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## Price Maps

A second alternative is the use of price maps for a 2-price variable programming problem. In this instance, by performing a variety of programming calculations using variable milk and hog prices, a map of plans that would cover the whole area of the relevant ranges of both prices would result. Such a map has the advantage of providing price limits for 2 prices for each plan presented, whereas the results presented here give such price ranges in only one price.

It will be noticed that plan 6 of table 1, and plan 6 of table 2 are identical. Thus we have here established the price limits for only one plan in a price map. To get a complete price map within the range of prices considered here would require several times as much calculation. The research worker can only weigh the added cost against the added information. If only one of two prices shows much variation in the real world, the advantage of a price map would be less. Alternatively, if more prices are considered, it might be best to do a price map with the 2 prices that show the greatest variation in practice.

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## Lease-Financing and Returns to Capital of Food Marketing Firms

*By Stephen J. Hiemstra*

The changing structure of the food marketing system focuses attention on competitive relationships existing in food industries. Conventional measures of profits, such as profit rates on stockholders' equity and on total assets, often are used to appraise the performance of these industries. This article points out some of the shortcomings of these profit ratios, giving special emphasis to the impact of lease-financing. Many retail chains use leases to finance their long-term capital needs, but few food processors do. When a firm finances its capital by leasing rather than by ownership or mortgage, the firm's net profit and its stockholders' equity each represent a larger percentage of total assets. As leased assets do not appear on the balance sheet, they represent implicit leverage. The following estimates present value of leased assets for a group of large food processing and retailing firms by capitalizing rental obligations. Total assets plus leased assets give total capital supplied by owners, creditors, and lessors. Gross returns to this capital are nearly equivalent for processors and retailers in spite of inequalities in conventional profit ratios. Some implications of this finding are considered.

IN COMPARING relative profitability of resources engaged in different firms or industries, dollar profits must be taken as a ratio of all capital responsible for generating those profits.<sup>1</sup> Both equity and creditor capital must be included, since distribution of income consistent with ownership rights is not the purpose of the comparison. Similarly, returns to both equity and creditor capital must be computed on total capital.

Stockholders' equity represents only one part of the total bundle of resources. Total assets include a greater share of the bundle because they include debtor as well as equity capital. Next in this progression is the addition of assets leased or hired. This final aggregation more nearly approximates the capital upon which profits and interest are accrued than does either stockholders' equity or total assets. The interest component of rental payment and total interest paid must be added to profits before taxes in obtaining gross returns to capital.

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<sup>1</sup> "Profits" in this report are defined by the principles of conventional accounting. Profit data were taken from secondary sources, without adjustment.

A profit ratio based on total assets is at a lower level than one computed on stockholders' equity because of the inclusion of debtor with equity capital (fig. 1). Thus, a difference between industries in their proportion of debt to equity capital (debt leverage) will affect their relative profit ratios. Similarly, a difference in proportion of assets leased (lease leverage) will affect profit ratios computed on total capital (total assets plus present value of leased assets).<sup>2</sup>

Long-term debt of the group of large food processors shown in figure 1 remained nearly a fifth of total capitalization between 1948 and 1958 (7, p. 98).<sup>3</sup> The group of food retailers had long-term debt of a tenth on total capitalization in 1948, but by 1954 it had increased to a fifth where it remained until 1958 (7, p. 92). As a result, debt leverage played no part in the difference between profit ratios of food processors and retailers shown in figure 1 during 1953-58, and it was a counterforce to variance that existed in the previous 5-year period.

The impact of lease leverage will be explored next.

### Long-Term Leases

The share owned of the gross value of resources used in their business is much larger among food processors than food retailers. In the 3 years

<sup>2</sup> The term "lease leverage" in this report will be used analogously to "debt leverage" in referring to the resources engaged in a firm that are financed by leases. As in the case of debt, leases accrue to the equity of a firm the returns above (or below) the cost of a fixed obligation. For any firm or industry:

$$i = p + (p - r_1) D_1 / C + (p - r_2) D_2 / C,$$

where  $i$  = profit rate on stockholders' equity,  $p$  = profit rate on total capital (equity, creditor, and leased),  $r_1$  = interest rate paid to creditors,  $D_1$  = amount of creditor capital,  $C$  = total capital,  $r_2$  = imputed interest rate paid as rent, and  $D_2$  = amount of capital leased. As long as  $p > r_1$  and  $p > r_2$ ,  $i > p$ .  $D_1 / C$  and  $D_2 / C$ , functions of debt leverage and lease leverage respectively, serve as weights in measuring magnitude of difference between  $i$  and  $p$ . Note that in the absence of both debt and lease financing, the second and third terms become zero and  $i = p$ . (Adapted from Proposition II, Modigliani and Miller (3, p. 271).)

<sup>3</sup> Italic numbers in parentheses refer to Literature Cited, page 29.

1956, 1957, and 1958 processing firms paid out only about a fourth as much in rent as they charged off in depreciation (table 1). In contrast, food retailers paid more in rent than they charged in depreciation. Rents on long-term leases also constitute a much larger part of total rent paid by large retailers than by large processors. Most rental payments by food processors are for machinery and equipment; large items in these categories are data processing and automotive equipment rentals.

About three-fourths of a sample of new supermarkets opened each year since 1954 have been under a long-term lease (5). "Sell-and-lease-back" or "buy-build-sell-lease" are terms descriptive of the nature of the contracts entered into by many of these firms. The ultimate lessee assumes the initiative in locating and building or buying the property to meet the firm's needs. The lessee typically pays for maintenance, repair, insurance, and taxes. The lease may include parking lot, fixtures, and equipment used in a store. The terms of these leases are designed to relieve the landlord of managerial and operational responsibilities. However, many traditional landlord-tenant rental contracts remain in the food business.

### Alternative Methods of Financing

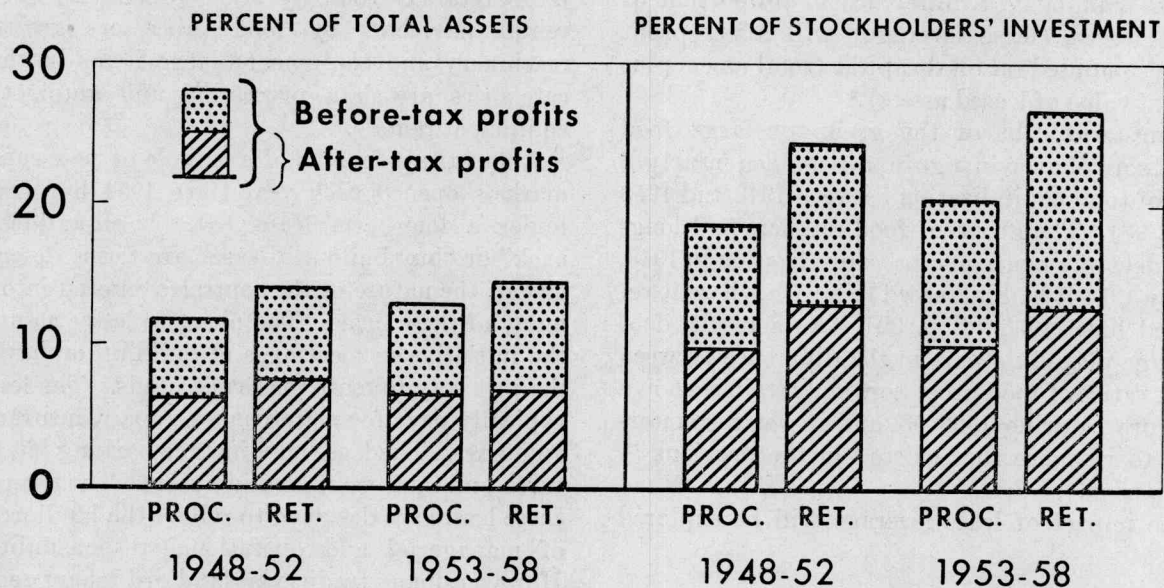
Lease financing is a close substitute for debt financing. They have many of the same characteristics and are similarly binding. Among characteristics that are similar are the following:

1. The initial term of the lease normally covers the entire cost of the asset plus interest as does a mortgage. For this reason, obligations are similar in magnitude; a lease will probably be shorter than a mortgage.

2. Cancellation is usually impossible before termination of the lease without a heavy penalty. Frequently a purchase option is included in the lease as the only way of breaking it.

3. Rental payments are based on the original cost of the asset and concurrent interest rates, as are mortgages. No subsequent change in rent is possible during the life of the lease based on change in market value of the asset or change in going interest rates.

# PROFIT RATIOS OF RETAIL FOOD CHAINS AND FOOD PROCESSING FIRMS



THE NUMBER OF RETAIL FOOD CHAINS VARIED FROM 27 IN 1948 TO 33 IN 1958; PROCESSORS NUMBERED 25. FEDERAL TRADE COMMISSION, "ECONOMIC INQUIRY INTO FOOD MARKETING", 1960, PART 1, 93-98.

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Figure 1

4. Long-term leases are frequently pure financial arrangements with low operating expenses and managerial requirements, making the investment attractive to large institutional investors (2, pp. 123-124).

It is true that in bankruptcy, secured notes and mortgages represent prior claims to lease obligations. But this legal advantage is of small importance if the lease is on property needed to operate a reorganized business. Rent payment may then have greater urgency than other obligations in maintaining continuity of the business.

The result of an incremental switch from debt to lease financing, with no change in the total amount of assets used by a corporation, results in (1) a decline in total assets owned by the firm, (2) a drop in debt outstanding, and, as a result, (3) an "improvement" in several of the conventional measures of financial strength.

These measures include a rise in profits computed as a percentage of total assets (assuming no change in dollar profits), a lower ratio of debt to stockholders' equity, and a higher coverage of interest by net income or current assets. When leases are numerous, it is standard accounting practice to recognize them in a footnote to financial statements, sometimes by giving the number in force and their gross value. Usually no attempt is made to clarify the terms of these leases. Thus, an illusion is created in comparing data from financial statements of firms or industries when they differ substantially in the proportion of assets under long-term lease.

Aside from leases, alternative financing includes retention of earnings, sale of corporate stock, notes, debentures or bonds, and accounts payable. Reinvested earnings account for a significant share of the expansion of many industries.

TABLE 1.—Rent and depreciation paid by food processors and retailers, 3-year averages for years beginning July 1, 1956, 1957, and 1958

Firm group	Depreciation charged	Total rent paid		Rent payable on long-term leases <sup>1</sup>	
		Amount	As percentage of depreciation	Amount	As percentage of total rent
		Million dollars	Million dollars	Percent	Million dollars
Food processors:					
All corporations <sup>2 3</sup> .....	720	182	25	36	39
50 large firms.....	274	93	34		
Food retailers:					
All corporations <sup>2</sup> .....	249	285	114	159	89
32 large firms.....	130	180	138		

<sup>1</sup> Primarily minimum annual rent payable at fiscal year end on real property leases expiring more than 3 years from the end of the year.

<sup>2</sup> Corporations reporting balance sheets to Internal Revenue Service.

<sup>3</sup> Total of food and kindred products and beverage groups.

Sources:

All corporations: U.S. Treasury Department, Internal Revenue Service, *Statistics of Income, Corporation Income Tax Returns*, (Washington: Gov't. Print. Off.) 1956-57 pp. 26 and 29, 1957-58 pp. 32 and 35, 1958-59 pp. 33 and 36.  
Firms: Compiled from corporate reports prepared for stockholders or the Securities and Exchange Commission.

But without other sources of funds the rapid rate of expansion experienced by the retail food business in the past decade would not have been possible. Equity financing has been used to only a limited extent because management dislikes dilution of ownership. Accounts payable and short-term debt are most applicable to inventory and other rapid turnover capital needs.

It is questionable whether all assets under lease in food retailing could have been financed in any other way without affecting either the growth rate of these firms or the ability to obtain funds on comparable terms.<sup>4</sup> For purposes of analysis and management decision-making, the substitution of debt for leases remains the most feasible alternative. Several large firms rely heavily on long-term leases as a source of capital and have little long-term debt. Two of the nine largest retail food firms in the country have no long-term debt

<sup>4</sup> The effects of alternative financing upon dollar profits is not clear. Profits might have decreased if inefficient, obsolete resources had been used. A rise in costs of borrowing could have resulted from a deterioration of credit ratings based on traditionally-accepted standards of debt ratios. But a slower rate of industry expansion would have increased profits of some firms because of increased pressure of demand upon supply of marketing services and in some areas "overstoring" would now be less of a problem.

but each has large rental obligations. Clearly, debt could be used to finance a part of the assets currently being leased if these firms adopted this policy.

Other rentals and short-term leases are commonly used in acquiring the use of machinery, equipment, or fixtures. These have the same type of effect on total assets as longer term leases, but their total effect upon the food industry is less. Annual rental payments under short-term leases comprise a larger share of the total value of assets leased than do longer leases.<sup>5</sup> A smaller proportion of assets therefore is not represented in financial statements.

### Present Value of Assets Leased

One method of analyzing the influence of leases on the capital structure of a firm or industry is to capitalize its rental obligations. The proper rate to use in capitalizing depends upon: (1) The proportion of original asset cost payable as annual

<sup>5</sup> A typical equipment leasing plan offered by Nationwide Leasing Company is an initial 3-year lease with 7 1-year renewals. A \$25,000 lease requires annual rentals of \$9,708 for each of 3 years and \$1,250 for the 4th through the 10th years. Annual rental payments exceed one-third the original value of the asset until after total original value of the asset has been recouped (1, p. 18).

rental; (2) the average number of years remaining in leases outstanding; and (3) the interest rate that the lessor required when the lease was negotiated. These determinants will vary from one firm or industry to the next, and from time to time, depending upon going rates of interest, type of assets leased, policies regarding lengths of leases, and average age of existing leases.

Gant's evaluation of lease financing uses 10 percent as the basis for capitalization (2, pp. 139-40). He contends that 10 percent is conservative as many creditors use 6 to 8 percent, resulting in a higher asset valuation. Capitalizing at 10 percent means that the present value of leased assets is 10 times the amount of the annual rent. It assumes an average remaining length of life of leases to be 15 years with interest at 5.5 percent per annum (table 2). That is, a loan of \$1.00 bearing 5.5 percent interest will be repaid in 15 years with annual payments of \$0.10. At 4 percent interest, the same annual rent would assume remaining life of leases to be 13 years.

The average length of initial leases was nearly 18 years for a sample of new supermarkets opened between 1955 and 1959 (table 3). In addition, in 1959 renewal clauses were included in 89 percent of the leases. They averaged 2.6 renewal options per lease, and 90 percent were for a period of 5 years. As these data represent a sample of less than 200 stores and are for large stores, they may not be representative of the industry. Detailed data on terms of leases were available for this study on eight retail food chains and four food processing firms. The weighted average remaining length of their real property leases was estimated at 12 years for the retailers and 11 years for the processors.

The appropriate interest rate to assume in capitalizing leases is based on the current market rate of interest if the purpose is to arrive at the current value of leased assets. Any difference existing between the current rate of interest and that existing at the time the lease was negotiated amounts to a windfall profit or loss corresponding to that which would have accrued to the buyer of the asset. The lessee obtains the windfall because the terms of the lease are binding on the lessor, not subject to renegotiation during the life of the lease. The lease corresponds to a 100 percent value loan based on no security other than the property being leased and the "goodwill" of the lessee. So,

TABLE 2.—Capitalization related to annual payment and remaining length of lease under specified interest rates

Rate of capitalization (percent)	Annual payment	Length of lease remaining if interest rate is—		
		4 percent	5.5 percent	7.0 percent
	<i>Percent of cost</i>	<i>Years</i>	<i>Years</i>	<i>Years</i>
8-----	12.5	10	11	12
10-----	10.0	13	15	18
12-----	8.3	17	20	27

Source: Interest tables, annuity whose present value is one, see Hodgman, C.D., *Mathematical Tables*, (8th ed., Cleveland: Chemical Rubber Pub. Co., 1947) pp. 316-17.

TABLE 3.—Percentage of new supermarkets opening with leases of specified length, 1955-59

Initial term of lease	1955	1956	1957	1958	1959
	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>
10 years-----	9	11	19	21	29
15 years-----	38	42	33	17	28
20 years-----	25	34	13	29	18
25 years-----	16	4	17	14	14
30 years-----	4	3	12	9	5
Other-----	8	6	6	10	
All supermarkets in sample-----	100	100	100	100	100
Average length of lease <sup>1</sup> -----	<i>Years</i> 18.3	<i>Years</i> 17.1	<i>Years</i> 18.4	<i>Years</i> 18.5	<i>Years</i> 16.5

<sup>1</sup> Weighted by percentages in each group.

Source: Super Market Institute, Inc., *Facts About New Super Markets* (Chicago: 500 N. Dearborn, annual issues 1955-59).

an interest rate above that yielded by corporate bonds is expected. Moody's "Aaa" corporate bonds yielded an annual average of 3.9 percent and the "Baa's" yielded 4.6 percent between 1956 and 1959 (6, p. 103).

Based on 11-year or 12-year average remaining length of leases and a 5.5 percent interest rate, interpolation from table 2 gives annual rent payments between 10 and 12.5 percent of the original value of the assets. These payments correspond to a capitalization rate between 8 and 10 percent. Ten percent is probably conservative in the sense of minimizing the effects of leases. The "true" rate of capitalization to use in evaluating assets leased by food marketing firms is not known.

Thus, a range will be presented in later tables to indicate a spectrum within which many rates will fall. Reference to table 2 will allow an individual firm to use the rate most applicable to its own operation.

### Effects of Leases on Profit Ratios

*Large retail food chains and food processors.*—Table 4 shows that a group of 32 large retail food chains had less than one-third the value of total assets that comprised a group of 50 large food processing firms in 1956–58. But the retailers paid nearly twice as much in total rental payments and owed more than four times as much rent on long-term leases as did the processors. Rental obligations under long-term leases amounted to nearly nine-tenths of the retailers' rental payments compared with less than four-tenths for the processors. Apparently a much larger share of the long-lived resources in their businesses was leased by the retailers than by processors. Before-tax profits earned by the processors, in aggregate, were more than twice as large as those of retailers. Computed on the basis of total assets, processors earned less by 3 percentage points.

Capitalizing rent payable under long-term leases, and adding it to total assets, increases adjusted assets of retailers by 49 to 74 percent, depending on the rate of capitalization. This rise compares with only 3 to 5 percent for processors. Changing the asset base of the retailers by such a large amount substantially drops their profit ratios when computed on adjusted total assets. After adjustments, before-tax profit ratios of the retailers, at 9 or 10 percent, are less than the processors' 12 percent. The decline in profit ratios is only about one-half of 1 percent for the processors compared with 5 or 6 percent for the retailers. The rate of capitalization used, between 8 and 12 percent, affects adjusted profit ratios to only a limited extent.

If, in addition, rent other than that paid on long-term leases were capitalized, the conclusions reached would be modified but not altered, as a much higher rate of capitalization would be required. Capitalizing at 33 $\frac{1}{3}$  percent, so that a multiplier of 3 is used, results in an additional decline in the profit ratio of 0.1 percent to 0.2 percent for the food chains and 0.2 percent for the processors.

The surprisingly large increase in total assets of food retailers and sharp decline in profit rates that follow rent capitalization dramatize the importance of leasing. Financial statements and their interpretation are greatly altered when leases are evaluated along with conventional sources of capital. Food retailers are not found conservatively financed, as a study of conventional debt ratios would indicate, as they rely heavily on lease leverage. Many food retailers have large fixed rental obligations—this is verified by analyzing footnotes to their published financial statements.

*Food processing industries.*—Apportioning the processing firms among seven food processing industry groups and comparing each with food retailers does not alter previous conclusions. Substantial variation exists in the profits earned by various processing groups and in the proportion of total rent payable on long-term leases. Three of the seven groups of processors earned higher profits as a percentage of total assets than the retailers earned. But capitalizing long-term rental obligations increased total assets of none of the food processing industries by amounts approaching the retail food chains. Dairy products showed the greatest increase—only 8 percent, using 10-percent rate of capitalization. (The author will supply, on request, the complete results of stratifications by food processing groups and by sales size of firm classes for each of the 3 years analyzed.) The before-tax profit ratio of dairy product firms was reduced by only 1.1 percent by adjusting total assets. The least affected by long-term leases was the meat products group whose profit ratio was depressed by only 0.1 percent by the asset adjustment.

*Sizes of firms.*—The samples of retail food chains and food processors were each divided into three groups according to size of sales to evaluate differing effects of long-term leasing. The group with the largest sales was somewhat more profitable than the group with the smallest sales in each case. Capitalizing long-term rental commitments lowered profit ratios computed on adjusted assets slightly less in the smallest group than in the largest in each of the two industries. The difference is suggestive of a trend in size but it is not conclusive.

Subtracting data for large firms from all corporation data reported in *Statistics of Income, Corporation Income Tax Returns*, gives a category

TABLE 4.—*Effect of long-term leases on profit ratios of retail food chains and food processors, 3-year averages for years beginning July 1, 1956, 1957, and 1958*

Item	32 large retail food chains			50 large food processors		
	8 percent (x 12.5)	10 percent (x 10.0)	12 percent (x 8.3)	8 percent (x 12.5)	10 percent (x 10.0)	12 percent (x 8.3)
Total assets (million dollars)-----	2, 693. 9			8, 485. 7		
Profits, before tax (million dollars)-----	408. 5			1, 058. 0		
Profits as percent of assets-----	15. 2			12. 5		
Total rent paid (million dollars)-----	179. 6			93. 2		
Long-term rental commitments (million dollars) <sup>1</sup> -----	159. 4			36. 3		
Percent of total rent-----	88. 7			39. 0		
Rate of capitalization						
Capitalized long-term rent (million dollars)-----	1, 992. 1	1, 593. 7	1, 327. 5	454. 2	363. 3	302. 7
Adjusted total assets (million dollars) <sup>2</sup> -----	4, 685. 9	4, 287. 5	4, 021. 4	8, 939. 9	8, 849. 1	8, 788. 4
Profits, before taxes, as percent of adjusted assets-----	8. 8	9. 6	10. 2	11. 9	12. 0	12. 1
Effect of leases on profit ratios <sup>3</sup> -----	-6. 4	-5. 6	-5. 0	-0. 6	-0. 5	-0. 4
Percent increase, adjusted assets over total assets-----	74. 0	59. 2	49. 3	5. 4	4. 3	3. 6

<sup>1</sup> Usually the minimum annual rental commitments at year end payable on real property leases due at least 3 years from fiscal year end.

<sup>2</sup> Total assets plus capitalized long-term rental commitments.

<sup>3</sup> Before-tax profits on total assets minus profits on adjusted assets (decline in percentage points).

Source: Compiled from corporate reports prepared for stockholders or the Securities and Exchange Commission.

of small corporations as a residual. As only total rent payments are given, the proportion payable under long-term leases must be estimated. Also, data from income tax reports are not strictly comparable with data from reports to stockholders and the Securities and Exchange Commission. Profits earned on assets were much less for small than large corporations, both for food retailers and processors; small processors earned more than small retailers. Total rental payments of small retailers were proportionately less than those of large retailers. Capitalization of estimated rental obligations, therefore, increased total assets less, and decline in profit ratios was less—only 1.5 percent in contrast to 5.6 percent. Effects of capitalization on profits of small corporate processors were somewhat less than those of larger firms, and less than these effects on the profits of any size of retailers.

*Changes over time.*—Between 1956 and 1958, total rent payments increased faster than value of total assets for both large food retailers and large food processors. Rent obligations on long-term leases increased faster than total rental payments, hence both groups exhibited existence of a trend.

Total rent payments were available on six of the large food retailers for 1948, but rent payable on long-term leases was not given. Between 1948 and 1958, these six firms increased total rent payments by more than either total assets or profits before taxes—231 percent for rent payments compared with 157 for total assets and 155 percent for profits before taxes. Even assuming that during this 10-year period long-term lease obligations did not rise as a proportion of total rental payments, leasing grew in importance as total rental payments rose.

### Gross Returns to Capital

In table 4 total profits before taxes are computed as a percentage of a large share of capital engaged in the respective groups of firms.<sup>6</sup> However, profits represent the claims of owners of only a part of this total capital, namely the equity of the firm. In order to evaluate total returns to

<sup>6</sup> Besides leased assets, there are other assets used by a firm that are absent from its balance sheet. Any productive service hired for use represents use of resources owned outside of the given firm. Labor services represent an extreme example of the same reasoning.



TABLE 5.—Gross return to capital of large retail food chains and food processors, 3-year averages for years beginning July 1, 1956, 1957, and 1958

Item	32 large retail food chains			50 large food processors		
	Profits, before tax (million dollars)-----	408.5			1,058.0	
Interest paid (million dollars)-----	14.2			65.9		
	Rate of capitalization of long-term rent					
	8 percent	10 percent	12 percent	8 percent	10 percent	12 percent
Imputed interest (million dollars):						
On long-term rental commitments <sup>1</sup> -----	109.6	87.7	73.0	25.0	20.0	16.6
On remaining rent paid <sup>2</sup> -----	3.3	3.3	3.3	9.5	9.5	9.5
Gross returns (million dollars) <sup>3</sup> -----	535.6	513.7	499.0	1,158.4	1,153.4	1,150.0
Total capital (million dollars) <sup>4</sup> -----	4,746.7	4,348.3	4,082.2	9,113.4	9,022.6	8,961.9
Gross return to capital (percent)-----	11.3	11.8	12.2	12.7	12.8	12.8

<sup>1</sup> Present value of assets under long-term commitments (capitalized long-term rent from table 4) times interest computed at 5.5 percent.

<sup>2</sup> Total rent paid minus long-term rental commitments capitalized at 33½ percent times interest at 5.5 percent.

<sup>3</sup> Sum of profits before tax, interest paid, and imputed interest.

<sup>4</sup> Adjusted total assets from table 4 plus excess of total rent paid minus long-term rental commitments capitalized at 33½ percent.

Source: Compiled from corporate reports prepared for stockholders or the Securities and Exchange Commission.

total capital, returns accruing to the owners of the balance of the capital must be added to profits.

These other owners are of two kinds—owners of bonds, notes, and other forms of borrowed capital, and the owners of land, buildings, and equipment that is rented. Creditors receive interest as their share of the proceeds of a firm's capital. Owners of rented capital receive rent payments. Rent payments are not analogous to interest but they include an interest component. Rent must be sufficient to cover both a principal payment and interest on the unamortized balance. It is equivalent to purchasing with debtor capital—depreciation (capital consumption) is charged against income as well as interest paid the creditor.

Likewise, profits received by owners of a firm include an interest component for the use of their money. In addition, an equity return based on debt leverage, lease leverage, risk, uncertainty, or monopoly gains may be either added or subtracted. The essential point to note is that all three classes of owners receive either interest alone or an interest component in their returns to capital.

Table 5 contains an estimation of the gross returns to capital of the sample of large retail food chains and food processors. Profits and interest paid were obtained directly from corporate reports. Imputed interest from rental payments

was estimated by taking 5.5 percent interest times the present value of assets under lease. Both long- and short-term lease commitments were capitalized so that total rent payments were exhausted.

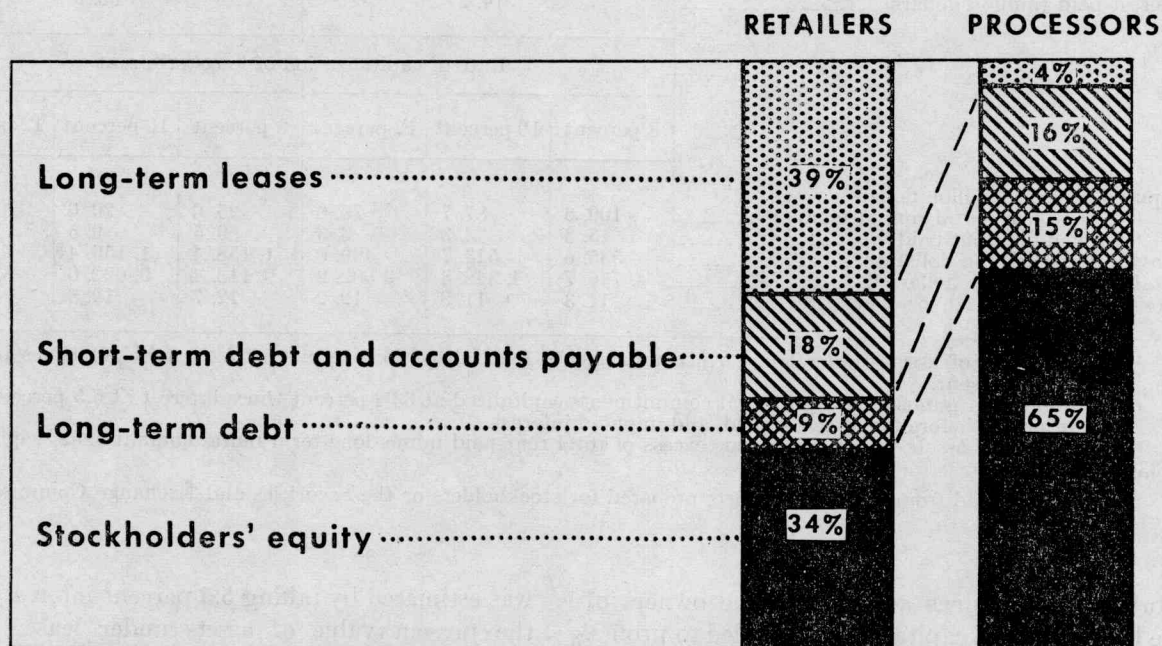
The striking similarity in gross returns to capital obtained by the two groups of firms contrasts with the ratios presented earlier. Profits on equity alone and on total assets are greater for the retailers than for the processors. When long-term rent is capitalized, profit ratios of retailers drop below those of processors. But now, when returns to all owners of total capital are aggregated, the ratios are nearly equated.

In evaluating the level of gross returns to capital, it must be recognized that two large segments exist: (1) Interest or imputed interest on capital and (2) corporate income taxes. Evaluation of corporate income tax as an economic cost of doing business is outside the scope of this report.

### Conclusions and Implications

*Lease leverage.*—Long-term leases have the effect of reducing the need for long-term debt. They are a means of obtaining the use of assets without increasing the ratio of debt to total capitalization. However, leases do not reduce the proportion

# SOURCES OF CAPITAL FOR LARGE FOOD CHAINS AND PROCESSORS, 1958



COMPILED FROM CORPORATE REPORT PREPARED FOR STOCKHOLDERS OR THE SECURITIES AND EXCHANGE COMMISSION, FOR 32 RETAIL FOOD CHAINS AND 50 FOOD PROCESSORS.

U. S. DEPARTMENT OF AGRICULTURE

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Figure 2.

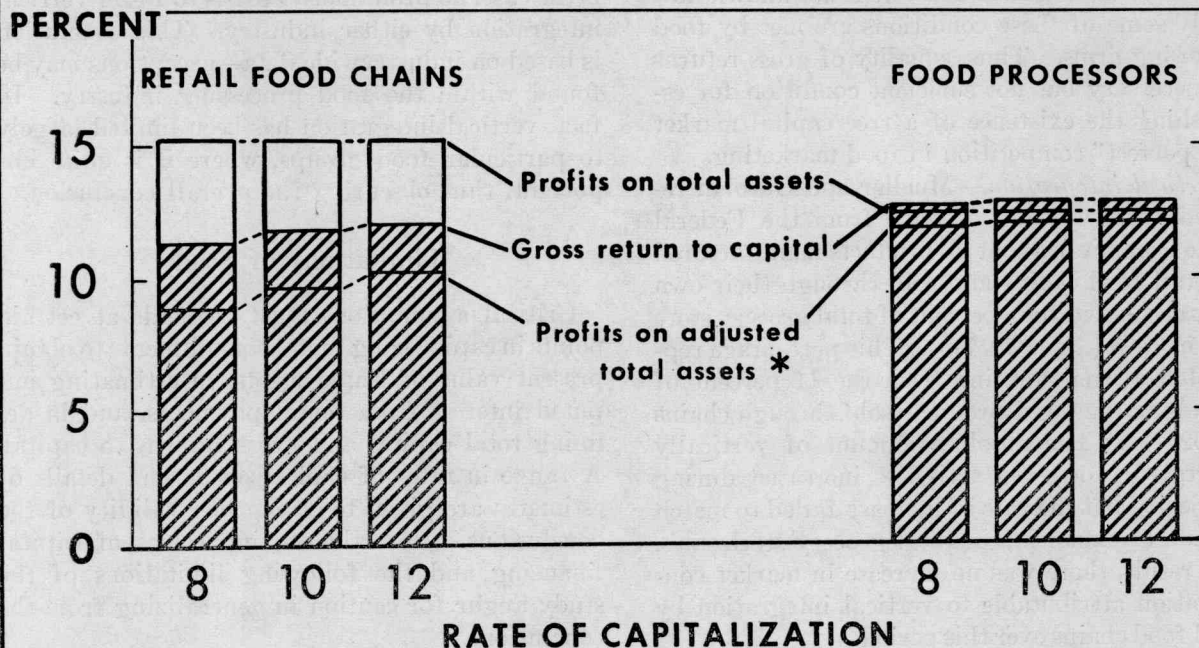
of total long-term obligations commensurate with the use of a given value of assets. Figure 2 shows the effect upon sources of capital of the large retail food chains and food processors when the present value of long-term leases is included with the components of total assets. Stockholders' equity as a percentage of capitalization is nearly the same in the two groups of firms, but stockholders' equity is a much smaller part of total capital used by retailers.

*Equality of gross returns.*—The differences in profit ratios shown in figure 1 are explained by figure 3. Profits as a percentage of adjusted total assets are lower for retailers than for processors. But, when interest paid and imputed interest paid as rent are added to profits and the resulting gross returns computed on adjusted total assets, the two sets of ratios are nearly the same. Some variation

exists—this depends on the rate of capitalization used—but the conclusion is not altered.

The similarity in gross returns and dissimilarity in other ratios is explicable in terms of leverage. Profits computed on the basis of stockholders' equity alone result in the greatest difference in profit ratios between the two groups, as one would expect from figure 2. Profits accruing to total capital used by the firm over and above the cost of hiring creditor capital, including rental payments, are credited to stockholders' equity. Thus, when equity capital represents a small share of the total, the percentage of profit is correspondingly large, assuming gross returns to capital exceeds the rate received by creditors. On the contrary, if returns to total capital fail to cover the rate of creditors' claims, profits on stockholders' equity will be correspondingly low or nonexistent.

# PROFIT RATIOS COMPUTED ON TOTAL ASSETS COMPARED WITH GROSS RETURN TO CAPITAL



\* CAPITALIZED LONG-TERM RENTAL COMMITMENT ADDED TO TOTAL ASSETS. 32 RETAIL FOOD CHAINS AND 50 FOOD PROCESSORS, 3-YEAR AVERAGES FOR FISCAL YEARS 1957-59.

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Figure 3.

Likewise, the difference between groups of firms in profits computed as a percentage of total assets is explained by leverage. Total assets represent only a part of the total capital used in a firm. Total assets of the large retailers represented only 61 percent of the total capital (total assets plus leased capital) compared with 96 percent for the large processors (fig. 2). The remaining leverage was exerted by lease financing. Thus, a profit ratio computed on total assets was higher for the retailers than the processors. But when an adjustment of total assets was made to include the value of assets under long-term leases, profit ratios of the processors exceeded those of the retailers. Each of the three sets of ratios represents a step toward increasing the asset base on which to compare profits. Each time the base comes closer to repre-

senting the total value of assets. However, not until interest is added to profits are gross returns to this total value of assets obtained. This ratio becomes a consistent concept of value upon which to compare returns accruing to capital in the two groups of firms. This comparison establishes the fact that capital in the two industries—at least that being used by the large firms—is accruing returns that are nearly equivalent.

*Nature of competition.*—The conclusion that gross returns accruing to capital are similar in large food retailing firms and large food processing firms is consistent with the performance of a free capital market. Resources freely flowing to the industry with the greater potential returns on new investments will yield equal average industry returns if certain conditions are met. These con-

ditions include reinvestment of at least some capital in both industries, declining marginal returns in each industry, revaluation of existing capital in line with price level changes, and schedules of depreciation reflecting true rates of obsolescence and loss of value due to use. It is not known how closely some of these conditions are met by food marketing firms. Thus, equality of gross returns is a necessary but not sufficient condition for establishing the existence of a free capital market and "perfect" competition in food marketing.

*Vertical integration.*—Mueller and Garoian reported from a study of data from the Federal Trade Commission that all products manufactured by retail food chains and sold through their own stores accounted for 8 percent of total grocery store sales in 1958 (4, pp. 72-77). This percentage represented a small decline from the 11 percent of chain-manufactured products sold through chains in 1929-32. The absolute amount of vertically integrated processing activities increased during this period but the rate of increase failed to match the rate of expansion of total grocery store sales. As a result, there was no increase in market concentration attributable to vertical integration by retail food chains over this period.

Vertical integration represents an avenue by which capital funds can flow from the food retailing industry into the food processing industry, or vice versa. It is expected that, by this method, profitable opportunities for investment in either industry would attract funds from the other, assuming the nature of the scale economies of each industry and institutional restrictions permit it. Complementary production coefficients, reduced transaction and informational costs, and management's ability are greater in vertically allied industries than in unrelated industries, hence investments outside a given industry often tend to be vertically directed into profitable alternatives. Other factors including desirability of establishing dependable supply sources for uniform quality products or captive outlets for products of a firm are also powerful forces stimulating vertical integration. However, the profit motive as an important incentive fostering vertical integration is advanced, among other writers, by Mueller and Garoian (4, pp. 81-88).

The fact that no relative increase in vertical integration of grocery chains has occurred in three decades is consistent with the findings of this report. Profitability of food processing is about the same as that of food retailing. Because this is the case, no profit motive exists to foster vertical integration by either industry. This conclusion is based on industrywide data—exceptions may be found within the food processing industry. In fact, vertical integration has been limited largely to particular food groups, where it is quite important, thus obscuring the overall conclusion.

### Limitations of Study

Critical assumptions must be made at certain points in capitalizing rental commitments to obtain present value of leased assets, in estimating imputed interest from rental payments, and in defining total capital and gross returns to capital. A range in rates of capitalization and details of estimates are given to strengthen validity of the conclusions. Nevertheless, intricacies of capital financing and the following limitations of the study augur for caution in generalizing from the conclusions.

1. The evidence is presented in terms of large retailers as a group versus large processors. Data on small firms in either group is sketchy.

2. An equality of returns to capital used by the two groups does not preclude the possibility that both groups of firms include elements of imperfect competition to an approximately equal degree. No comparison of returns was made with either nonfood industries or a competitive norm.

3. Only one criterion of the nature of competition is analyzed, namely, returns to capital. But economic theory attaches great importance to this one element of market performance.

4. The analysis is based on data from accounting records of firms. Additional measurement problems and departure from theoretical concepts regarding such items as wages to management, depreciation, and valuation of assets may alter the results.

5. The time period of 3 years is relatively short for drawing long-term conclusions.

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