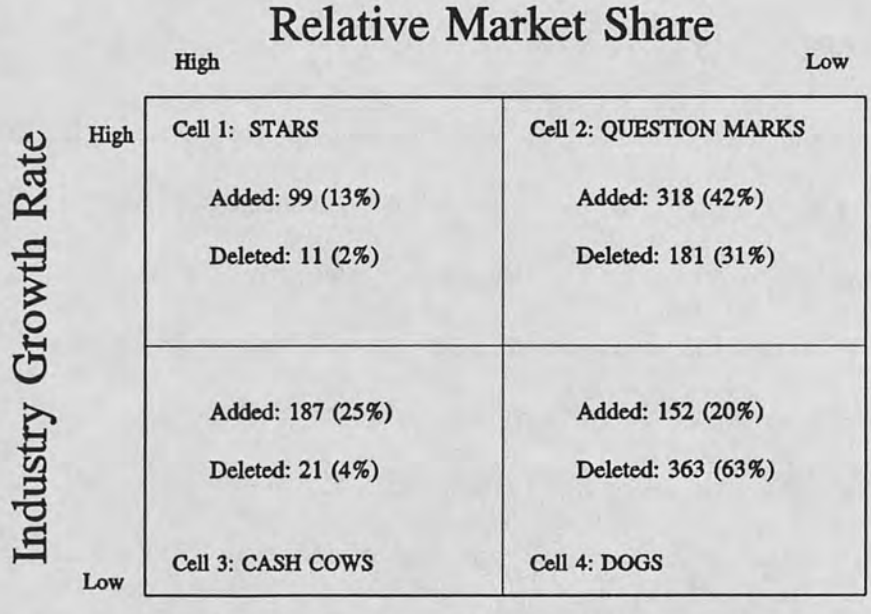

Figure 2. Distribution of Added and Deleted Lines on the BCG Matrix

These findings suggest that, during the 1980s, sample firms have been adding manufacturing lines that had stronger market positions and deleting manufacturing lines that had weak market positions. This type of action is consistent with the retrenching and consolidation strategies of many firms documented in other studies [Shleifer and Vishny, 1990; Porter, 1987]. Although many lines were added and deleted during the period, a closer look at the market positions of added and deleted lines reveals a preference for lines that generate near-term cash flows or those that have promising growth potential regardless of their relatedness. While these results may not be strong enough to warrant sweeping conclusions, they suggest that firms did not try so much to shed "unrelated" lines as to consolidate by eliminating marginal lines where they held weak competitive positions. These findings provide tentative support for the alternative hypothesis. This preference for stronger competitive positions is important because it may open up a different dimension to diversification analysis. Instead of focusing exclusively on diversification and its relatedness, it may also be important to look at the impacts of restructuring and diversification on firms' competitive positions.

5. Summary

Corporate restructuring during the 1980s is argued to have focused on improving firm performance by increasing related and decreasing unrelated diversification. We examined this hypothesis using evidence from the food manufacturing sector and found no support for it. The lack of support for the relatedness hypothesis led to testing the alternative hypothesis that corporate restructuring in the top firms in the food/tobacco manufacturing industries in the 1980s was aimed at improving firms' competitive positions rather than increasing related diversification. Preliminary results suggest that the pursuit of improved market positions may have been a major objective of the restructuring activities of the 1980s. They also suggest that diversification was only part of the strategic planning, and it was considered desirable only if the firm could capture leading positions by diversifying. Firms preferred to avoid lines (related or unrelated) where they were relatively weak and focus on lines (again, related or unrelated)

where they had competitive advantages. This proposition is supported by evidence that added lines tend to have higher market shares and better growth opportunities than deleted lines. Pursuit of market position through restructuring may provide an explanation for the structural changes in the food/tobacco manufacturing industries during the 1980s.

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