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The Union Impact on Profits: Evidence  
from the Supermarket Industry

by

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Abstract

A number of studies have found that unions lower profits, but controversy continues over whether the union impact is or is not greater in more concentrated markets or when firms have greater market share. This empirical controversy is linked to two major underlying issues: whether unions distort capital investment decisions and whether prior research has tended to understate the level of monopoly profits in the U.S. economy.

Research on the supermarket industry reveals that indeed unions lower profits substantially in this sector. The impact is apparently greater when local markets are more concentrated or when firms are positioned better vis-a-vis rivals, but these findings must be regarded as tentative given the multicollinearity existing in the data analyzed.

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Recently there has been an explosion of research concerning the union impact on profits and the associated question of whether unions reduce profits more in noncompetitive than competitive sectors (Brown and Medoff, 1978; Freeman and Medoff, 1982; Freeman, 1983; Clark, 1984; Salinger, 1984; Ruback and Zimmerman, 1984; Karier, 1985; Connolly, et. al., 1985; Voos and Mishel, 1986). This has become an important empirical issue for a variety of reasons. One concern has been whether unions distort capital investment decisions. Insofar as unions merely capture monopoly rents, as opposed to reducing the rate of return in competitive industries, the presumption is that unions would create less distortion. A separate issue has been whether previous research has underestimated the extent of total monopoly rents. This would occur if observed profits are less than total profits in noncompetitive sectors because in those sectors a portion of monopoly rents are being redistributed to unionized employees. Both these issues are directly related to the empirical question of whether unions reduce profits more in noncompetitive sectors. Other issues include that of income distribution—which population groups ultimately pay for higher union wages—and the rationality of management resistance to unionization.

Despite an enormous diversity in the type of data utilized and the way profits are measured or proxied, most studies find that unions lower profits.<sup>1</sup> The extent of the average estimated impact varies, from about 20% when returns on sales or price-cost margins are analyzed, to between 12 and 50 percent when the rate of return on investment is examined, and to even higher figures when measures of the current market value of the firm relative to the replacement

value of its physical assets are employed. Controversy continues regarding whether unions reduce profits more in industries with less competitive market structures. Freeman (1983) and Karier (1985) both find that unions have a much larger effect in concentrated industries. However, Connolly, et. al. (1985), question that conclusion. And Clark (1984), in contrast, reports that profits are sharply lowered by unionization when companies have market shares of less than 10 percent, but not when firms have market shares of more than 35 percent. This finding with regard to market share stands in sharp contrast with most evidence with regard to concentration, and while this may occur because the two are very different aspects of market structure, it also indicates the need for more research on the underlying issue of whether unions reduce profits more in less competitive market environments.<sup>2</sup>

Most research to date on this issue has utilized either 3-digit or 2-digit manufacturing industry data, manufacturing firm data, or division-of-manufacturing-firm data.<sup>3</sup> This has an important advantage: the results are generalizable to an important and sizable portion of the economy: manufacturing. Nonetheless, the nonmanufacturing industries are also a sizeable portion of the economy and should not be ignored by researchers; it would be desirable to investigate the union impact on profits in this sector as well.

Moreover, there is an important additional reason for examining the union impact on profits in the nonmanufacturing sector. In manufacturing, unionization and concentration are positively correlated, whereas in non-manufacturing the reverse may well be true (Rees, 1961; Levinson, 1967).

Many heavily-organized nonmanufacturing industries (e.g. construction, truck transport, coal mining) are not particularly concentrated. Consequently, the nonmanufacturing sector provides an important econometric test of the hypothesis that unions reduce profits more in less competitive environments.

Unfortunately, it is impossible at present to research the impact of unions on profits in a representative cross-section of nonmanufacturing industries. No data set exists which adequately measures concentration in all these industries; moreover, the wider prevalence of local or regional markets in the nonmanufacturing sector complicates the development of such a data set. Research in this area thus must be industry specific.

This paper reports the results of investigating the union impact on profits in one nonmanufacturing industry: supermarkets. This industry is suitable for research on the impact of unions on profits in a number of respects. First, union and nonunion firms coexist in the industry, and some firms are partially unionized. Second, it is possible to obtain a sufficient number of independent observations for statistical analysis because the markets in the industry are local. And third, the industry has a relatively homogeneous product and technology, if it is defined to exclude small and convenience stores and if a period is selected prior to the introduction of automated checking systems.<sup>4</sup>

Of course, the major disadvantage of studying the impact of unions on profits in the supermarket industry is that the results may reflect factors particular to the industry. In particular, the reader should be aware that contrary to popular mythology, the supermarket segment of the grocery

industry has relatively high levels of local market concentration. For example, in 240 SMSAs nationwide in 1972, the grocery store four-firm concentration ratio averaged .53 and the supermarket ratio averaged .70; in the data used in this research, the four firm concentration ratio had a mean of .50. In contrast, in manufacturing generally, concentration averages about .38. Levels of concentration in the supermarket industry do vary considerably across geographic areas, facilitating research on the interaction between unionization, concentration, and profitability. The correlation between concentration and unionization in the data used for this study was negative, in sharp contrast to the situation in manufacturing generally.

The primary purpose of the research which follows is to ascertain whether or not unions have a negative effect on profits in the supermarket industry and to determine whether that effect is larger when local markets are more concentrated. If unions do reduce profits more in less competitive markets, this will be important corroborating evidence for the relationship that generally has been found to exist in manufacturing.

A secondary goal will be to investigate the interaction between the union impact on profits and market share. Market share, of course, is a somewhat different aspect of market structure than concentration, measuring the position of the individual firm relative to its competitors in a given market. In a number of studies, market share has been found to be positively associated with profitability. This empirical relationship probably reflects economic efficiency, in part, (as more efficient firms grow, gain market share, and simultaneously are more profitable given lower costs) and probably reflects the exercise of monopoly power, in part. Insofar as firms with greater market share gain monopoly rents, unions may

share in those rents. Consequently, the hypothesis here is that unions will reduce profits more when firms have greater market share.

#### The Data Utilized and the Model Estimated

The original data on which this research was based was gathered under subpoena by the Joint Economic Committee of the U.S. Congress in 1974 from large companies in the supermarket industry. This data has been subjected to rigorous examination by researchers acting for the committee and to cross-examination by industry spokesmen critical of their central finding: in the supermarket industry, local market structure is an important determinant of prices and profits (Joint Economic Committee, 1977a and 1977b; Marion et al., 1979a and 1979b). Firms which provided the data originally were promised confidentiality; that promise of confidentiality has been maintained by Marion, et al., throughout the conduct of the additional research reported below.<sup>5</sup>

The original J.E.C. data is organized in the following manner. Observations exist for the average pretax profit/sales ratio over the period 1970-1974 for individual supermarket chains in particular metropolitan areas. These profit/sales ratios are matched to information on the individual firm (the companywide rate of growth, whether or not it was a new entrant in that particular market in the period 1967-1970, its absolute and relative market share in that area), and to information on the food retailing market in the particular SMSA (the four-firm concentration ratio, the size of the market, the growth of the market, and the mean sales per grocery store on average in the market). Thus, to use a hypothetical

example, one observation would be for all Safeway stores in the Boston, Mass. SMSA. There are 71 such observations.<sup>6</sup>

These observations are drawn from six major supermarket chains; the 71 observations result from data in different SMSA's for each chain. While some SMSA's contain information on more than one chain, many do not. This occurs because most supermarket chains are semi-regional; Safeway, in fact, does not operate in the Boston metropolitan area.

The authors of this article gathered data on the union status of individual chains in particular SMSA's for the 1970-1974 period; this information was matched by Marion, et al., to the original data. Information on union status was requested from both the supermarket firms and from the union dominant in the supermarket industry, The United Food and Commercial Workers. These data sources were in agreement in all instances but one; in that instance, the information from the supermarket chain was judged to be more reliable.<sup>7</sup> In those instances in which firms declined to participate, information from the union alone was employed.<sup>8</sup>

Since firms in this sample generally were found to be either completely unionized or completely nonunion in these particular metropolitan areas in this time period, union status was modeled as a 0-1 variable. All nonunion observations occurred in two of the six chains, one of which was completely nonunion and one of which was partially union and partially nonunion. Given the limited number of observations, particularly on partially-unionized chains, it is not possible to completely disentangle supermarket chain effects from union effects in this data; in the research which follows, reliance is placed on the variables measuring firm characteristics to control for such effects.<sup>9</sup>



This data is utilized to estimate the impact of unions on profits in a manner comparable to that used in most previous research. The unionization variable, alone and in interaction with key market structure variables, is added to a standard structure-conduct-performance model predicting profitability. Several things should be noted about the structure-conduct-performance model before the precise models actually estimated are detailed. First, while it was originally predicated on the hypothesis that noncompetitive market structures permit the exercise of market power, leading to higher prices and higher profits, that "monopoly power" interpretation has been challenged sharply in recent years. At present, some economists posit that the widely-observed positive relationship between profitability and market concentration occurs for a very different reason. Under the alternative "market efficiency" interpretation, more efficient firms have higher profits because of lower costs; as these firms grow there is a tendency to market concentration (Demsetz, 1973; Peltzman, 1977).

The present study is not designed to test these alternative interpretations of the coefficient on market concentration; in this study, the variable serves predominantly as a control for the variable of interest: unionization.<sup>10</sup> However, we would argue that evidence on the impact of unions on profits is indirectly related to this controversy. That is, insofar as it is found that unions reduce profits more in noncompetitive markets, it might be inferred that unions are capturing monopoly profits. Perhaps there are other explanations; adherents of the "market efficiency" hypothesis would at a minimum be called upon to provide an alternative interpretation of this phenomenon.

It also should be noted that in all of the models which follow, union status is taken to be exogenous; this has been the approach of most previous

research.<sup>11</sup> Moreover, the data does not include information on capital investment per unit of sales so this potential control variable is not included in any of the following models. This omission is less worrisome than it might otherwise be in that the supermarket industry had a relatively homogeneous technology in the period of analysis, at least in the large chains represented in the sample, and so the capital sales ratio probably did not vary greatly across observations. Nonetheless, the estimated coefficient on union status will not be strictly comparable to the same coefficient from studies controlling explicitly for capital per unit of sale.

Four conceptually distinct models were estimated. The first is that structure-conduct-performance model which is commonly estimated in the absence of information on unionization:

$$(1) \text{ Profits/Sales} = f(\text{Market Structure, Firm Characteristics})$$

This equation has already been the subject of extensive analysis using this data (Joint Economic Committee 1977a and 1977b; Marion; et al., 1979a and 1979b). For the current study, those market structure and firm characteristic variables which emerged as important in previous research are simply adopted; the current authors claim no credit for these variables. In general, simple linear versions of the basic equation are preferred by us over nonlinear variants.<sup>12</sup>

The second model results from the addition of a linear unionization variable to the first model:

$$(2) \text{ Profits/Sales} = g(\text{Market Structure, Firm Characteristics, Unionization})$$

The assumption underlying this model is that the extent to which unions reduce profits is not a function of either market concentration or firm

market share.

In sharp contrast, the third model posits that unions do not reduce profits in perfectly competitive environments but do reduce profits in concentrated markets. One rationale for this model would be that unions cannot reduce profits when they are normal without driving firms out of existence, but can garnish a share of monopoly profits, when they exist. Karier (1984) discusses this view of the union-profit relationship at some length. The third model can thus be summarized as follows:

$$(3) \text{ Profits/Sales} = h(\text{Market Structure, Firm Characteristics, Unionization*Concentration})$$

The fourth model combines the hypotheses underlying the second and third models. That is, unions are posited both to reduce profits across all firms, to some extent, and also to partially share in monopoly profits:

$$(4) \text{ Profits/Sales} = j(\text{Market Structure, Firm Characteristics, Unionization, Unionization*Concentration})$$

All the above models utilize the measures of market structure and firm characteristics developed in the previous research utilizing this data. A brief description of each market structure variable, and the hypothesis associated with it by Marion, et al. follow.

1. CR4 = 1972 four-firm concentration ratio for all retail grocery stores in the SMSA.<sup>13</sup> Hypothesis:  $\alpha > 0$ , insofar as seller concentration permits the elevation of prices and profits. Alternatively, some readers may prefer to view this as a control for higher profits resulting from greater efficiency in the area which has elevated concentration.
2. MG = market growth, defined as percentage real growth in total grocery sales in the SMSA between 1967 and 1970. Hypothesis  $\alpha > 0$ , since market growth usually generates more utilization of existing facilities and thereby lowers cost per dollar of sales. This occurs under the usually-correct assumption that supermarket capacity expansion lags market growth.

3. MS = market size, measured in total grocery store sales in an SMSA. Hypothesis  $\alpha > 0$ , since market size is positively related to the extent to which CR4 for the entire metropolitan area understates the actual concentration in grocery markets, which in large metropolitan areas may be considerably smaller geographically than the entire SMSA. Economies of scale for larger market size will also be reflected in the coefficient on this variable.
4. SS = average store size in the market, measured as 1972 sales per grocery store in the SMSA. Hypotheses  $\alpha < 0$ , insofar as mean store size indicates the extent to which measured CR4 understates true concentration given a differing mix of supermarkets and convenience stores in the retail grocery industry of an SMSA. At the same time, the coefficient simultaneously reflects possible economies and diseconomies of scale and the ratio of total grocery stores to population.

The firm characteristic variables utilized in the analysis are:

5. FG = firm growth, defined as the percent increase in grocery store sales for the supermarket chain in all SMSA's between 1970 and 1973. Hypothesis:  $\alpha > 0$ , since this is a proxy for better chain management, for chains which have successfully developed a more positive store image, or for random factors affecting the entire corporation. These profit-elevating attributes of entire supermarket chains are reflected in this variable.
6. E = proxied expenditures on entry for firms which entered a particular SMSA between 1967 and 1970. The cost of entry, which is presumed to reduce profits, is hypothesized to be systematically related to existing market concentration. So Marion, et al., define E as equal to 0 for firms which were not recent entrants and equal to CR4 for firms which did enter during the 1967-1970 period. Hypothesis  $\alpha < 0$ , since new entrants have lower profits as a result of bearing entry costs.<sup>14</sup>
7. RFMS = relative firm market share in 1972, defined as the firm's market share (FMS) divided by CR4. Hypothesis:  $\alpha > 0$ , since firms relatively dominant vis-a-vis their leading rivals will have more discretion in pricing and thus greater profits. Also, these firms may have cost advantages from the realization of greater economies of scale.

8. FMS = firm market share in 1972. Hypothesis:  $\alpha > 0$ , for the same reason noted regarding RFMS. RFMS and FMS are used alternatively in different variants of our analysis. Marion, et al., prefer RFMS to FMS because it is not so highly correlated with CR4 and because they believe it to be a better measure of relative dominance by one particular chain (1979a, p. 71).

Descriptive statistics for the total sample and the union and nonunion subsamples are presented in Table 1. The overall profit/sales ratio, 1.1%, seems low, but the reader should recognize that according to their annual reports, the companies in this sample had a net income, on average, of 16% of stockholders equity in 1974 (Marion, et al., 1979a, p. 60). The nonunion subsample had strikingly higher profit/sales ratios on average than the union subsample: 3.2% as opposed to .7%. On the other hand, if the above hypotheses are correct, that difference in profitability reflects a number of factors besides unionization. The nonunion chains had higher absolute and relative firm market shares, operated in more concentrated markets, were less likely to have been a new entrants in the preceding four years, experienced much more rapid firm growth and presumably better management, were positioned in more rapidly expanding markets, and were in markets with lower sales per store. The only factor favoring the union subsample, on the other hand, was their location in larger markets. Obviously, it is necessary to control for these multiple factors to determine the actual relationship between union status and profitability. This is the purpose of the following multiple regression analysis.

TABLE I  
 Mean Values of Variables for the Sample and  
 for the Union and Nonunion Subsamples

	<u>Means (Standard Deviations)</u>		
	Total	Union	Nonunion
Average Profits/Sales	.0106 (.0195)	.0067 (.0183)	.0316 (.0115)
Union Status	.845 (.364)	1.000 (.000)	.0000 (.0000)
Concentration	.498 (.106)	.4890 (.1061)	.5468 (.0922)
Market Growth	.220 (.138)	.1991 (.1227)	.3329 (.1682)
Market Size	.894 (.827)	.9744 (.8746)	.4567 (.1599)
Average Store Size in Market	.909 (.245)	.9439 (.2445)	.7183 (.1438)
Firm Growth	.3710 (.2197)	.3403 (.2254)	.5387 (.0407)
Expenditures on Entry	.064 (.178)	.0759 (.1921)	.0000 (.0000)
Relative Firm Market Share	.230 (.145)	.2283 (.1555)	.2396 (.0684)
Firm Market Share	.1169 (.0821)	.1138 (.0862)	.1336 (.0538)
N - Observations	71	60	11

### Regression Results

According to the multiple regression analysis presented in Table 2, unions do reduce profits in the supermarket industry, on average, even after controlling for all these other factors which tend to elevate the profits of nonunion supermarket chains. The average reduction is 76.4%, according to estimation 2, a very substantial reduction indeed, and one that is highly significant despite a relatively small sample size. The average reduction is translated into percentage terms by dividing the estimated coefficient on the union variable by the overall sample mean of the dependent variable, .0106, as is usual in this type of analysis.

According to the third estimation, unions do reduce profits more in concentrated markets than in competitive markets. The coefficient on the interaction variable, which is negative and significant, indicates that at the mean level of concentration (.498) existing in this sample, unions reduce profits 65.8%. On the other hand, in a relatively competitive market in which CR4 were to equal .10, union would be predicted to reduce profit/sales ratios only 13.2%. It seems likely that unions reduce profits more in concentrated markets because they are able to capture a portion of monopoly profits where they exist.

It is also interesting to note that the coefficient on the concentration variable becomes more significant when the interaction is added to the regression. This is consistent with the view that industrial organization studies not controlling for unionization might tend to underestimate the impact of concentration on profits or incorrectly assess the significance of that relationship (Karier, 1984). Moreover, the fact that concentration elevates profits to a much greater extent in the absence of unionism (equation #3), is consistent with the market power interpretation of the concentration-profits relationship, but is puzzling under the efficiency interpretation.

TABLE 2

The Impact of Unions on Supermarket Profit/Sales Ratios  
(Standard errors are in parentheses)

Independent Variables and Hypotheses	Estimations			
	(1)	(2)	(3)	(4)
<u>Union Variables:</u>				
UN-Union Status (<0)	--	-.0081** (.0035)	--	-.019 (.017)
UN*CR4-Union-Concentration Interaction (<0)	--	--	-.014** (.007)	.021 (.030)
<u>Market Characteristics:</u>				
CR4-Concentration (>0)	.026* (.014)	.020 (.013)	.032** (.013)	.003 (.029)
MG-Market Growth (>0)	.032** (.011)	.026** (.010)	.025** (.010)	.027** (.010)
MS-Market Size (>0)	.0027 (.0019)	.0023 (.0018)	.0022 (.0018)	.0026 (.0018)
SS-Average Store Size in Market (<0)	-.010 (.006)	-.0036 (.0065)	-.0043 (.0065)	-.0038 (.0065)
<u>Firm Characteristics:</u>				
FG-Firm Growth (>0)	.045** (.007)	.040** (.006)	.041** (.006)	.040** (.006)
E-Expenditures on Entry (<0)	-.042** (.008)	-.041** (.007)	-.040** (.007)	-.041** (.007)
RFMS-Relative Firm Market Share (>0)	.063** (.011)	.064** (.011)	.063** (.011)	.064** (.011)
Constant	-.031** (.008)	-.023** (.008)	-.030** (.008)	-.014 (.015)

Estimation is GLS. N = 71

\*\* significant at .025, 1-tailed test, or at .05 2-tailed test

\* significant at .05, 1-tailed test, or at .10 2-tailed test



On the other hand, when both the linear union status variable and the interaction term are added (estimation 4), the coefficients on unionization, unionization\*concentration, and concentration, all become insignificant. This probably occurs because of the small number of observations and the multicollinearity between variables in this model. While the regression does not indicate that unions have a negative and significant impact on profits in the absence of concentration, that must be a tentative conclusion given the generally unsatisfactory nature of the estimation.

Table 3 contains the key coefficients of interest under a number of alternative experiments conducted by the authors. The use of OLS estimation, rather than GLS estimation results in somewhat larger standard errors, as expected, but otherwise very similar results.<sup>15</sup> Use of absolute market share, as opposed to relative market share, does not affect the sign or significance of key estimated coefficients in any of these models. And pooling of the data over the five year period, rather than averaging the dependent variable, again does not affect the substantive conclusions.<sup>16</sup>

Considered as a whole, these econometric experiments on data from the supermarket industry predominantly support the third model of the union impact on profits. That is, unions do not reduce profits by the same amount in all firms, but instead reduce profits more when firms operate in less competitive economic environments. One explanation for this is that these firms enjoy higher profits which are available to be shared with unionized employees when labor organizations effectively threaten the firm with lost revenues (in a strike situation) if they do not share profits.

TABLE 3

The Coefficient on Union Status Under Alternative Estimation Methods and an Alternative Formulation of the Regression Equation (Standard errors are in parentheses)

	Estimations <sup>(a)</sup>			
	(1)	(2)	(3)	(4)
<b>I. <u>OLS Estimation:</u></b>				
UN	--	-.0085* (.0046)	--	-.018 (.023)
UN*CR4	--	--	-.014* (.008)	.018 (.041)
R <sup>2</sup>	.71	.73	.85	.85
<b>II. <u>Market Share Replaces RFMS(OLS):</u></b>				
UN	--	-.0089* (.0047)	--	-.021 (.023)
UN*CR4	--	--	-.015* (.009)	.023 (.043)
R <sup>2</sup>	.69	.71	.71	.71
<b>III. <u>Data Pooled Over 5 Yrs, N = 355,</u><sup>(b)</sup>:</b>				
UN	--	-.0087** (.0032)	--	-.018 (.017)
UN*CR4	--	--	-.015** (.006)	.018 (.029)
R <sup>2</sup>	.49	.50	.50	.50

(a) See Table 2 for the other variables included in each equation. Full results available upon request.

(b) Four year dummies added to each equation, estimation is OLS.

\*\* significant at .025, 1-tailed test, or at .05, 2-tailed test

\* significant at .05, 1-tailed test, or at .10, 2-tailed test

Market Share and the Union Impact on Profits

Some investigators have considered whether the union impact on profits differs across firms with different positions in the market in terms of market share (Clark, 1984). In our view, this empirical question is less closely linked with the underlying theoretical issues than is the interaction between unionism and concentration. It nonetheless may be a matter of some interest. Supermarket firms which are in a better position relative to their competitors, either in terms of relative firm market share or in terms of absolute market share, were found to have significantly higher profits than other firms in all regressions. It is likely that these higher profits partially reflect economies of scale in any particular market. For instance, supermarket chains which are large in any particular locale should have lower warehousing and advertising costs per dollar of sales revenue. Thus, economic efficiency results in lower costs and higher profits. A monopoly power element may also be present, however. Large chains in any given locale often enjoy considerable consumer loyalty and thereby may have greater discretion in pricing and higher profits. In either case, unions may exert bargaining power to share in the higher profits enjoyed by firms with greater market share.

In order to explore this hypothesis, two additional models were estimated and contrasted with the basic linear model (equation 2). The first additional model (Model 5) replaces the linear unionization variable with a unionization-market share interaction, as follows:

$$(5) \text{ Profits/Sales} = k(\text{Market Structure, Firm Characteristics, Union-} \\ \text{ization*Market Share})$$

This model is parallel to model 3 in a formal sense (the unionization-market share interaction replacing the unionization-concentration interaction) but

is less easily justified in terms of economic theory. The model posits that unions cannot reduce profits when firms have low market share, even if those firms are located in concentrated markets, presumably because low market share firms do not enjoy monopoly profits given their higher costs and lesser consumer loyalty.

The second additional model (Model 6) relaxes this logic by positing that unions reduce profits to some extent across all companies, but do so to a greater extent in firms with greater market share. To wit:

$$(6) \text{ Profits/Sales} = f(\text{Market Structure, Firm Characteristics, Unionization, Unionization*Market Share})$$

Table 4 contains the coefficients on the key variables for these two additional models, as well as for the basic linear model; full results are available upon request. Two variants were estimated, one using relative firm market share and one using absolute market share. A quick glance at Table 4 indicates that the results were similar with either variant and for ease of exposition the discussion will refer to market share.

It is apparent that the final model, model 6, could not be estimated with any degree of precision, given the small sample size and high degree of multicollinearity in this data. None of the coefficients in the final column are significant, not even that of the market share variable, and so this equation cannot be relied upon for information about the possible interaction of unionization and market share. Model 5, however, apparently indicates that unions do reduce profits more when firms have high market share, as hypothesized. Whether this is because there is an element of monopoly profits in the higher than normal profits enjoyed by firms with

TABLE 4

The Interaction Between Unionization and Relative Firm  
Market Share or Firm Market Share  
(Standard errors are in parentheses)

	MODEL		
	(2)	(5)	(6)
<u>Relative Firm Market Share Variants</u> <sup>(a)</sup>			
RFMS-Relative Firm Market Share	.064** (.011)	.091** (.018)	.057 (.037)
UN-Union Status	-.0081** (.0035)	--	-.0098 (.0096)
UN*RFMS	--	-.029** (.014)	.007 (.038)
<u>Market Share Variants</u> <sup>(a)</sup>			
FMS-Firm Market Share	.113** (.021)	.149** (.034)	.085 (.055)
UN-Union Status	-.0087** (.0039)	--	-.012 (.008)
UN*FMS	--	-.045* (.026)	.029 (.055)

(a) Other variables included in each equation: Firm growth, expenditures on entry, concentration, market growth, market size, average store size in market.

Estimation is GLS. N = 71.

\*\* significant at .025, 1-tailed test, or at .05, 2-tailed test.

\* significant at .05, 1-tailed test, or at .10, 2-tailed test.

greater market share, or whether unions are able to share in the gains from greater efficiency, is not clear. Certainly, this would be an interesting subject for future research.

### Discussion and Conclusion

Unions clearly lower profits in the supermarket industry. While the evidence is not entirely conclusive, they apparently lower profits to a greater extent if local markets are more concentrated or if firms have greater local market share. One explanation would be that monopoly profits in the supermarket industry are being redistributed, in part, to unionized employees; another would be that unions are able to exert bargaining power to share in above normal profits, whatever their source. Despite considerable evidence of redistribution, large supermarket chains have earned rates of return on equity comparable to those obtained elsewhere.

These general conclusions are more likely to be supported by further research than the particular magnitudes reported here of the union profit effect. The average union impact on supermarket profit/sales ratios as measured in this data is at the high end of previously published estimates.<sup>17</sup> Several characteristics of the supermarket industry contribute to a higher expected average impact of unions on profits than would be anticipated for unions generally: high average levels of industry concentration, labor costs being a high proportion of total costs in the industry,<sup>18</sup> and relatively high levels of industry unionization leading presumptively to relatively-great gains for unionized employees.<sup>19</sup>

Nonetheless, it is likely that the estimates reported here are overstated somewhat due to the special nature of the sample. In particular, most but not all of the nonunion observations are drawn from one supermarket

chain and that chain is one of the most profitable firms in the supermarket industry. It is possible that part of this firm's profitability is due to superior management and that superior management is not entirely captured by the firm growth variable. Also, this firm employs different financial practices from its competitors, drawing less than five percent of its assets from creditors compared to the other supermarket chains which had debt, on average, of over 25% of assets. This financial practice elevates the particular dependent variable used in this research.<sup>20</sup>

Several colleagues suggested that in order to investigate the importance of individual firm effects, the equations reported in Table 2 be reestimated with the addition of five firm dummies; this experiment would yield the union impact on profits holding constant for "fixed effects by firm." Unfortunately, considerable collinearity between union status and firm status, in combination with small sample size, made it impossible to perform such an estimate. The simple linear equation (#2) was reestimated, however, with firm dummies replacing the union status variable; the firm growth variable was excluded from this equation for reasons of multicollinearity. That experiment is reported in Table 5.

The actual company names are not listed in Table 5 for reasons of confidentiality, but firms are characterized in terms of the degree of company-wide unionization, as well as the degree of unionization for that firm in this data set.<sup>21</sup> In general, the three least unionized companies have the largest, positive coefficients. Interestingly, Firm #2, a company which is only partially unionized firmwide but which is completely union in this data

TABLE 5

Coefficients on Individual Supermarket Firms in a Regression  
Predicting Profit/Sales Ratios and a Characterization of Their Unionization  
(Standard errors are in parentheses)

<u>Firm Dummy Variables</u> <sup>(a)</sup>	(1)	(2)
Firm 1 - A Completely Nonunion Firm	.034** (.005)	.027** (.005)
Firm 2 - Partially Unionized Firmwide, Completely Union in this Data	.025** (.005)	.028** (.005)
Firm 3 - Heavily Unionized Firmwide, Partially Union in this Data	.017** (.004)	.017** (.005)
Firm 4 - Heavily Unionized Firmwide Completely Union in this Data	.011** (.005)	.010** (.005)
Firm 5 - Heavily Unionized Firmwide Completely Union in this Data	.009 (.006)	.015** (.005)
 <u>Other Independent Variables:</u>		
RFMS, CR4, Constant	Yes	Yes
SS, E, MS, MG	No	Yes
R <sup>2</sup>	.63	.74

N = 71. Estimation is OLS. Firm Growth could not be included because it was highly colinear with the dummy variables.

(a) The base firm was a heavily unionized company, completely union in this data.

\*\* significant at .25, 1-tailed test, or at .05, 2-tailed test

\* significant at .05, 1-tailed test, or at .10, 2-tailed test



set, has a larger point estimate than Firm #3, a company which is heavily unionized firmwide, but is only partially unionized in this data. These latter two point estimates are not significantly different from each other, however. This entire experiment simply serves to confirm that individual firm effects are important, that they are apparently correlated with the union status of entire companies, and that they are indistinguishable from union effects in this data. Consequently, particular caution should be exercised in interpreting the regression results reported in Tables 2 through 4.

Nonetheless, we would draw several conclusions, with varying degrees of certainty, from the estimations reported here. Although the precise extent of the reduction is not evident, it is clear that unions reduce profit sales ratios in this nonmanufacturing industry, just as they have been found to reduce profitability in manufacturing. As in manufacturing, the union wage effect in the supermarket industry is apparently funded in part by a reduction in the rate of return to capital below what it would otherwise be, and is not passed on in entirety to consumers in the form of higher grocery prices (Voos and Mishel, 1986). Moreover, there is some evidence that unions reduce profits more in this industry either when local markets are more concentrated or when organized firms have greater local market shares, although these interaction effects must be considered tentative. In consequence, it appears plausible to us that unions are capturing a portion of the monopoly rents which exist in the supermarket industry. If that is the case, unions may not be distorting investment decisions in this industry to any great extent. Given the inconclusive nature of some of the evidence, these latter judgments are likely to remain controversial; certainly other research on the relationship between unionization, concentration, market share, and profitability would be highly relevant to these important issues.

## FOOTNOTES

<sup>1</sup>U.S. Manufacturing industry data has been examined by Karier, Freeman, Freeman and Medoff (1982), Brown and Medoff, and Voos and Mishel. Firm data or data on operating divisions of large corporations in the U.S. has been utilized by Clark, Connolly, et al., Salinger, and Ruback and Zimmerman. British industry data has been examined by Cowling and Waterson. Profitability has been measured or proxied by the price-cost margin, by the return on sales, by the return on investment, by "quasi-rents/capital," by the stock prices of firms, and by various measures of the current market value of a firm relative to the replacement value of its physical assets. Brown and Medoff and Cowling and Waterson are the only studies which do not find that unions lower profits. In a reanalysis of the Brown and Medoff data, Karier reports a negative and significant effect.

<sup>2</sup>Clark's finding maybe due to the nature of his sample (PIMS data in which all firms are large) as opposed to actual differences between the way industry concentration and firm market share interact with profits. This is a question for further research.

<sup>3</sup>The only study reviewed which utilized information from nonmanufacturing as well as manufacturing firms was Ruback and Zimmerman. Nonetheless, their largest industries were Chemicals, Machinery except electrical, Electrical equipment, and Transportation equipment, all in the manufacturing sector.

<sup>4</sup>Small and convenience stores are part of the grocery industry, but not part of the supermarket industry, in the terminology adopted here. Supermarkets generally account for about 75 % of grocery store sales. Convenience stores, superettes, and "mom-n-pop" grocery stores account for the balance; they sell a different product mix to a distinctive group of consumers.

<sup>5</sup>Marion, et. al. ran multiple regression equations specified by us and forwarded the results. We are deeply indebted to them for doing this and for sharing their data and expertise so generously with us. Bruce Marion and Frederick E. Geithman deserve special thanks. They are not responsible for any errors or omissions in the final product, nor do they necessarily share all our views.

<sup>6</sup>There were 355 observations on the profit/sales ratios, but only 71 observations on the firm variables and the market structure variables. That is, the profit/sales ratio was available separately for each of the five years for each supermarket chain in each locale. Thus, it would be possible to treat the data as a pooled time-series, cross section, instead of as a simple cross-section. Some regressions of this type are reported. However, this was not judged to be generally warranted because only one observation exists for each independent variable.

<sup>7</sup>One firm reported that in the period in question, meatcutters were represented in one SMSA, whereas retail clerks were not; the union reported that the firm was unionized. The retail clerks became unionized in subsequent years. Union status was defined as equal to 1 whenever retail clerks were unionized because there are a larger number of clerks than meatcutters in the typical supermarket. This instance was the only one in which there was different union status for clerks and meatcutters in this sample.

<sup>8</sup>Two firms declined to participate, one firm ignored our request for information, and three firms provided us with the requested data.

<sup>9</sup>That is, it was not possible to add firm dummy variables to the regressions reported here; those dummies were simply too collinear for the calculation of regression coefficients.

<sup>10</sup>Marion, et al., did test these alternative hypotheses by analyzing J.E.C. data on the grocery prices of three large chains in 36 SMSA's. Price data was related to market concentration, relative firm market share, and other variables. Grocery prices had a significant positive relationship to both market concentration and relative firm market share. As concentration increased, grocery prices increased faster than profits, providing no support for the "market efficiency" argument. Marion, et al. interpret these results as instead providing evidence of "x-inefficiency" in concentrated markets.

The J.E.C. data on prices was not utilized by us because the three chains were entirely unionized.

<sup>11</sup>Voos and Mishel examine this assumption and contrast it with the hypothesis that union status is influenced by profitability. The empirical evidence on union endogeneity/exogeneity is mixed. Two-stage estimates of the union impact on profits with the endogenous model are larger than OLS estimates under the assumption of exogeneity. This issue is ignored in the current research in part because this data set lacks the information necessary for the estimation of the two-stage model.

<sup>12</sup>In particular, Marion et al. experiment with a nonlinear version of the concentration variable, whereas we limit our investigation to the linear version. Moreover, Marion et al. prefer some variants in which market growth squared replaces market growth and market size squared is simultaneously added to the model. Since we did not find any apriori theoretical rationale convincing for the latter variant, we limited the control variables to the simple linear format.

<sup>13</sup>Since the available data measures grocery store rather than supermarket concentration, the coefficient will be biased towards zero. This mismeasurement is partially corrected by the introduction of the store size variable.

<sup>14</sup>The higher costs are due to lesser availability of preferred supermarket sites, established consumer loyalty to existing firms because of past merchandising efforts, and high costs of advertising per unit of sales. The latter arises from the small initial size of entrants and the sizable economies of scale which exist in advertising.

<sup>15</sup> In the GLS estimations, heteroskedasticity was corrected for by estimating the following function in order to create a weighting matrix:

$$\sigma_i^2 = \beta_0 X_i \beta_1$$

where  $\sigma_i^2$  is the estimated residuals from the OLS regression and  $X_i$  is company growth. This procedure was suggested by Marion, et al.

<sup>16</sup> See footnote 6 for a discussion of why the pooled estimates are not emphasized.

<sup>17</sup> It must be recognized, however, that our estimates are not strictly comparable with earlier estimates insofar as there is no control for capital per unit of sales on the right hand side of our equations. If union firms generate, for instance, 2% more sales per dollar of assets (e.g. from greater economies of scale in larger stores), then unions would reduce the return on assets by less than the estimates stemming from these regressions.

<sup>18</sup> Labor costs in supermarkets can be as much as half of the gross margin, which is defined as the difference between sales revenue and what retailers pay for merchandise, whereas profits account for 5 to 10 percent of gross margins (Joint Economic Committee, 1977a, p. 83).

<sup>19</sup> We know of no detailed study of the union wage effect in the supermarket industry. Nonetheless, labor economists have found that in general, the union wage effect is greater when a greater proportion of the industry is organized.

<sup>20</sup> The reason is pre-tax profit/sales ratios are measured after all business expenses. Since interest on debt is a business expense, a firm with larger debt will have lower profits by our measure, even though it may seem more profitable on other measures. (Earnings per share, for instance, can be raised by leverage if borrowed money can generate earnings in excess of the net after-tax cost of the interest on debt.) In most studies, financing has not been considered because it is not of importance unless it is correlated with rates of unionization, as it is in this particular sample.

The difference created by financing may be substantial because while interest expenses averaged only .6 to .7 cents per dollar of sales, the pre-tax margin itself in the early seventies was only about twice that (Marion et. al., p. 163). As a result, a reduction in debt expense can lead to much higher pre-tax margins.

<sup>21</sup> Characterizations of company-wide unionization is based on our knowledge of firms in the supermarket industry.

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