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MOBILITY AMONG THE LARGEST FOOD MANUFACTURING COMPANIES, 1950-1975

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Introduction

The extent of competition among industrial firms has been the subject of scores of empirical investigations. Various techniques have been applied to determine which industry or firm characteristics are associated with socially desirable business conduct or performance. These methods have traditionally included intensive studies of particular industries and, more recently, several varieties of econometric tests. A third, and less well known, general type of quantitative studies of industrial competition are known as "mobility" or "turnover" studies. The principal purpose of this paper is to review several of the more recent studies of this type and to apply the technique to the U.S. food manufacturing sector over the quarter century 1950-1975.

The basic ideas behind the notions of firm mobility or turnover are comparatively simple. Mobility among a group of firms is the extent to which their relative positions change within the group. Position is typically indicated by some index of size or market share, and the group conventionally chosen is the top 100 or 200 firms of a given industry or sector. Turnover, on the other hand, registers the extent to which firms enter or leave the chosen group, as evidenced by either a count of the number of entering or exiting units during a certain time period or by the size effects of this turnover on the group under study.[1/]

[1/] Turnover and mobility studies have often been combined with calculations of changes in the size distribution of the group of largest companies over time, since the data requirements are similar and since the interpretations of size inequality and stability are parallel.

Both mobility and turnover levels have been considered indicative of competitive conditions within the industry or group under investigation. Essentially, high levels of mobility and turnover are held to reflect the rough and tumble turbulence associated with strong rivalry and aggressive corporate behavior. By contrast, great stability (the opposite of mobility) in size rankings, shares, or the identity of the largest firms over time is taken to be evidence of cooperative behavior among leading firms. Either the leading companies prefer the comfortable status quo and are fearful of the reactions of rivals (which would account for low observed mobility) or they have the market power to exclude potential rivals from the ranks of the largest and presumably most successful firms (which would show up as low turnover). Under either interpretation the relevant units of observation are the largest companies since size and monopoly power are at least empirically associated.

Mobility among a fixed sample of firms is intimately related to firm growth, which in turn can be affected by factors other than those relating to competitive strategy. That is, measures of mobility may be affected by a firm's efficiency, progressiveness, the growth rate of its industry, and merger (or dissolution) activity (Friedland 1957). In order to ensure that mobility measures the rigor of long run rivalry, various authors have made adjustment to remove the effects of some of these factors on "apparent" mobility. With turnover also, some researchers distinguish between "natural" exits and those due to acquisition.

Thus, properly measured, true mobility closely measures the state of competition in a given industry or sector. But precisely how the concept of mobility fits into the industrial organization model (structure ⟶ conduct ⟶ performance) is subject to some differences in interpretation. Most authors have considered mobility an alternative, fourth measure of industry structure. That is, mobility was conceived of as a dynamic indicator of changing industry structure (Boyle and Sorenson 1970) or even as a substitute for concentration (Bond 1975). Others, however, consider mobility a measure of overall conduct, the result of collusion that has as its aim constant market shares among industry leaders. William Shepherd, for example, states that

> ... the greater the stability, the greater the probability that overt or covert cooperation exists; a churning among the leading firms could suggest active competition, no matter how monopolistic the structure seems to be (Shepherd 1970: 133).

Heggestad and Rhoades (1976) have shown that within the banking industry both mobility and turnover (as well as market share changes) are directly related to other market structure dimensions such as concentration. Therefore, within fairly narrow markets at least, mobility would appear to be a manifestation of firm conduct at least partly determined by the elements of market structure. Within broader sectors, however, the undesirability of stability is, like aggregate concentration, harder to justify. Increasing aggregate mobility may represent improving long-run, interindustry

competition through diversification or one may have to resort to arguments revolving about sociopolitical power (Bond 1975).

The interpretation of turnover is more clear cut. The extent of entry and exit to and from the largest size classes of firms is a rough, but direct measure of the height of barriers to entry (and exit, too, since the size of the leading firm group will be fixed). As Collins and Preston (1961b) put it, stability measures the degree of entrenchment of large corporations, but turnover is more an indicator of the "equality of business opportunity" for potential entrants.

One final point by way of introduction is that mobility analysis is not by itself sufficient to make firm conclusions on the state of competition. A degree of mobility and turnover is a necessary condition for workable competition, but it is not a sufficient one, for mobility may be relatively high in periods of rapid monopolization. But low mobility in combination with high and increasing concentration is reason for public policy concern.

Review of Previous Studies

In a word, most previous researchers of the mobility/turnover phenomenon have chosen the stated, total asset sizes of the largest, public industrial corporations over fairly long periods as the basis for their analyses. We will elaborate on each of these points in this section.

Since the first comprehensive mobility study was completed by Kaplan (1954), total assets has been the size standard employed in most research of this kind.[1/] Total assets has the convenient properties of both availability (especially in earlier years) and a tendency not to fluctuate as wildly from year to year as the major alternative size indexes: sales, employment, and profits (Mermelstein 1969).[2/] Of the four, assets has traditionally been viewed as the best measure for registering firm size changes over time (see Adelman 1951). Moreover, Collins and Preston (1961a), applying Kendall's coefficient of concordance, found no significant difference among rankings based on sales, assets, or combinations of the two, using a sample of 100 large companies in a single industry group. It is unlikely that, because of differing capital intensities, a more broadly defined sector would exhibit such a concordance in sales and assets rankings.

Assets data also have several well known disadvantages. If the object is to determine something about the competitive conditions among rivals in the same industry, then asset rankings may be misleading. The published asset figures will be increasingly seriously inflated because of the multinationalization and product diversification of most leading

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1/ One exception is Heggestad and Rhoades (1976) who had access to bank market shares by SMSA and used as their index the sum of the rank changes of the top 3 to 5 firms over a three year period.

2/ Collins and Preston (1961a) argue that a value added ranking would be a superior alternative, but calculation of this statistic is found only rarely in company financial reports.

firms over time. Single product, entirely domestic leading firms are becoming increasingly rare. On the other hand, the existence of joint ventures, unconsolidated investments, and the management of government owned (often military) establishments all tend to underrate the asset size of many leading corporations (Mueller 1976). Finally, individual firm differences in accounting procedures introduce unknown incomparabilities in asset figures.

Most previous studies have confined themselves to samples of publicly owned industrial firms. Often mining and distribution firms are included along with manufacturing ones (e.g., Collins and Preston 1961b, Mermelstein 1969, Friedland 1957, and Aaronovitch and Sawyer 1975). Such broad samples have been criticized as containing many noncompeting firms. However, both Boyle and Sorenson (1970) and Collins and Preston (1961a) used (2 digit SIC) industry groups as the basis of their analysis. Heggestad and Rhoades (1976) consider even the two digit level overly broad, but researchers utilizing public data are unlikely to be able to amass a sufficiently large sample size with a narrower industry definition.

Most studies have examined mobility among only those firms that have survived as public and independent business units throughout the period under consideration.[1/] Turnover analyses have considered entering

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1/ Few studies have used as a sample any firm reaching the, say, top 100 in any of the endpoints of a subperiod, and acquired firms are usually excluded. The only exceptions appear to be Bond (1975), who investigated the 200 largest manufacturing firms at every five year point over 1948-68, and Collins and Preston (1961a), who use the top 100 food firms at irregular intervals over 1935-50. Bond assumed acquired firms had the same assets at the end of the subperiod that they had at the time of acquisition.

and exiting firms as well. The necessary elimination of privately held firms, cooperatives, and foreign owned firms from consideration introduces an unknown and unexplored element that may potentially bias the results.[1/]

The time periods that have been studied have been generally quite lengthy, from 20 years (e.g., Bond 1975) to about 50 years (e.g., Collins and Preston 1961b), and generally broken into subperiods of from 5 to 10 years each. For many mobility indices, it is important to use subperiods of equal length.

Several different, but similar indices of stability or mobility have been adopted. The two simplest and commonest stability coefficients are asset rank correlation and absolute asset correlation.[2/] Rank correlation has the disadvantage of treating a shift of n places equally, no matter what the absolute level of n (Boyle and Sorenson 1970). That is, a shift in a firm's position from 3rd to 1st is treated equally to that of a decline from 48th to 50th rank.[3/] Moreover, it does not

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1/ In any given two digit SIC industry group, examination of the 100 or even 200 largest corporations is likely to be unaffected by the exclusion of private corporations. In the food processing industry, however, agricultural cooperatives are a significant competitive force, though they hold few leading positions. If public, the subsidiaries of foreign companies can be justifiably included in a mobility analysis, but not the parent company.

2/ Some authors also choose to calculate the correlation between the logarithms of total assets, the so-called product-moment coefficients.

3/ Assuming that the Spearman rank correlations technique is used; this requires ranking all observations in continuous order.

capture size changes unassociated with rank shifts and it is sensitive to the choice (entirely arbitrary) of the size of the leading firm group, especially if it is small (say, less than 25). The larger the n, the lower the rank correlation, since there will be a larger number of smaller firms with assets quite close to each other and, thus, a large number of rank changes due to random shifts (Juskow 1960). Simple asset (or log asset) correlation is apparently not as limited as rank correlation, and generally produces markedly similar patterns over time.

The important thing to realize with these correlation coefficients is that, like price indices, they are meaningful in no absolute sense but only in temporal comparisons.[1/] Unlike the search for a "critical" level of concentration, these stability indices are useful only for ordinal, intertemporal comparisons.

Turnover has typically been measured by simple counts of entrants or dropouts from the fixed group of largest firms. In addition to numbers, turnover "rates" have been calculated by measuring the ratio of entering or exiting assets to total industry assets (or the total assets of the leading firm group).

Collins and Preston (1961b) were the first to attempt to correct their turnover coefficients for the effects of mergers and dissolutions,[2/]

1/ Collins and Preston (1961a) developed an index that does have a cardinal interpretation since it is calculated by reference to a state they define as "perfect" mobility.

2/ The dissolutions were the court ordered ones against American Tobacco and Standard Oil.

thus demonstrating the decline over time of "natural" exits and entries; this exercise was repeated for a later period by Boyle and Sorenson (1970), with the same results. A more ambitious analysis by Bond (1975) corrects the calculated stability coefficients by adjusting the assets of the largest firms for the effects of mergers and spin-offs. He finds that the apparent increase in mobility among the 200 largest manufacturing corporations over 1948-68 is removed completely when merger-adjusted assets are employed. In the fourth section of this paper, we apply Bond's method to a mobility analysis of the largest U.S. food processing firms during 1950-75.

The Sample

The period chosen for anlaysis is the quarter century 1950-1975. The beginning year is an apt one because the recent FTC (1972) staff report on the sales (by five digit product class) of the 1,000 largest manufacturing companies in 1950 allowed us to determine the 140 largest food and tobacco companies with unusual precision.[1/] All 140 firms

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1/ The FTC report included both public and private, domestic and foreign owned corporations, though cooperatives were apparently omitted. There were only 135 companies classified as primarily food or tobacco by the FTC, but five others were added for the following reasons: three (Archer-Daniels-Midland, Central Soya, and Darling) because their principal products were edible oils (an industry soon after 1950 reclassified into SIC 20), one (Publicker) because more than 50 percent of sales were distilled liquor (SIC 2085), and one (General Cigar) erroneously omitted from the top 1,000 due to a questionnaire error (FTC 1972: 8A).

obtained at least 50 percent of their revenues from food or tobacco processing (SICs 20 and 21) in 1950. Tobacco firms are included because, with the benefit of hindsight, we know that most of the large cigarette companies were strong potential competitors of the traditional food firms, more so than the firms of any other major industry group.[1/] The year 1975 was selected as the most recent one for which company financial data could be widely obtained,[2/] and, following past practice, it also permitted collection of asset data at equal five year intervals.

The history of the 140 largest food firms in 1950 was traced. Of that group precisely half (70) remained public and unacquired throughout 1950-1975 (see list IA1 in the Appendix); these we call the survivors.[3/]

1/ On the basis of the absolute amount of their food processing sales alone, four or five of the larger tobacco companies would qualify among the top 200 food firms in 1975 anyway. In addition to their diversification, tobacco companies (i) use an agricultural raw material, (ii) promote and advertise their products in much the same way as do producers of highly differentiated foods, and (iii) make use of most of the same retail channels of distribution.

2/ The "year" 1975 here means the fiscal year ending closest to December 31, 1975, so as to cover as much as possible of the calendar year 1975.

3/ Data were continuously available for all but one of these firms. In lists A2 and A3 of the Appendix, 13 other firms that remained independent are listed, but they were private during at least part of the 1950-1975 time span. Thus, in this broader sense, 83 (59 percent) survived.

The rest of the firms in section I can be termed dropouts. At least 54 (39 percent) of the 140 largest firms were acquired during the 25 year period (see lists B1 to B5), while another three companies apparently failed.[1/] In 1950, 24 of the largest food firms were privately owned; subsequently four went public (that is, issued stock on an exchange or over the counter), two failed, and seven were taken over. Thus, a smaller proportion (38 percent) of private firms "survived" than did public firms, but they had an equal chance (38 percent) of being acquired.

In 1950 only five of the 140 largest food processors were foreign owned, two of them publicly owned[2/] and three wholly owned subsidiaries.[3/] But by 1975 at least seven more had become part of foreign based multinational corporations.[4/] Thus, by 1975 nearly a tenth of the 140 largest

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1/ The primary sources for the company histories were the various Moody's manuals (Industrial, Investment, Over the Counter, Transportation, etc.), the News Front publications 25,000 Leading U.S. Corporations and 30,000 Leading U.S. Corporations, and the various public merger files supplied to us by the Federal Trade Commission.

2/ Hiram Walker and Joseph E. Seagram, both subsidiaries of only slightly larger Canadian concerns.

3/ Brown and Williamson Tobacco of British-American Tobacco, Nestlé of Nestlé Alimentana, and Thomas J. Lipton of Unilever.

4/ Hills Bros. Coffee, Griesedieck Western Brewing, Libby McNiel & Libby, Lucky Lager Brewing, and United Biscuit of America. Two others, Kingan and Hygrade Food Products, were majority owned by 1975 though the transaction was only complete in early 1976.

food companies in 1950 had become foreign owned and controlled. In short, there has been a considerable loss of information concerning the largest food firms over the period 1950-1975. In 1950 only 17 percent of the 140 largest issued no public reports on their finances. But by 1975, while 7 of the formerly private firms had become subsidiaries or divisions, fully 46 percent of the 140 largest in 1950 issued no regular, public statements.[1/]

In addition to the largest food firms in 1950, a second group of 121 large food and tobacco firms was selected to form the universe for this study. From a comprehensive directory, all those companies with at least $100 million in 1975 U.S. food and tobacco manufacturing sales were selected (see Connor and Mather 1977). This list of companies we call food industry entrants can be found in Appendix list II.[2/] A few of these entrants (about 20) arrived into the food processing industry at least partially by means of acquiring one of the largest 1950 firms, so in this sense there is a little "double counting" involved. By taking a census of the largest (by sales) food firms at both ends of

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1/ We exclude from these calculations the three failed firms, but we include the two firms "acquired" by cooperatives.

2/ In the list of 121 companies, only 69 could potentially be used in the analysis (see list IIA) and of these 50 had sufficient asset data. The other 52 qualified companies had to be omitted either because of insufficient data (lists D and E) or because their U.S. food processing was less than $200 million in 1975 and represents less than 50 percent of total sales (lists B and C) or both (list F).

the time period, it is expected that all of the 100 largest (by assets) food firms at any time in between is almost certain to emerge.

Among the 121 entrants into the food processing industry during 1950-1975, we have a reasonably complete idea of the origins of about 85 of the 121 entrants.[1/] It is possible to roughly categorize these entering firms into three broad types: (1) those that entered primarily through internal growth or a combination of internal growth and horizontal or geographic market extension mergers; (2) conglomerate mergers, both product extension and "pure" conglomerate; and (3) firms that entered from a vertical relationship to the food processing industry.[2/]

Of the three broad categories, the first is by far the largest, accounting for 46 (55 percent) of all the entrants for which we have data. Less than half (20) of this group grew primarily by means of internal growth, while the rest (26) relied quite heavily, on average, for horizontal or geographic market extension mergers for their 1975 positions.[3/] In general these firms are fairly specialized: soft drinks,

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[1/] Most of the remaining entrants were private or cooperative firms who grew primarily via internal growth.

[2/] Supporting documents for these and other similar statements will be found in a forthcoming, expanded version of this paper to be published as a Working Paper of NC 117. One firm, Bluebird, could not be categorized.

[3/] By primarily internal growth we mean that less than 10 percent of the company's assets in 1975 were the result of mergers. The 26 firms whose growth was substantially aided by mergers on average had about 45 percent of their 1975 assets from mergers during 1950-1975 (see the next section for an explanation of the methodology).

milk, beer, sugar, grains and baking, and meatpacking represent the bulk of these firms. The entry by meatpacking firms is especially impressive; fully 17 of these companies are meatpackers, and all 7 of the newly founded (since 1950) firms were meatpackers. This phenomenon is undoubtably closely related to the relative decline for four decades now of the large meatpackers.

Among the second group, the 22 conglomerates, we have classed 15 companies as "pure" conglomerates (such as Greyhound, ITT, Loews, LTV, RCA, and SCM). Many of these have bought large food firms in order to even out or temporarily bolster their profit performance, while others may be trying to take advantage of cross-subsidization or other conglomerate strategies (see Mueller 1976). The remaining 7 conglomerate entrants are predominantly of the product extension type. All 7 of these are drug or toiletry firms. These firms have generally sought to transfer their abundant consumer marketing skills to the field of highly differentiated food products such as candy or chewing gum.

The smallest category of entrants (15) were those in a vertical relationship to the food processing industry prior to entry. Here we include companies that were primarily food retailers or wholesalers, hoteliers or restauranteurs, grain traders, or in farm level production. The retailers have generally sought to produce "private label" items and for that reason operate in a segment of the market for processed foods that is somewhat insulated from the rest. For the other firms, the strategies are doubtlessly more diverse; economies of vertical integration,

vertical foreclosure, or simply a sort of insiders' knowledge of a promising acquisition may have played a part in their decisions.

Empirical Results

The 261 food firms for which we had sufficient asset data (69 survivors and 50 entrants) were ranked by size in each of the six years 1950, 1955, ..., 1975. The survivors were all public, primarily food and tobacco processing companies, and the entrants were all large, public, food companies in 1975 (see Appendix lists IA1 and IIA).[1/] From data taken from public FTC merger files, it was possible to identify most of the major acquisitions by these food processors over the 1950-1975 period. The date and amount of assets acquired were recorded.[2/] Data on these mergers is much more complete for large mergers than small ones, and there is some difficulty in assigning the merger to the proper year. Then the absolute acquired assets were assumed to grow, once

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1/ One survivor, Froedtert Grain, was eliminated because the nature of its business radically altered when it became Sola Basic Industries. The entrants are all "large" in an absolute sense (over $100 million in U.S. food or tobacco processing sales), but are not primarily U.S. food processors unless their sales are between $100 and $200 million; also, they are not admitted to the analysis until they begin substantial food processing activities.

2/ Unfortunately, the "small" merger series (assets less than $10 million) was unavailable for the years 1970 and 1971 only. Both domestic and foreign assets were netted in the adjustment procedure. In a small proportion of cases, where assets were unknown, "consideration paid" was used in its stead; where both of these data were missing, asset estimates were made from the sales figures by using the total assets/total sales ratio for the appropriate "minor industry" and year, as reported in the IRS's Source Books.

Table 1. ASSET CONCENTRATION AND ASSET ACQUISITION DATA FOR THE 100 LARGEST U.S. FOOD MANUFACTURING COMPANIES, SELECTED YEARS, 1950-1975.

	1950	1955	1960	1965	1970	1975
1. Total assets ($ millions)	$8,760	$11,093	$14,828	$20,927	$54,382	$87,831
2. Percentage of assets of 100 largest food firms held by:						
(a) four largest firms	24.3%	22.2%	22.9%	19.8%	26.2%	26.8%
(b) eight largest firms	39.3%	38.3%	36.9%	33.2%	38.6%	39.3%
(c) twenty largest firms	66.9%	65.7%	63.4%	60.0%	61.6%	61.9%
3. Number of acquisitions, previous five years	---	10	143	202	672	465
4. Number of acquisitions with asset data	---	10	42	85	358	315
5. Assets acquired since 1950, adjusted for firm growth ($ millions)	---	$220	$897	$2,530	$20,168	$34,749
6. Percentage of growth-adjusted, acquired assets of 100 largest food firms acquired by:						
(a) four largest firms	---	0.0%	7.7%	7.5%	44.5%	42.2%
(b) eight largest firms	---	43.6%	17.4%	27.7%	54.4%	46.6%
(c) twenty largest firms	---	68.6%	50.5%	56.7%	71.4%	69.5%
(d) fifty largest firms	---	100.0%	94.1%	93.2%	94.3%	93.5%

Table 2. STABILITY COEFFICIENTS FOR THE LARGEST FOOD PROCESSING FIRMS, 1950-1975.

Sample and Coefficient	No.	Periods					
		1950-1955	1955-1960	1960-1965	1965-1970	1970-1975	1950-1975
A. Survivors only	69						
(1) Total asset correlation							
(a) stated assets		0.987	0.963	0.966	0.947	0.950	0.746
(b) adjusted assets		0.989	0.972	0.978	0.959	0.951	0.787
(2) Rank correlation							
(a) stated assets		0.966	0.975	0.972	0.953	0.972	0.815
(b) adjusted assets		0.970	0.981	0.977	0.966	0.983	0.845
B. Survivors plus Entrants	100						
(1) Total asset correlation							
(a) stated assets		0.986	0.958	0.967	0.946	0.922	0.752
(b) adjusted assets		0.988	0.967	0.978	0.967	0.954	0.787
(2) Rank correlation							
(a) stated assets		0.982	0.985	0.971	0.940	0.964	0.803
(b) adjusted assets		0.984	0.987	0.977	0.956	0.966	0.832

acquired, as fast as the whole company (netting out the effect of the acquired assets on that growth). These growth-adjusted acquired assets were then subtracted from the end-period stated assets of the firm; the resulting figure is called adjusted assets, and they were accumulated for the entire 25 year period.[1/]

Some summary statistics resulting from this method are shown in Table 1. The total assets of the 100 largest food firms rises continuously over 1950-1975 (line 1), but the proportion of growth-adjusted, cumulative, acquired assets (line 5) rises much more than proportionately, even though the latter estimate is surely a lower bound on the true figure.[2/] The table reveals quite clearly the effects of the merger frenzy of the late 1960s, a state only slightly abated in the early 1970s.

Continuing a trend discovered by Collins and Preston (1961a) for the U.S. food processing sector over 1935-1955, we also find a slight decline

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1/ As an example, suppose that United Banana Co. had assets of $25, $40, and $70 million in the years 1950, 1955, and 1960, respectively. With one $5 million merger in 1950, consolidated in the company's books in 1951, the merger-adjusted growth rate for 1950-55 is (40 - (25 + 5)) ÷ (25 + 5) or 33 percent, not 60 percent. With no other acquisitions, the value of the acquired assets rises to $6.7 million in 1955 and to $11.7 million in 1960. Thus, the adjusted total assets of United Banana becomes $25, $33, and $58 million in 1950, 1955, and 1960, respectively.

2/ For two reasons: (1) many, mostly smaller mergers have missing asset data, and (2) most acquired firms were, prior to merger, growing at a faster rate than the acquiring firms.

in asset concentration up to 1965.[1/] The entry by huge conglomerates and the merger activity of the survivors reverse that after 1965, however, particularly among the top eight food firms.

From line 6 of Table 1 one can observe that it is the largest food firms in any given year that are responsible for most merger activity. The proportion of assets acquired by the top eight firms took a large jump after 1965. Throughout the entire quarter century, the top 50 companies have been responsible for at least 93 percent of all mergers by the top 100.

Table 2 presents the results on food processing industry mobility, section A for the 69 1950-1975 survivors only, section B for the 100 largest firms, whether survivors or entrants. Two different, but highly parallel stability coefficients were calculated, total asset correlation in lines no. 1 and Spearman rank correlation in lines no. 2.

Looking first at the stability among the survivors, we note that there is no discernible trend over time. Of course, there is more mobility for the entire 1950-1975 period than for each of the quinquennial sub-periods, but this is only to be expected. Except that they are very slightly higher, the rank correlations tell no different a story than the total asset correlations. The final point is that, as expected, correcting the stated assets for merger activity reduces apparent mobility in

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[1/] The samples were quite similar except for the inclusion of tobacco companies in the present study. Thus, our asset concentration ratios averaged 10 to 20 percent higher than did Collins and Preston's.

all six time periods and with respect to both indices. However, among the survivors the stability coefficients are so close to unity that the correction procedure yields only a miniscule improvement.

The contrast between "real" and apparent mobility can also be seen in section B of Table 1. As before, high stability coefficients result when adjusted assets are used rather than stated assets, the difference being larger over the total period 1950-75 than in any of the subperiods. Except for slightly higher mobility during 1965-75, there is no trend in mobility over time. Mobility in comparable periods is somewhat greater among the 100 than the 69 survivors when the stated assets coefficients are compared. But when the coefficients are calculated using the merger-adjusted assets data, mobility is not generally greater. The pessimistic conclusion is that entry by nonfood firms has not improved the competitive environment of the U.S. food processing industry.

To summarize, the size stability among food manufacturing companies during 1950-1975 is extremely high and shows no signs of abating in recent years. Though it is, strictly speaking, improper to compare stability coefficients among different samples, our results show generally higher correlations than two very similar studies of the U.S. food processing industry for earlier periods (Collins and Preston 1961a, Boyle and Sorenson 1970). Finally, the laborious corrections made in

this study for mergers' effects on size validate the results of Bond (1975) for the entire manufacturing sector: some apparent mobility is due to merger-induced jumps in asset figures. This correction for mergers is a highly desirable methodology in industries during periods of high acquisition activity, but when the correction procedure is applied to a narrower group of firms in more concious rivalry, the differences are not so stark.

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APPENDIX:

UNIVERSE OF LARGEST FOOD & TOBACCO FIRMS,
1950-1975

I. THE 140 LARGEST IN 1950, BY 1950 NAME (140)

A1. Independent Survivors (Public 1950 ⟶ Public 1975) (70)

*A.E. Staley Manufacturing
*Amalgamated Sugar
#*American Distilling
*American Maize-Products
American Snuff
*American Sugar Refiners
*American Tobacco
*Anheuser Busch
*Archer-Daniels-Midland
*Arden Farms
#*Bayuk Cigars
*Beatrice
*Borden
*Brown-Forman Distillers
*California Packing
*Campbell Soup
*Carnation
*Central Soya
*Coca-Cola
*Corn Products Refining
*Fairmont Foods
*Falstaff Brewing
#*Froedtert Grain & Malting
*General Baking
#*General Cigar
*General Foods
*General Mills
*George A. Hormel
*Gerber Products
*Glenmore Distillers
*Great Western Sugar
*Green Giant
*H.J. Heinz
*Hershey Chocolate
*Hiram Walker & Sons
*Holly Sugar
*Hunt Foods
*Imperial Sugar
*International Milling
*Interstate Bakeries
*Jos. E. Seagram
*Kellogg
*Liggett & Myers
*McCormick
*National Biscuit
*National Dairy Products
*National Distillers
*National Sugar Refining
*Oscar Mayer
*Pabst Brewing
*Pepsi-Cola
*Pet Milk
*Peter Paul
*Phillip Morris
*Pillsbury Mills
*Publicker Industries
*Purity Bakeries
*Quaker Oats
*R.J. Reynolds
*Ralston Purina
*Rath Packing
*Savannah Sugar
*Standard Brands
*Stokeley-Van Camp
*Swift
*Tobin Packing
*United States Tobacco
*Utah-Idaho Sugar
*Ward Baking
*Wm. Wrigley

A2. Independent Survivors (Private 1950 ——→ Private 1975) (9)

Brown & Williamson Tobacco
Darling
Dubuque Packing
Fisher Flouring
Gordon Baking (?)
Mars
Nestlé
Rahr Malting
Thos. J. Lipton

A3. Independent Survivors (Private 1950 ——→ Public 1975) (4)

Adolph Coors
Flour Mills of America (?)
Jos. Schlitz Brewing
F. & M. Schaeffer Brewing

B1. Acquired Firms (Public 1950 ——→ Public/sub 1975) (35)

American Chicle
*Armour
*Beech Nut Packing
Best Foods
*Burris Mills
*Canada Dry Ginger Ale
#*Centennial Flouring Mills
City Products Corp.
Clinton Foods
*Colorado Milling & Elevator
Consolidated Cigar
*Continental Baking
*Creameries of America
Cuban-American Sugar
*Cudahy Packing
*E.J. Brach
Flothill Products
*Foremost Dairies
*Godchaux Sugars
Golden State
#*Jacob Rupert
Jno. H. Swisher
*John Morrell
Life Savers
Miller Brewing
*P. Lorillard
Pacific American Fisheries
*Pennick & Ford
*Planters Nuts & Chocolate
*Russell-Miller Milling
*Schenley Industries
Seabrook Farms
*Sunshine Biscuits
*Wesson Oil & Snowdrift
*Wilson

B2. Acquired Firms (Public 1950 ——→ Private/sub 1975) (8)

*Allied Mills
*Duquesne Brewing
*Griesedieck Western Brewing
*Hygrade Food Products
*Libby, McNiel & Libby
*Lucky Brewing
Pasco Packing
*United Biscuit Co. of America

B3. Acquired Firms (Private 1950 ⟶ Public/sub 1975) (7)

C.A. Swanson
Curtiss Candy
French Sardine
Joe Lowe
Mrs. Tucker's Foods
P. Ballantine
Theo. Hamm Brewing

B4. Acquired Firms (Private 1950 ⟶ Private/sub 1975) (2)

Hills Bros. Coffee
Kingan

B5. Acquired Firms (Public 1950 ⟶ Coop 1975) (2)

American Crystal Sugar
Welch Grape Juice

C1. Failed Firms (Private 1950) (2)

Doughnut Corporation of America (?)
Liebman Breweries (?)

C2. Failed Firms (Public 1950) (1)

Goebel Brewing

II. FOOD & TOBACCO INDUSTRY ENTRANTS, BY 1975 NAME (121)

A. Public/large 1975 (69)

*American Home Products
*Amfac
*Anderson, Clayton
Associated Coca-Cola Bottling
*Bluebird
C.H.B. Foods
*Cagles
*Campbell Taggart
*Castle & Cooke
*Choc Full O'Nuts
*Coca-Cola Bottling of Los Angeles
*Coca-Cola Bottling of New York
*ConAgra
*Consolidated Foods
*Dean Milk
*Dellwood
*Dibrell Bros.
Dinner Bell Foods
*Dr. Pepper
*Federal Co.
*Flavorland Industries
Flowers Industries
Foremost-McKesson
Frederick & Herrud
*G. Heileman
Glover Packing
Greyhound
*Heublein
Idle Wild Foods
Illini Beef Packers
*Iowa Beef Processors
*International Telephone & Telegraph
*IU International
*J.M. Smucker
*Kane-Miller
*Knudsen
*Lance
*Loews
*LTV
*Marhoeffer Packing
*MBPXL
Monfort of Colorado
*National Industries
*Olympia Brewing
Peavey
*Procter & Gamble
*Rapid-American
*RCA
*Riviana
*Royal Crown Cola
Schluderberg-Kurdle
*SCM
*Seaboard Allied Milling
Seven-Up
Smithfield Foods
Southdown
*Spencer Foods
*Sucrest
Sugardale Foods
*Tobin Packing
Tropicana
*Tyson Foods
*United Brands
*United States Sugar
*Univar
*Universal Foods
*Universal Leaf Tobacco
*Valmac Industries
*Warner-Lambert

B. Public/small 1975 (7)

*Abbott Labs
*Chesebrough-Pond's
*Gulf & Western
*IC Industries
*Ogden
*Squibb
*W.R. Grace

C. Public/retailers 1975 (5)

*Great Atlantic & Pacific Tea
Jewel
*Kroger
Safeway Stores
Southland

D. Cooperatives 1975 (17)

Associated Milk Producers
Boone Valley Processing
California Almond Growers
California Canners & Growers
California & Hawaiian Sugar
Farmers Union Grain
Farmland Industries
Gold Kist
Land O'Lakes
Mid-America Dairymen
Missouri Farmers Assn.
Norbest
Rice Growers Assn.
Riceland Foods
Sugar Cane Growers
Tri-Valley Growers
United Dairyman's Assn.

E. Private 1975 (18)

A.W. Perdue
Cargill
Continental Grain
E. & J. Gallo
E.M.G.E. Packing
Grain Processing
H.P. Hood
Hubbard Milling
J.R. Simplot
Krey Packing
L.D. Schreiber Cheese
Lykes Bros. of Florida
Moorman Manufacturing
Packerland International
Stroh Brewery
Sunnyland Foods
Superiors Brand Meats
Valleydale Packers

F. Foreign 1975 (5)

#Copersucar
Imperial (Tobacco) Group
J. Lyons
Unilever
United Biscuits

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* These are entering firms for which we have sufficient asset data to determine their ranking in the food and tobacco industry over 1950-1975.

These firms, or their successors if acquired, were "small" firms in the U.S. food or tobacco processing industries in 1975; their 1975 U.S. food and tobacco sales were less than $200 million or, if between $100 and $199 million, constituted less than 50 percent of the firm's total revenues.