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STATE SALES-BELOW-COST LAWS:
AN EMPIRICAL EVALUATION OF EFFECTIVENESS*

by

Thomas W. Paterson** and Willard F. Mueller***

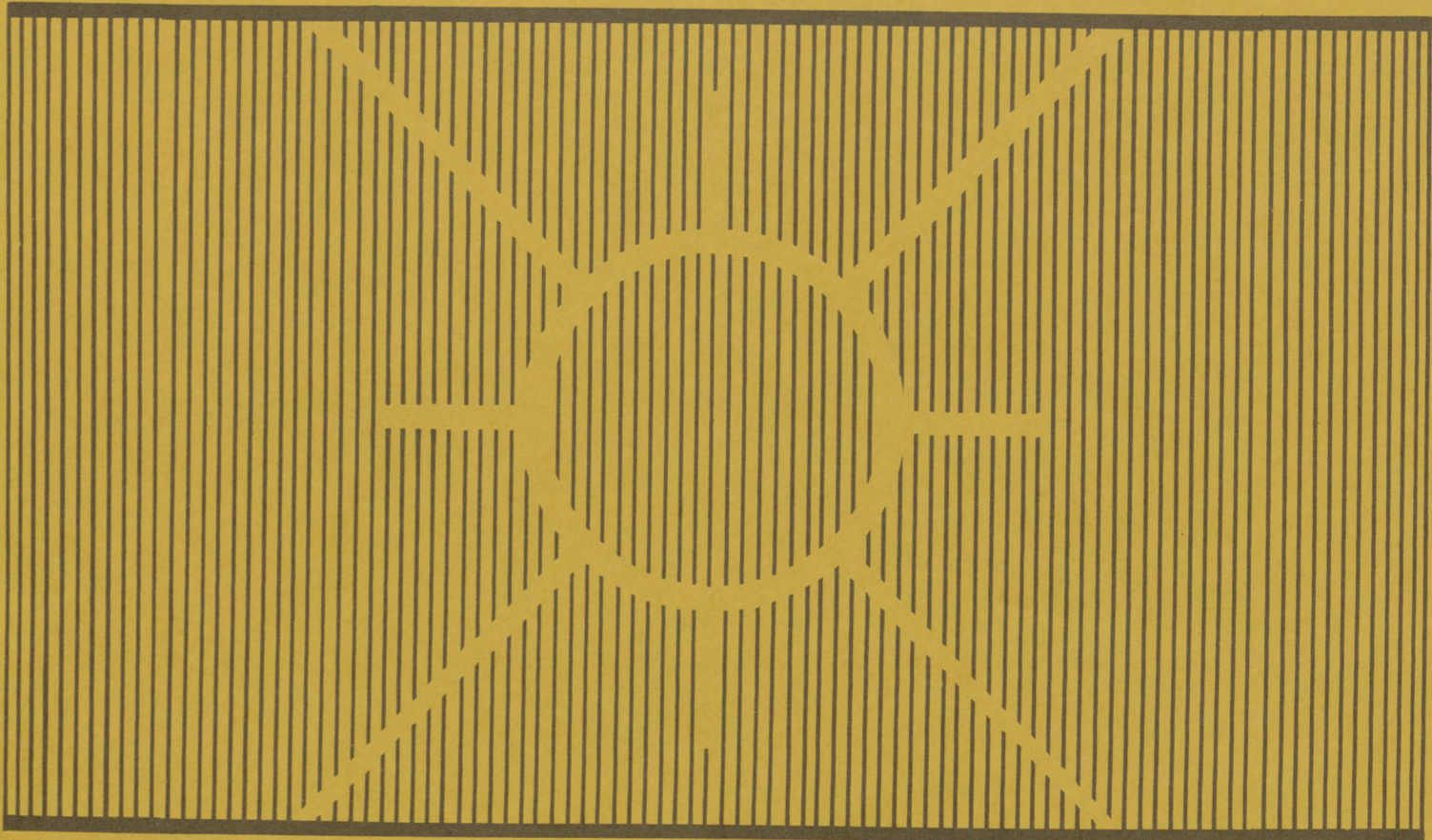
WP#79

January 1985

N. C. Project 117

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January 1985

* This is a revised and expanded version of Working Paper #79 appearing in September 1984. The main substantive change is the inclusion of the material on grocery warehouse store operations, pages 17-21.

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State Sales-Below-Cost Laws:
An Empirical Evaluation of Effectiveness^{*}

by

Thomas W. Paterson^{**} and Willard F. Mueller^{***}

I. Introduction

In 1984, 22 states had legislation prohibiting wholesale and retail sales at prices below cost.¹ Called sales-below-cost or minimum-markup laws, the laws prohibit sales at prices below some statutory definition of cost.² Some laws enumerate the costs a seller is to include in determining his price floor.³ Other statutes provide that, in the absence of proof of a lesser cost, the seller's cost equals the sum of delivered cost⁴ plus some percentage markup.⁵ The percentage markup at retail is, usually, 6 percent of delivered cost.

Legislative policy statements point to one or two objectives for sales-below-cost laws. Most states passed their law to prohibit below cost pricing aimed at eliminating competitors or destroying competition. A few states added a second objective of deterring implied misrepresentations of generally lower prices.⁶ The focus in the misrepresentation or deception argument is on loss leader selling. This refers to pricing conduct where the seller takes deep price cuts on certain highly visible products important in the consumer's market basket, doing so to convey what is actually a false impression that prices on all products are generally lower than those of a competitor.⁷ The seller undertakes the pricing policy hoping consumers will respond to the low margin goods and, in patronizing his store, will also purchase his high margin, price-insensitive goods.

Whether anticompetitive pricing⁸ or loss leader selling motivates a seller's price cuts, some economic consequences from success are not much different. Those rivals not able to sustain losses from predation may exit or be prevented from expanding. This is more likely to occur when the predator is a multimarket firm competing with single-market firms. Those rivals not able to respond adequately to deception created with loss leaders also lose market share, exit the market, or are forestalled from expanding. This is particularly likely where some firms enjoy advantages of large scale advertising and promotion. In food retailing, for example, a firm with a large market share enjoys considerable advantages over conventional supermarket or warehouse store operators with a single store.⁹ In this situation, a dominant retailer is able extensively to advertise loss leader prices on a relatively few price sensitive items to convey the misimpression that its prices are generally lower than those of its smaller rivals. When firms with smaller market shares cannot effectively respond to this strategy, they are placed at a significant competitive disadvantage even though they sell at prices equal to or below those of the dominant firm. Thus, both predatory pricing and loss leader selling tend to increase market concentration and retard the entry of single-market operators.

Since enactment in the late 1930's and early 1940's, scant empirical analysis has been done on whether sales-below-cost laws satisfy legislative objectives. A basic problem is how to test for effectiveness. One test for effectiveness is to compare market structure in those states having a sales-below-cost law with those states which do not.¹⁰ While simple, there can be problems with this approach. If there is no significant difference between market structures in states with and without the laws, this is not

particularly useful information. Nonsignificance might merely indicate that if the law is not enforced, the law will not deter conduct leading to increases in market concentration.¹¹ But even if differences exist, this fact has only limited interpretive power. It is difficult to contend that just because a state has a law the law is effective. And because different states enforce the law differently, the findings mask the relationship between enforcement and effectiveness.¹² Jurisdictions having a law must be distinguished beyond the point of whether they have a law--say, by looking at enforcement--in order to have any meaningful test of the law's effectiveness in the jurisdiction.

In this paper we evaluate the effectiveness of state sales-below-cost laws in the retail grocery industry. On the basis of survey results from enforcement officials, we first consider econometric evidence of whether the laws have been effective in deterring the predatory or deceptive pricing conduct that might lead to less competitive market structures. We then summarize survey evidence from Wisconsin grocery warehouse store operators on their experience with the law.

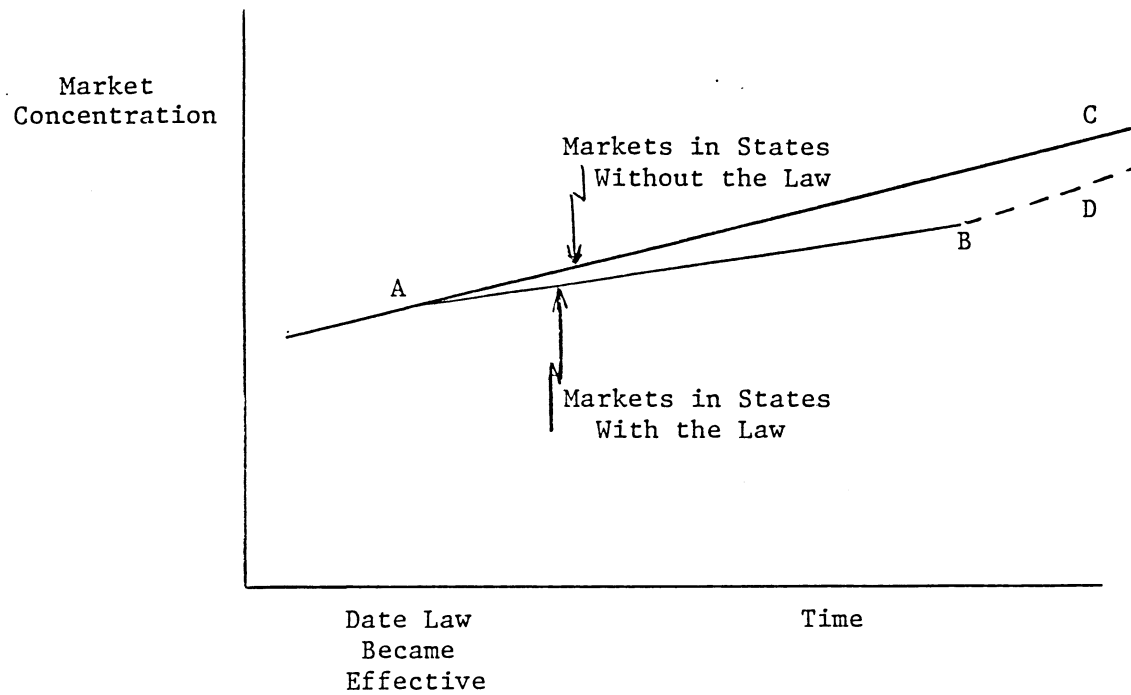
II. The Effect of Sales-Below-Cost Laws on Market Structure

Sales-below-cost laws seek to deter pricing conduct unrelated to efficiency or competition on the merits. By prohibiting sales at prices below some statutory definition of the firm's costs, sales-below-cost laws address predatory and other pricing practices that are anticompetitive.¹³ It should be emphasized at this point, however, that sales-below-cost laws do not prevent all predation based on across-the-board pricing below costs. Conventional supermarket operators usually have cost structures requiring an average markup of about 25 percent of the cost of merchandise; this is

equivalent to a gross expense margin on sales of 20 percent. Warehouse stores have an average markup of about 15 percent, requiring a gross expense margin of about 13 percent. Thus, a would be predator that marked up all of its items only 6 percent above delivered costs--the minimum percentage required by most state sales-below-cost laws--would be selling far below its average total costs and, very probably, below its marginal or average variable costs.¹⁴ Many economists use pricing below average variable costs as a sufficient basis for identifying predatory pricing.¹⁵ While recognizing that sales-below-cost laws do not prevent all predatory pricing, they do make the practice more costly for a predator. The most cost effective strategy for a would be predator in grocery retailing is to reduce prices deeply on only a relatively few highly price sensitive items. Such deep price cutting on selected items often involves pricing well below invoice costs, which are far below marginal costs. Such pricing is the most "cost effective" predatory strategy because it attracts more consumer patronage than if a like dollar volume of losses were accepted in order to lower the price of all price and nonprice sensitive grocery products by a smaller amount.

If sales-below-cost laws deter anticompetitive pricing, market structures in sales-below-cost states should differ from market structures in states without the law or its equivalent. If there has been a trend towards market concentration, as in grocery retailing,¹⁶ diagram 1 explains the effect sales-below-cost laws would have had on concentration. Markets in states with sales-below-cost laws would have lower concentration levels than in states without the law. The underlying notion is that a sales-below-cost law deters the anticompetitive pricing conduct that can accelerate increases in concentration and result in higher levels of

Diagram 1



concentration. Should point B be reached where the law is declared unconstitutional, repealed, or no longer enforced,¹⁷ increases in concentration attributable to anticompetitive pricing may follow path BD, paralleling or perhaps eventually intersecting with AC.

If a sales-below-cost law tends to place firms with different financial resources on a more equal footing in a market, size disparity among firms might be less than in states without the law. This is because even if a firm has the resources to survive a below cost pricing campaign aimed at market dominance or to engage in deceptive pricing for the same ends, the firm cannot set price lower than the statutory definition of its cost without violating the law. An equally efficient but less powerful firm can therefore be a more effective competitor in markets in jurisdictions with the law. Instead of a few firms dominating market sales, market shares will be more evenly distributed among a number of firms. For example, if there are four leading firms in a market, their share of market sales will be a smaller proportion of total sales in states with the law. This means that the less dominant firms, taken as a group, will control more market sales in states with the law than in states without the law.

III. Empirical Analysis

A. Econometric model of market concentration

Market concentration is one dimension of market structure. The more dominant are a few firms, the more concentrated is the market. Concentration is relevant for public policy because economic theory predicts and empirical studies verify that prices and profits are greater in highly concentrated markets than in less concentrated markets.¹⁸ Market concentration at a given point in time will depend on various factors. Among these

factors are economies of scale, market conduct, and government policies.

Equation 1 specifies the general econometric model used for estimating the relationship between the sales-below-cost law and the level of market concentration.

$$\text{(eq. 1) } CR_{1977} = b_0 + b_1 \text{Sales}_{1977} + b_2 \text{SBC} + \\ b_3 \text{MultiMarketFirms} + u_i$$

The model examines retail grocery store concentration in 237 Standard Metropolitan Statistical Areas (SMSAs) in the United States in 1977.¹⁹

1. Dependent variable

The dependent variable in the model is market concentration measured in two ways. First we estimate the 1977 market Herfindahl-Hirschman, or just Herfindahl, Index (Herf 1977).²⁰ As a concentration measure, the Herfindahl Index is sensitive to disparity in market shares, giving greater weight to the role a dominant firm in a market plays.²¹ We also estimate the share of 1977 grocery store sales held by the largest four firms ($CR4_{1977}$), the share held by the ninth through twentieth largest firms ($CR9-20_{1977}$), and the share held by all firms smaller than the top 20 ($CR21-n_{1977}$) in each SMSA.

2. Independent variables

The independent variables in this study--those variables explaining variation in concentration among the SMSAs--account for economies of scale, state government competition policy, and firm conduct. For each of these factors influencing concentration, we use a proxy to assess the relationship between that factor and concentration levels.

Market Size Economies of scale and market size interact to influence market concentration. Economies of scale refer to the decreasing costs of production associated with producing larger quantities of output. Scherer

observes that these lower costs derive from product, plant, and multi-plant economies.²² The economies of scale available in a market indicate the level of production and distribution firms will try to achieve in order to minimize costs.²³ Market size is a constraint on the number of firms that can exist in the market at efficient levels of production. If economies of scale are large relative to market size, the market will be able to support fewer firms at efficient levels of output. Because market size affects the number of firms that can realize all cost advantages, it influences market concentration. The proxy we use for market size is the natural logarithm of retail grocery sales in a Standard Metropolitan Statistical Area (SMSA) in 1977 (Sales₁₉₇₇). We expect that larger markets will be less concentrated; the coefficient will be negative.

Sales-Below-Cost Law A sales-below-cost law represents a government policy designed to deter pricing conduct that tends to increase concentration for reasons other than efficiency or competition on the merits. Insofar as sales-below-cost laws are effective, the market share of the largest firms will be lower in an SMSA in a state with the law than in an otherwise identical SMSA in a state not having the law. We use alternative measures to gauge the effectiveness of sales-below-cost (SBC) laws. The alternatives for the SBC variable indicate presence of the law and enforcement activity.

SBC-Law_{1970's} is a zero-one binary variable indicating whether the SMSA was in a state having a law in 1977 or if it had one sometime during 1972 to 1977. Using this variable follows the example of prior research²⁴ and subjects the results to the same criticisms.²⁵ Unlike prior research, though, we assigned a value of one to the variable if the SMSA was in a state having a sales-below-cost law sometime during the early 1970's though

not necessarily in 1977.²⁶ This recognizes that these states had the law for several decades prior to repeal or a finding of unconstitutionality and that the legislative or judicial activity occurred, at most, five years prior to 1977. Concentration levels in 1977 should therefore still reflect the state having previously had the law.

Ideally, a variable could be specified that would precisely reveal the relationship between a sales-below-cost law and market concentration. The variable would indicate each instance where the law deterred predatory or deceptive pricing that would have led to increases in market concentration. Data for such a variable are not available. Next best alternatives include variables revealing public and private enforcement of sales-below-cost laws.²⁷ Since data on private enforcement are not readily available, public enforcement is a remaining alternative.

In 1983, we surveyed enforcement officials in each state having the law in that year.²⁸ State attorneys general or enforcement agencies responded to survey questions seeking assessments of overall enforcement effectiveness of the respective laws from 1960 to 1982; the number of complaints received from 1960 to 1982 alleging below cost selling; the number of investigations from 1960 to 1982 into alleged below cost selling; the number of formal complaints issued from 1960 to 1982 charging violations; the judicial decisions in sales-below-cost cases from 1960 to 1982; and the budget for enforcing the law from 1960 to 1982. Responses show that enforcement agencies did not maintain records on much of the requested information, especially for the period prior to the late 1970's--the period for which concentration data are available. Responses also suggest a rapid turnover in enforcement personnel, limiting recall of past enforcement activity. The most enforcement agencies were usually able to

provide were general indications, often estimates based on contemporary activity, of past activity. This fact prevents being able to test variables specified in continuous terms for a particular time period--for example, the number of complaints received during the 1970's or the number of investigations undertaken or the monies spent on enforcement.

Enforcement agency responses clearly revealed, however, that states enforce the law differently. With the limited information from the surveys, we constructed three variables reflecting our subjective assessment of the states' budgetary commitment to enforcing the law from 1960 to 1980. Based on the financial resources enforcement officials indicated had been allocated to enforcement, we characterized SBC states as having had a low, moderate, or high level of enforcement during the 1960's and 1970's. We did this to test the hypothesis that the more aggressive the enforcement, the more effective the law. If the SMSA was in a state having a law in 1977 and enforcement officials did not respond to the survey or responded but said that nothing was spent to enforce the law, we assigned a value of one to the relevant low enforcement variable and a zero otherwise. If the SMSA was in a state having the law in 1977 and enforcement officials responded indicating with certainty that money was allocated to enforcement, we assigned a value of one to the appropriate "aggressive" enforcement variable and a zero otherwise. We assigned a value of one in the intermediate, moderate enforcement level cases--SMSAs in states having the law in 1977 and where enforcement officials alluded to some budget commitment but not of a nature approaching "aggressive" enforcement--and a zero otherwise. From our characterization of enforcement in the states having sales-below-cost laws, we determined that the level of state enforcement was low in 93 SMSAs, moderate level in 11 SMSAs, and high in 11 SMSAs.

A low, moderate, or a high level of enforcement for states having a sales-below-cost law in 1977 necessarily assigns a zero value for each variable to all SMSAs in states not having the law in that year. These SMSAs would be in states that had never had a sales-below-cost law and states that once had the law but no longer had it in 1977. As shown in Diagram 1, states not having the law in 1977 but having had it in the not too distant past would be expected still to have a significant residual influence from the law, especially since the laws were passed in the late 1930's and early 1940's. To distinguish SMSAs in these states²⁹ from SMSAs in states never having had the law or having repealed it many years earlier,³⁰ we added a fourth SBC variable in the equations testing the budget variables. For each SMSA we assigned a one to the SBC-Repeal variable if the SMSA was in a state where the law was repealed or found unconstitutional from 1972 to 1977 and a zero otherwise. To the extent legislative or judicial activity on these laws reflected general awareness of the laws or enforcement activity in those states, we expect the laws were effective. That is, larger firms would have controlled a smaller proportion of market sales in those states than in states without the law or in states where there was minimal enforcement activity.

In sum, if the laws are "pro-competitive" rather than "protectionist," they would have a negative effect on the concentration of sales as measured by the Herfindahl index and CR4, they would have a positive effect on the share of sales of moderate size retailers as measured by CR9-CR20, and they would have no effect on the share of very small and, presumably, inefficient firms as measured by CR21-n.

Number of Multimarket Chains Firms in a given market do not necessarily have the same conduct options. Predatory pricing and related types

of strategic conduct require survival resources that small competitors may lack. Advertising can convey information; it can also convey impressions vis-a-vis competitors. Like predatory pricing, aggressive loss leader price advertising campaigns can be costly. The firms most likely to engage in predatory pricing or to undertake loss-leader advertising in order to deter entry or to capture market share are those firms in the SMSA having the most extensive financial resources--resources not limited to a particular market. For these reasons, multi-market operation is a necessary condition for successful predation.³¹ The proxy we use to capture the potential for anticompetitive firm conduct in a market is the number of firms among the largest eight chains in the SMSA in 1972 that operated grocery stores in 10 or more other SMSAs in 1972 (MultiMarketChains₁₉₇₂).³² The greater this value, the greater the likelihood of conduct causing increasing concentration or deterring new entry. We therefore expect the coefficient on this measure of predatory potential to be positive. It should be emphasized that this variable is not entirely independent of the sales-below-cost (SBC) variables.³³ Insofar as SBC laws deter multimarket firms from engaging in predatory and deep loss leader selling, other things being the same, we would expect fewer such firms to operate in SBC states with effective enforcement. Therefore, because the variable is causally related to the SBC variables, its inclusion is expected to reduce the explanatory power of the SBC variables.

B. Estimation results

Using multiple regression analysis, we tested equation 1. Table 1 summarizes the ordinary least squares coefficient estimates and statistics using alternative variables to capture the relationship between the sales-

Table 1
The Relationship Between Sales-Below-Cost Laws and Retail Grocery Concentration, 1977.

Dependent Variable	Constant	Market Size 1977	SBC-Law 1970's	Sales-Below-Cost Laws Budget				Multi Market Chains 1972	\bar{R}^2	F
				Low (n=93)	Moderate (n=11)	High (n=11)	Repeal (n=24)			
1a Herf ₁₉₇₇	1029.8 (14.97) **	-133.1 (4.05) **	-194.9 (3.19) **					9.4	13.06 **	
1b CR ₄ ₁₉₇₇	53.87 (32.27) **	-3.28 (4.11) **	-4.45 (3.01) **					9.0	12.72 **	
1c CR ₉₋₂₀ ₁₉₇₇	11.18 (15.44) **	-.91 (2.64) **	1.73 (2.69) **					5.0	7.26 **	
1d CR _{21-n} ₁₉₇₇	22.84 (22.12) **	5.23 (10.61) **	1.01 (1.10)					32.1	56.7 **	
2a Herf ₁₉₇₇	1023.2 (14.92) **	-137.4 (4.19) **		-155.3 (2.34) *	-14.4 (.09)	-305.4 (2.09) *	-366.2 (3.51) **	10.6	6.51 **	
2b CR ₄ ₁₉₇₇	53.7 (32.40) **	-3.40 (4.29) **		-3.24 (2.02) *	-.34 (.10)	-8.69 (2.46) **	-9.10 (3.60) **	11.1	6.89 **	
2c CR ₉₋₂₀ ₁₉₇₇	11.37 (16.06) **	-.79 (2.33) *		-75 (1.09)	1.30 (.86)	4.59 (3.04) **	4.44 (4.11) **	10.0	6.23 **	
2d CR _{21-n} ₁₉₇₇	22.80 (21.96) **	5.20 (10.47) **		1.29 (1.28)	.16 (.07)	2.86 (1.29)	-.55 (.35)	31.9	23.1 **	
3a Herf ₁₉₇₇	802.3 (6.12) **	-162.6 (4.64) **		-136.15 (2.04) *	20.98 (.13)	-220.67 (1.46)	-392.68 (3.75) **	46.74 (1.97) *	11.7	6.14 **
3b CR ₄ ₁₉₇₇	46.17 (14.78) **	-4.25 (5.07) **		-2.59 (1.62)	.80 (.23)	-5.81 (1.60)	-10.01 (3.99) **	1.59 (2.82) **	13.7	7.24 **
3c CR ₉₋₂₀ ₁₉₇₇	13.91 (10.35) **	-.50 (1.39)		.53 (.77)	.91 (.60)	3.62 (2.32) *	4.75 (4.40) **	-.54 (2.22) *	11.5	6.10 **
3d CR _{21-n} ₁₉₇₇	28.92 (14.95) **	5.89 (11.37) **		.76 (.77)	-.77 (.35)	.51 (.22)	.20 (.13)	-1.30 (3.71) **	35.4	22.6 **

** - 1 percent level of significance using a one-tail test.

* - 5 percent level of significance using a one-tail test

t-statistics are in parentheses. CR estimated with 237 observations and Herfindahl estimates measured with 234 observations.

below-cost law and market concentration. Each of the equation specifications is significant at the 1 percent level based on an F-test.³⁴

In all equations except for those with CR21-n₁₉₇₇, market sales in 1977 has the expected negative sign and is significant at the 1 percent level. As hypothesized, the coefficients indicate that the larger were market sales, the less concentrated was the market, as measured by the Herfindahl Index and four-firm concentration ratio (CR4). For example, in two otherwise identical SMSAs, if CR4 in an SMSA with \$1.0 billion in annual grocery sales had been 50, the CR4 on average would have been slightly under 47 in the SMSA with \$2.0 billion in annual sales (eq. 1b).

The results on the binary variable Law_{1970's} support the hypothesis that sales-below-cost laws tend to reduce market concentration.³⁵ The coefficient is significant at the 1 percent level in equations 1a, 1b, and 1c and has the expected signs. The Herfindahl Index (eq. 1a) indicates that retail grocery concentration was lower in states having a law during the 1970's. The top four firms had a smaller market share (eq. 1b) and the less dominant ninth through twentieth firms had a greater market share (eq. 1c) in states with a law.³⁶ On the other hand, the share of the very smallest firms, CR21-n (eq. 1d), was not affected by the law, suggesting the laws did not "protect" these small and, perhaps, inefficient firms. While these findings are consistent with more competitively structured markets, the evidence is misleading because it does not distinguish between SMSAs in states with different levels of enforcement activity.³⁷ We expect that SMSAs in some states bias the results.

The various enforcement variables provide more useful results on the relationship between market concentration and sales-below-cost laws than does the Law_{1970's} variable. In markets where there was a high level of

budget commitment--Minnesota and Wisconsin--the model predicts a statistically significant lower Herfindahl Index and a lower CR4 share than in markets without the law (eq. 2a and 2b). On average, the Herfindahl index in high enforcement states was 305 points lower than in states without the law. In contrast, states with moderate enforcement did not differ significantly from states with no laws.³⁸ States with low enforcement had Herfindahls of only 155 points below states with no laws. The difference between the performance of the low and moderate SBC variables was unexpected, but it may reflect errors in our distinguishing between enforcement levels in these two groups of states. The results for CR4 (eq. 2b) are similar to those for equation 2a. CR4 in high enforcement states was 8.69 percentage points lower than in states with no law. The moderate enforcements states were not significantly different from states without laws and the low enforcement states had CR4s that were 3.24 percentage points below states without laws. The share held by CR9-20 firms was significantly higher in high enforcement states (eq. 2c). Neither the low or moderate enforcement state variable was significantly different from states with no laws.

Finally, as hypothesized, the share held by small retailers (eq. 2d) was not statistically significant at the 5 percent level in any enforcement category.

A statistically significant relationship also exists between concentration and whether an SMSA was in a state abandoning a sales-below-cost law during the 1970's. In SMSAs in states where the law was repealed or declared unconstitutional between 1972 and 1977,³⁹ the Herfindahl Index (eq. 2a), CR4 (eq. 2b), and CR9-20 (eq. 2c) had values that were not significantly different from states with high enforcement.⁴⁰ To the extent

that declaring a statute unconstitutional or that repealing a law reflects public awareness and, perhaps, past enforcement efforts of the law, the SBC-Repeal variable is an indicator of activity in the state qualitatively similar to what we tried to construct in the high level of enforcement variable. If this is correct, the statistical results on the SBC-Repeal variable further support the hypothesis that concentration among leading firms is lower in SMSAs in states where there is more public and private enforcement or awareness of the law.

Equations 3a-d display the regression results when the multimarket chain variable is included in the analysis. As hypothesized, the number of multimarket chains in a market has a positive influence on concentration and is statistically significant at the 1 percent or 5 percent levels.⁴¹ On average, for each increase in the number of multimarket chains in a market the Herfindahl index increases 46.74 points, CR4 increases 1.59 percentage points, and CR9-20 decreases .54 percentage point.

The inclusion of the multimarket chain variable in the analysis weakens the statistical significance of the "high" SBC variable and reduces the value of its regression coefficients. As discussed above, this result was expected because the existence of an effectively enforced sales-below-cost law in a state tends to reduce the number of multimarket chains operating in the state. As such, the number of multimarket chains in a market is influenced, in a positive causal sense, by SBC laws that are effectively enforced. Conversely, multimarket chains, which possess an inherently greater potential for predation and other anticompetitive conduct, are discouraged from operating in states with SBC laws. Not surprisingly, therefore, the addition of the multimarket chain variable in an equation has the most pronounced affect on the regression coefficient

and statistical significance of the "high" enforcement variable. Although equations 3a-3d are of some interest, we believe equations 1 and 2 provide the most unequivocal test of whether SBC laws affect industry structure.

In sum, these findings support the hypotheses that sales-below-cost laws, when effectively enforced, result in more competitively structured markets. It also supports the hypothesis that increases in the number of multimarket chains tends to increase market concentration.

C. Impact of the Wisconsin sales-below-cost law on warehouse store operations

An alternative method of evaluating the effectiveness of sales-below-cost laws is to examine their impact on retailers whom the laws might be expected to affect most directly and adversely. One such group is grocery warehouse store operators. The experience of grocery warehouse store operators seems particularly relevant for several reasons. These stores represent the most important cost-reducing innovation in grocery retailing since the introduction of the supermarket in the 1930's. Operating with gross margins between 10 percent and 15 percent, warehouse store prices average at least 5 percent to 10 percent below the prices of conventional supermarkets.⁴² Warehouse stores are a recent innovation in the United States, dating from around 1970 in Minnesota and Wisconsin⁴³ and from the mid- to late-1970's in most other states.

Insofar as sales-below-cost laws prevent prices from reflecting lower costs, as some commentators argue,⁴⁴ one would expect that the laws would especially inhibit warehouse stores with their lower margins. Also, if the laws tend to retard entry because they prevent newcomers from engaging in strategies such as loss leader pricing that allegedly are essential to attract new patrons, one would expect the laws to have especially adversely

affected the entry and subsequent expansion of warehouse stores.

To provide insight on these matters the authors surveyed all known grocery warehouse store operators in Wisconsin in 1982 to obtain information regarding their experience with and opinions of the Wisconsin law, which has a 6 percentage markup. In addition to objective evidence of their operations, specifically their sales size, growth, and gross margins, we inquired as to their familiarity with the law, its affect on their pricing practices, its affect on their entry, their experience in complying with the law, their opinion of past and recent public enforcement of the law, and whether they believed the law should be repealed, amended, or maintained.

Of the 15 known grocery warehouse store operators in Wisconsin in 1982, survey information was received from 13.⁴⁵ These 13 operators ran 55 retail grocery warehouse stores in Wisconsin in 1982. The first of these stores was opened in 1972; in 1976 there were 10 stores and in 1978 there were 20 stores. Seven respondents each operated one store in 1982; three respondents each operated from two to three stores; and three operators had ten or more stores each. Combined total sales for the stores were about \$660 million in 1982. Of the 55 stores one had a gross margin between 10 and 11.9 percent in 1982; 31 were at 12 to 13.9 percent, and 23 operated on gross margins from 14 to 15.9 percent.

All warehouse store operators were familiar with selling below cost strategies and with the Wisconsin sales-below-cost law. Seven operators indicated that incumbents responded to their entry with selective selling at prices below cost. None reported deep, prolonged below cost selling in response to their entry. Nine operators encountered below cost selling after having made entry. With respect to the sales-below-cost law, 12

respondents thought the law limited the amount of below cost selling competitors undertook; one did not. Nine felt, however, that the law only deterred some below cost selling; three felt the law deterred much below cost selling. Several respondents noted that while the law may not deter all below cost sales, it does deter the full scale price war.

The respondents' views on the law's effectiveness tended to reflect recent experience with the law. A general consensus was that in recent years noncompliance has become widespread. A number of respondents attributed this to the entry of large competing warehouse stores of large multi-market firms that have undertaken below cost selling strategies and the inability of state enforcement authorities to control the situation.⁴⁶ Despite their dissatisfaction, though, nine said the law should not be repealed; two said it should be repealed; and two had no opinion. Three said that amending the law would make it more effective.⁴⁷

Overall, warehouse operators' responses indicate that the Wisconsin law does not interfere with their ability to compete. Twelve respondents answered that the law does not reduce their flexibility in pricing; one said it does. The same 12 also disagreed with the notion that the law interferes with their ability to make effective use of advertised specials. Instead, these 12 indicated that, when enforced, the law enhances their ability to compete more effectively because it prevents large competitors from using advertised specials as loss leaders. None believed--correctly--that the law prevents meeting a competitor's price. Twelve disagreed with the contention that the law interferes with efficient operations. All but one of the respondents answered that the law permits the operator to compete more effectively because it prevents large competitors from selling below their costs. Eleven respondents did not think the six percent markup

is too high; one said it is; one had no opinion. In terms of mechanics, twelve operators expressed no problem with complying with the law.⁴⁸ On balance, 10 respondents indicated that at least in the past the law was helpful in terms of their ability to compete; one said the law was harmful; two said the law had no effect.

These survey results support the hypothesis that sales-below-cost laws promote rather than inhibit price competition. Several observations are particularly significant. First, practically all respondents expressed the view that the law does not interfere with their pricing flexibility or with efficient operations. Second, the percentage markup over delivered cost substantially understates the cost of doing business. At a 6 percent markup, the Wisconsin law--at most--serves to limit the losses a firm can incur in trying to establish itself or to dislodge a competitor. Finally, the views expressed probably reflect the fact that the Wisconsin law has been enforced to a greater extent than in all other states except, perhaps, for Minnesota.

The findings regarding experience with Wisconsin's sales-below-cost law reinforce the findings from the econometric analysis. The survey of state enforcement officials identified Wisconsin as one of only two states--the other being Minnesota--that had made a significant commitment to enforce these laws. This enforcement has extended over several decades. It is probably therefore significant that warehouse store operators in Wisconsin and Minnesota were among the earliest and most successful of such stores in the nation. The first stores in these states opened around 1970. Unlike experience in many other markets, new warehouse store entrants in these states have not been subjected to deep, prolonged below cost selling, although some operators reported they experienced some below cost selling

when they first opened. This may well explain why warehouse stores have flourished in both states. In 1984 warehouse stores did about 47 percent of the business in Minneapolis-St. Paul and 46 percent in Milwaukee.⁴⁹ Warehouse stores also do a sizable share of business in all medium size cities in Wisconsin and in a number of quite small cities.

IV. Conclusions

The econometric evidence in this study supports the following hypotheses: SMSAs in states with sales-below-cost laws have lower levels of leading firm concentration than in SMSAs in states without the laws. The market share of less dominant firms is larger in SMSAs in sales-below-cost jurisdictions than in jurisdictions without the law. Among SMSAs in states with the law, the level of concentration among the top firms is lower and among the smaller firms is larger the more aggressively the law is enforced. The laws do not appear to protect small, inefficient grocery retailers. Finally, the analysis supports the hypothesis that increases in the number of multimarket firms capable of engaging in predatory and lesser kinds of anticompetitive conduct tend to increase market concentration. There also is evidence that such firms are less likely to operate in states with effectively enforced sales-below-cost laws.

These results are subject to a number of qualifications. First, we must emphasize that our characterization of states as having had a low, moderate, or high level of enforcement depends on enforcement officials' 1983 recollection of past enforcement activity. Second, we ignore the effects of private enforcement. Some states may have had more private than public enforcement. Third, we have avoided saying that sales-below-cost laws are solely responsible for lower levels of concentration found in

states with the laws. States with a law or with more active enforcement might also have had complementary laws or might have had more aggressive consumer protection or antitrust divisions that have contributed to more competitive markets. We know of no state, however, that uses its antitrust laws to challenge predatory pricing or other anticompetitive practices in grocery retailing. Nor is it apparent how comparative pricing or consumer protection programs might significantly impact on market structure in grocery retailing.

Recognizing these qualifications, market concentration in states with the law differed considerably from concentration in states without the law. The observed difference in concentration in the Herfindahl equations is substantial. The mean Herfindahl Index in the 234 SMSAs was 1,123. The model predicts that relative to no law, in SMSAs in states aggressively enforcing the sales-below-cost law the Herfindahl would have been 305 points lower than the mean adjusted for market size (eq. 2a).

The potential significance of lowering the Herfindahl by this magnitude is apparent when viewed in the context of the Department of Justice merger guidelines.⁵⁰ The Department generally considers markets with a post-merger Herfindahl below 1,000 as "unconcentrated" and "will not challenge mergers falling in this region, except in extraordinary circumstances."⁵¹ On the other hand, the Department considers markets with a Herfindahl between 1,000 and 1,800 as being in the region "at which the competitive concerns associated with concentration are raised to the point at which they become quite serious"⁵² Absent special circumstances, the Department will challenge mergers in this region producing an increase in the Herfindahl of more than 100 points.⁵³ When the Herfindahl exceeds 1,800, the Department is particularly sensitive to merger activity.

It will challenge mergers increasing the Herfindahl by more than 50 points unless special conditions exist.⁵⁴ From these guidelines it is therefore apparent that a 300 point difference in the Herfindahl can represent a substantial difference in a market's competitive environment.

It would be a serious oversight, however, to measure the potential impact of sales-below-cost laws solely in terms of their relationship to market concentration. Of considerable importance as well is their potential effect on strategically created entry barriers even when concentration is not different among jurisdictions. Simply put, if the laws deter predatory conduct, they tend to make markets more subject to effective challenge. Even if actual entry does not materially lower concentration in these markets, competition in the marketplace may be enhanced. Survey evidence from Wisconsin grocery warehouse store operators supports this argument. Rather than interfering with efficient operations, the Wisconsin law only limits the losses a firm can incur in trying to establish itself or to dislodge a competitor. The rapid and extensive entry and growth of warehouse stores in Wisconsin and Minnesota--the two states with the most strictly enforced sales-below-cost laws--further support the expectation that the laws lower strategically created entry barriers.

The policy implications from our study are straightforward. States having sales-below-cost laws had more competitively structured retail grocery markets in 1977 than did states that never had the law. Because sales-below-cost laws, at most, define a price floor tied to the most efficient firm's costs, this evidence on market structure is consistent with competitive performance in grocery retailing in these states. The evidence concerning the affect of the Wisconsin sales-below-cost law on grocery warehouse stores is directly contrary to the assertion of those who

believe such laws "might well eliminate an entire class of retailers, i.e., discounters."⁵⁵ The evidence presented here places a burden of proof on those seeking repeal of these laws: They must demonstrate affirmatively that effective competition requires that food retailers sell some or many products at prices far below marginal costs.⁵⁶ Absent alternative solutions, our findings counsel against the repeal movement of the 1970's and 1980's.⁵⁷ But having a law is not enough. The more actively states enforce the law, which most likely requires greater awareness of the law's long-run potential benefits for consumers, the more significant the relationship between the law and competitive markets.

Notes

* This is a revised and expanded version of the paper appearing in September, 1984. The main substantive change is the inclusion of the material on grocery warehouse store operations, pages 17-21.

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We express our appreciation to Frederick Geithman, Bruce Marion, and Liz Schiferl for their criticisms and assistance.

1. Ark. Stat. Ann. § 70-303 (1979);
- Cal. Bus. & Prof. Code §§ 17000-17100 (West 1964 and Supp. 1984);
- Colo. Rev. Stat. §§ 6-2-101 - 6-2-117 (1973 and Supp. 1983);
- Hawaii Rev. Stat. §§ 481-1 - 481-11 (1976);
- Idaho Code §§ 48-401 - 48-413 (1977 and Supp. 1984);
- Ky. Rev. Stat. §§ 365.020 - 365.070 (1971);
- La. Rev. Stat. Ann. §§ 51:412 - 427 (West 1965);
- Me. Rev. Stat. Ann. tit. 10 §§ 1201 - 1207 (1980 and Supp. 1984);
- Md. Com. Law Code Ann. §§ 11-401 - 406 (1983);
- Mass. Gen. Laws Ann. ch. 93, § 14E-K (West 1974);
- Minn. Stat. §§ 325D.01 - 325D.08 (1981);
- Mont. Code. Ann. §§ 30-14-201 - 30-14-224 (1983);
- N.D. Cent. Code §§ 51-10-01 - 51-10-14 (1981);
- Okla. Stat. tit. 15, §§ 598.1 - 598.11 (1965);
- 73 Pa. Cons. Stat. §§ 211 - 217 (1971);

R.I. Gen. Laws §§ 6-13-1 - 6-13-8 (1969);
 S.C. Code Ann. § 39-3-150 (Law. Co-op. 1976);
 Tenn. Code Ann. §§ 47-25-201 - 47-25-206 (Supp. 1979);
 Utah Code Ann. §§ 13-5-1 - 13-5-18 (1972 and Supp 1983);
 W. Va. Code §§ 47-11A-1 - 47-11A-7 (1980 and Supp. 1983);
 Wis. Stat. § 100.30 (1982);
 Wyo. Stat. §§ 40-4-101 - 40-4-116 (1977 and Supp. 1984).

2. We refer to the laws as sales-below-cost laws because that label avoids any confusion that might come either from thinking that minimum-markup laws require all sellers to mark up merchandise by a given amount or from erroneously equating these laws with resale price maintenance statutes.

For a detailed legal-economic analysis of sales-below-cost laws, see Paterson and Mueller, "State Sales-Below-Cost Laws: A Legal-Economic Analysis of Effectiveness" (N.C. 117 Working Paper No. 80, University of Wisconsin-Madison, Sept. 1984) [hereinafter cited as Paterson and Mueller].

3. E.g., Arkansas, Colorado, and Kentucky.

4. Delivered cost refers to invoice cost on merchandise plus any costs associated with delivering the product to the store for sale.

5. E.g., Massachusetts, Oklahoma, and Wisconsin.

6. E.g., California, Idaho, and Wisconsin

7. Leed and German, Food Merchandising Principles and Practices at 124-28 (1973).

8. See note 13 infra for our definition of anticompetitive conduct.

9. For example, in a metropolitan area the size of Milwaukee, a conventional supermarket operator with sales of \$15 million would have a market share of 1 percent. If these operators sought to match the adver-

tising effort of a leading firm with a 30 percent market share, the smaller operators would have to spend 30 times as much per dollar of sales as the leading firm. Because of this cost disadvantage, smaller operators could not hope to match the newspaper and electronic media advertising of their larger competitors.

It is generally acknowledged that the existence of substantial economies of scale in advertising constitute a major barrier to entry in food retailing. Moreover, the real economies of large-scale advertising are magnified by the existence of volume discounts often granted by newspapers to their largest customers. B. Marion, W.F. Mueller, R. Cotterill, F. Geithman, and J. Schmelzer, The Food Retailing Industry: Market Structure, Profits and Prices at 26-27 (1979) [hereinafter cited as Food Retailing Industry].

10. Generally researchers use a binary variable, assigning a one when the unit of observation is in a jurisdiction with the law and a zero otherwise. Houston, "Minimum Markup Laws: An Empirical Assessment," 57 J. Retailing 98 (Winter 1981); Cook, Deiter, and Mueller, "The Effects of Wisconsin's Minimum Markup Law" (Staff Paper Series No. 62, Dept. of Agri. Econ., University of Wisconsin-Madison, May 30, 1973) [hereinafter cited as Cook, et. al.].

11. In following this approach and without explaining the basis for his hypothesis, Houston found that sales-below-cost laws did not explain variation in either the number of sole proprietors and partnerships or their proportion to all stores in states having the law in 1977. He did this for aggregate retail trade and individually for grocery stores, apparel stores, variety stores, automobile dealers, furniture stores, and liquor dealers. Based on these results, he concluded that repeal would not

be a detriment to small retailers. 57 J. Retailing at 106-12. Houston does not distinguish between different levels of enforcement among states. Also, he mistakenly excludes states that had a sales-below-cost law for many years immediately prior to 1977 but not in 1977.

12. Cook, et. al., found that the law explained variation in the share of business done by grocery chains in 1967. Grocery chains in states with the law controlled a smaller share of business than in states without the law. Based on this and other evidence, they concluded the law had been effective in deterring concentration in retail grocery sales. Cook, et. al., supra note 10. The Cook, et. al., finding supports effectiveness but it failed to distinguish between effects in states which enforce the law and those states which do nothing to enforce the law. They also found that the gross margins of single-unit supermarkets in Wisconsin were smaller than the gross margins of these operators nationally. From this they inferred that the Wisconsin law did not protect small operators to such an extent as to result in higher operating margins. Id.

13. We refer to pricing conduct that tends to increase concentration for reasons other than efficiency or competition on the merits as anticompetitive pricing and sometimes simply as predatory conduct. The concept includes such anticompetitive strategic behavior as deceptive, loss-leader pricing supported by advertising that has the capacity to restructure markets as well as practices reaching the level of predatory pricing as defined by economists. See Joskow and Klevorick, "A Framework for Analyzing Predatory Pricing Policy," 89 Yale L.J. 213 (1979). Empirical evidence demonstrates that in grocery retailing a firm may benefit from strategic conduct that restructures a market even when it does not give the firm the market dominance required for a successful attempt to monopolize

under Section 2 of the Sherman Act. See Mueller "Alleged Predatory Conduct in Food Retailing," N.C. 117 Working Paper 76, University of Wisconsin-Madison, September 1984.

14. Variable costs of conventional supermarkets account for over 50 percent of in-store costs. Thus, a store that marked up all of its products an average of 6 percent might cover as little as 60 percent or less of its variable costs. See Mueller, supra, at appendix B.

15. Joskow and Klevorick, supra note 13. These and other economists argue that while selling below average variable costs is a sufficient condition for predatory pricing it is not a necessary condition since under certain conditions predation may also occur at prices above average variable costs and even at prices above average total costs.

16. The historical trend in grocery retailing in most SMSAs has been toward increased concentration. Food Retailing Industry, supra note 9, at 14-15.

17. The point is that, for whatever reason, the law is no longer enforced.

18. Food Retailing Industry, supra note 8, at 95-129; Lamm, "Prices and Concentration in the Food Retailing Industry," 30 J. Indus. Econ. 67 (1981); Hall, Schmitz, and Cothorn, "Beef Wholesale-Retail Marketing Margins and Concentration," 46 Econometrica 395 (1979); Cotterill, "Market Structure-Price Relationships in Vermont Food Retailing Markets" (N.C. Project 117 Working Paper #83, U.W.-Madison, November 1984).

19. Data in this study are from a special Census tabulation prepared for the Federal Trade Commission.

20. The Herfindahl Index is a summary concentration measure reflecting market share and dispersion of market share among firms. The market

Herfindahl is the sum of each firm's squared market share; for the largest four firms the Herfindahl is the sum of each's squared market share. If there were five firms in a market and one firm had 40 percent of sales and each of the other firms had 15 percent, the Herfindahl would be 2500. If, instead, the same five firms each had 20 percent of the market, the Herfindahl would be 2000. The difference reflects the disparity of market power in the first example. See F. Scherer, Industrial Market Structure and Economic Performance at 58-59 (2d ed. 1980) [hereinafter cited as Scherer]. We measure the Herfindahl using 234 SMSAs.

21. For this reason, the U.S. Department of Justice uses the Herfindahl Index in assessing the competitive impact of horizontal mergers. [Jan.-June] Antitrust and Trade Reg. Rep. (BNA) No. 1169, at S-1, S-5 (June 14, 1984) [hereinafter cited as Merger Guidelines].

22. Scherer, supra note 20, at 81-84.

23. As indicated in note 9 supra, one of the most important economies of scale in large markets is advertising advantages for firms with a large market share. In small markets, the size required to operate an efficient supermarket or warehouse store is the major determinant of the number of firms in the market.

24. See note 10 and accompanying text supra.

25. See notes 11 and 12 and accompanying text supra.

26. The 1970's cut-off excludes SMSAs in Kansas--which repealed its law in 1961. During the early 1970's, Connecticut (1973), Nebraska (1972), New Hampshire (1977), New Jersey (1975) and Oregon (1975) each had a sales-below-cost law which was declared unconstitutional or repealed or both. Paterson and Mueller, supra note 2, at Table 1.

27. Most states authorize both public and private enforcement. Paterson and Mueller, supra note 2, at Table 5.

28. Questionnaires on enforcement and effectiveness of state sales-below-cost laws were sent to 25 states. All states having the law in 1983 also had the law in 1977. Some response was received from all states but Louisiana, Rhode Island, and Tennessee. Oklahoma, South Carolina, and Virginia declined to provide any response due to limited staff time. The most complete answers were received from Arkansas, California, Colorado, Hawaii, Idaho, Minnesota, Montana, Washington, West Virginia, Wisconsin, and Wyoming.

29. See note 26 supra.

30. Id.

31. R. Posner, Antitrust: An Economic Perspective 185-86 (1976).

32. These data were calculated by the Bureau of the Census in a special tabulation prepared for the Federal Trade Commission and the U.S. Department of Agriculture. Grinnell, Parker, and Rens, Grocery Retail Concentration in Metropolitan Areas, Economic Census Years 1954-1982, Bureau of Economics, Federal Trade Commission, 1979. In another study, Cotterill and Mueller use the number of the top 22 national firms operating in each market. "The Impact of Firm Conglomeration on Market Structure: Evidence for the Food Retailing Industry," 25 Antitrust Bull. 557, 572-73 (1980). It was not possible to develop this information for all the markets used in this study. A further possibility would be a variable indicating the change over time in the number of multi-market firms rather than the number in a given year. Necessary data are not available, however.

33. See Cook supra note 10 at 24-25.

34. A 1 percent level of significance means that the probability of the specified equation having only a random effect on the dependent variable is less than 1 percent.

35. Although our methods and data are different, these findings are consistent with those of Cook, et. al., supra note 11.

36. For the fifth through eighth largest firms, market share was statistically slightly higher than in states without the law.

37. See text corresponding to note 12 supra.

38. These SMSAs were in Idaho, Maine, Montana, Washington, and West Virginia.

39. See note 26 supra.

40. This SBC-Repeal coefficient is not statistically different from the coefficient on a high level of enforcement.

41. This finding is similar to that of Cotterill and Mueller who used more precise proxies for extra-market resources in a data set with fewer observations. "The Impact of Firm Conglomeration on Market Structure: Evidence for the Food Retailing Industry," 25 Antitrust Bull. 557, 577 (1980).

42. Mueller estimates that grocery warehouse stores saved Milwaukee area consumers about \$51 million in 1983. "Alleged Predatory Conduct in Food Retailing" (N.C. 117 Working Paper No. 76, University of Wisconsin-Madison, Sept. 1984).

43. The first warehouse store in Minnesota, Cub Markets, opened about 1968. Super Valu Stores acquired its six stores in 1980. Supermarket News, July 21, 1980, at 46. The authors believe that the first warehouse store in Wisconsin was opened in 1972.

44. Sales-below-cost laws define the cost below which price is not to be set in two basic ways. Some states enumerate the costs, using a fully allocated approach. To invoice cost is added an allocation for labor and salaries, rent, interest on borrowed capital, depreciation, selling cost, equipment, credit losses, license fees, taxes, insurance, advertising, and other fixed or incidental expenses. Most states, perhaps recognizing that such an allocation is unreasonable, opt for a percentage markup to determine the cost of doing business. Absent proof of a lesser cost, a firm is not to set price below the sum of invoice cost, delivery charges, and a percentage of delivered cost. The percentage at retail is usually set at 6 percent. Commentators have continued to argue that (1) since the percentage markup is so much easier to determine, retailers will not even try to set price according to actual costs of doing business, but (2) this has the effect of artificially keeping price above cost, especially for the more efficient retailer. These arguments are reviewed in Paterson and Mueller, supra note 2.

45. The two non-respondents were large warehouse operators with sales per store exceeding \$20 million annually. A mail survey was sent to all operators and, in five instances, was followed up with a telephone or personal interview of the respondent. Copies of the confidential questionnaire are available from the authors.

46. Twelve operators advocated increased funding for state enforcement. In 1982, Wisconsin allocated more to enforcement than any other state that responded to the authors' enforcement official survey. Wisconsin spend \$37,360.88. Minnesota allocated the second most, \$23,000.

47. One respondent recommended eliminating provisions for criminal liability. Another suggested tying the severity of monetary forfeitures to

the number of violations with a jail term for the C.E.O. on the third offense. See also Paterson and Mueller, supra note 2.

48. Though not difficult to determine cost, a number of operators advised that they had sold below cost in order to meet a competitor's prices.

49. Supermarket News, Market Profiles, 1984 at 28, 32 (July 30, 1984).

50. Merger Guidelines, supra note 21.

51. Id. at S-5.

52. Id.

53. Id.

54. Id.

55. In an amicus curiae brief the Federal Trade Commission argues that the Oklahoma Unfair Sales Act is in conflict with the federal antitrust laws. Snyder v. Wal-Mart Stores, (N.D. Okla. 1984) No. 84-C-436-E. The Oklahoma statute is very similar to the Wisconsin statute, including a requirement that retailers markup prices a minimum of 6 percent. The FTC brief says, in part, "[s]ystematic enforcement of the Oklahoma Act might well eliminate an entire class of retailers, i.e., discounters. The growth of discount retailers in recent years has had a substantial procompetitive effect on many retail industries including clothing, food, and consumer electronics...." FTC brief at 16.

The Oklahoma case involves a discount drug chain rather than food retailing. But since drug stores have historically had higher markups than food retailers, it follows that a minimum markup of 6 percent is less likely to interfere with pricing flexibility of drug store retailers than of grocery retailers.

56. See note 13 supra.

57. In addition to the states indicated in note 26 supra, the following states have repealed their statutes: Arizona (1982), Texas (1983), Virginia (1984), and Washington (1983).

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