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## THE RETAIL PRICE EFFECT OF THE KENTUCKY AND TENNESSEE MILK MARKETING LAWS

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### Abstract

Retail prices of milk in Kentucky and Tennessee are compared following the abolishment of Kentucky's Milk Marketing Law. Data and comparisons are also presented from the six adjacent states having no milk marketing law.

*Key words:* milk, prices, retail competition, regulation.

The abolishment of the Kentucky State Milk Marketing Law in 1983/84 provided an opportunity for the authors to test their conclusions from an earlier study concerning the effect of the State Milk Marketing Law on retail prices of milk. Results of both studies, as well as new research questions raised in the second study, are summarized here.

### THE INITIAL STUDY

The market for milk and milk products in the United States has a long history of federal and state intervention. Federal intervention has, for the most part, influenced the farm price of milk, while state intervention has tended to focus on the retail price of milk. At the state level, the range of control measures has been quite wide, encompassing, among other things, (1) prohibition of sales below cost, (2) specification of minimum mark-ups, (3) outright dictation of prices, and (4) prohibition of predatory practices. A number of studies have tried to assess the impact of state milk-marketing laws on the retail price of milk (Bartlett; Masson and DeBrook; Shaw et al.; Knutson). Results of the studies have been varied, as one would expect, but the preponderance of evidence seems to suggest that the state laws do indeed have the result of elevating retail prices above competitive levels. Estimated magnitudes of the eleva-

tion depend largely upon the type of regulation imposed.

The Kentucky Milk Marketing Law could best be described as legislation designed to regulate trade practices, including a prohibition of sales at prices below cost. In 1981, the authors were commissioned by the Kentucky Department of Agriculture to estimate the impact of the Kentucky Law on the retail price of milk in Kentucky (Thompson and Edwards, 1981). A three-pronged approach to the question was used. First, we simply analyzed the law, as well as the composition of the commission charged with enforcing the law, to infer, through common sense, whether or not prices would tend to be elevated through reduced competition or through retailer-inhibiting regulations. Our conclusion from this analysis was that the law would certainly inhibit a retailer's pricing freedom and would likely reduce price competition in the market as well. Furthermore, the commission was composed mainly of people having an economic stake in the dairy industry. There were no members of the commission whose backgrounds would lead them to be concerned first and foremost with the interests of consumers (Thompson and Edwards, 1985).

Second, a random sample of 87 store managers was surveyed to either support or refute the working hypothesis that the law would tend to inhibit retailers' pricing freedom. It was obviously the perception of a large proportion of retailers that the Milk Marketing and Antimonopoly Commission did, in practice, have the power to set or strongly influence retail prices of milk. Retailers also indicated that their freedom to make and change prices for milk was highly restricted by the commission. (The questionnaire and summary of responses are re-

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Third, a random sample was taken of retail milk prices from 144 grocery stores in Kentucky and five adjacent states—Tennessee, West Virginia, Ohio, Indiana, and Illinois. Kentucky and Tennessee had virtually identical milk marketing laws, while the other states had none (details of the sample construction are presented in Thompson and Edwards, 1981). Six products were sampled:

- $P_1$  = price of whole milk in gallons,
- $P_2$  = price of two-percent milk in gallons,
- $P_3$  = price of skim or low-fat milk in gallons,
- $P_4$  = price of whole milk in half-gallons,
- $P_5$  = price of two-percent milk in half-gallons, and
- $P_6$  = price of skim or low-fat milk in half-gallons.

The question then arose as to whether any observed differences in retail prices between the law and non-law states could be wholly or partially explained by differences in farm-level prices. The farm-level price is influenced by a range of factors including transportation costs from the Minnesota-Wisconsin market area, production cost differentials, over-order premiums negotiated by the dairy cooperatives, and the utilization rate of Class I milk. A number of studies have addressed the effects of these factors upon raw milk prices (*Federal Milk Marketing Orders and Price Results*; Hallbert and King; Babb et al.), and the empirical results vary considerably.

Without trying to isolate these individual factors and estimate their magnitudes, we followed a conservative approach and adjusted the sampled retail prices for the difference between the average prices received by farmers in the two law states, Kentucky and Tennessee, versus the six-state average. This resulted in a small decrease in the prices of Kentucky and Tennessee. We also adjusted the sampled retail prices in the four non-law states, West Virginia, Illinois, Indiana, and Ohio, in the same way, and this resulted in a small increase in the prices in the non-law states. Table 1 shows the average farm price of milk in dollars per cwt and the adjustment multipliers used. The Kentucky multiplier, for example, was calculated as  $13.75/13.80=.996$  and was then multiplied by every Kentucky retail price. Tennessee and the non-law states were handled in a similar fashion. This approach in effect assumes that the difference in retail prices between the law and non-law states can be broken into two parts—

TABLE 1. ADJUSTMENT MULTIPLIERS FOR THE PRICE DATA

	1982 <sup>a</sup> \$/cwt	Adjustment Multiplier
Kentucky	13.80	.996
Tennessee	13.90	.989
NON-LAW STATES (AVE)	13.70	1.004
SIX-STATE AVERAGE	13.75	
Six-state Average		

<sup>a</sup>Source: U.S. Department of Agriculture, Statistical Reporting Service, Crop Reporting Board. *Prices Received by Farmers: Livestock, Dairy, and Poultry, by State and United States, 1978-82*. Statistical Bulletin No. 727.

one part due to the existence of the state milk marketing law and the other part due to those factors mentioned above, which impinge upon the farm price of milk. The multiplier then removes the effect of the second part from the retail prices.

After determining that the adjusted retail prices in Kentucky were not statistically different from those in Tennessee, we regressed the adjusted retail prices for the six milk products on a dummy variable for law and dummy variables for store type.<sup>1</sup> Results of the regressions for the six milk categories surveyed are presented in Table 2. Our empirical evidence suggested that the retail price of milk was elevated due to the state milk marketing law by \$.16 to \$.21 for gallon containers and \$.06 to \$.09 for half-gallon containers. Coefficients on the dummy variable for law were all highly significant, although coefficients of determination were not impressively high. These results suggest that the state milk marketing laws elevated milk prices by some 5 to 11 percent.

## THE SECOND STUDY

In 1983, circumstances fortuitously permitted an assessment of the accuracy of the conclusions of the first study. The Kentucky Milk Marketing Law became inoperative when it was invalidated by the Franklin Circuit Court. Tennessee's law, on the other hand, remained in effect, and the four non-law states remained as they were. In order to take advantage of this opportunity, we conducted another price survey, and in order to minimize managerial differences and other variations across stores, we revisited, to the extent possible, the very same stores that had been surveyed in 1981. Of the

<sup>1</sup>Store types included were (1) national/regional chains, (2) local chain supermarkets, (3) independent non-chain supermarkets, (4) chain convenience stores, and (5) independent convenience stores (typically "mom-and-pop operations").

TABLE 2. REGRESSION RESULTS FOR 1981 DATA<sup>a</sup>

Dependent Variable	Coefficient of D	t Statistic	n	Adjusted R <sup>2</sup>
P <sub>1</sub> = Price, whole milk, gallons	.1667	5.37	144	.2772
P <sub>2</sub> = Price, 2% milk, gallons	.1649	4.77	137	.2468
P <sub>3</sub> = Price, low-fat milk, gallons	.2114	5.29	95	.3101
P <sub>4</sub> = Price, whole milk, half-gallons	.0646	3.42	139	.2646
P <sub>5</sub> = Price, 2% milk, half-gallons	.0722	2.85	126	.2318
P <sub>6</sub> = Price, low-fat milk, half-gallons	.0857	3.62	105	.2980

<sup>a</sup>Functional Form:  $P_j = \alpha + \beta D + \xi_j S_j$ ,  $j = 1, \dots, 4$ , where  $D = 1$  for law state, 0 otherwise; and  $S_j$  = dummy variables to control for store type.

TABLE 3. SUMMARY OF MILK PRICE SAMPLE DATA

Variable	1981 SAMPLE			1986 SAMPLE			% CHANGE IN MEANS	
	MEAN	S.D.	n	MEAN	S.D.	n		
ALL STATES (KY, TN, IL IN, WV, OH)	P <sub>1</sub>	2.2120	.2122	144	2.1023	.2850	163	-4.959
	P <sub>2</sub>	2.0712	.2260	137	1.9372	.3093	155	-6.470
	P <sub>3</sub>	1.9360	.2259	95	1.7481	.3101	108	-9.706
	P <sub>4</sub>	1.2563	.1249	139	1.3145	.1589	158	4.633
	P <sub>5</sub>	1.2377	.1574	126	1.2536	.1616	151	1.285
	P <sub>6</sub>	1.2154	.1376	105	1.2395	.1850	111	1.983
KENTUCKY ONLY	P <sub>1</sub>	2.2663	.1841	67	2.0915	.2922	89	-7.713
	P <sub>2</sub>	2.1095	.2002	66	1.9146	.2870	83	-9.239
	P <sub>3</sub>	1.9967	.1767	45	1.7908	.2917	61	-10.312
	P <sub>4</sub>	1.2922	.0948	63	1.3439	.1578	85	4.001
	P <sub>5</sub>	1.2751	.1324	57	1.2915	.1465	82	1.286
	P <sub>6</sub>	1.2580	.1322	49	1.2914	.1923	59	2.655
TENNESSEE ONLY	P <sub>1</sub>	2.2956	.1947	27	2.3488	.1702	26	2.317
	P <sub>2</sub>	2.2083	.1840	23	2.2550	.1939	26	2.115
	P <sub>3</sub>	2.0665	.2025	17	1.9057	.2452	14	-7.781
	P <sub>4</sub>	1.2685	.1317	27	1.3512	.1224	26	6.520
	P <sub>5</sub>	1.2418	.1859	22	1.2873	.1513	22	3.644
	P <sub>6</sub>	1.2274	.1456	19	1.2500	.1257	14	1.841
OTHER STATES (IL, IN, WV, OH)	P <sub>1</sub>	2.0942	.2089	50	1.9890	.2403	48	-5.023
	P <sub>2</sub>	1.9529	.2258	48	1.7985	.2782	46	-7.906
	P <sub>3</sub>	1.7861	.2214	33	1.6021	.3183	33	-10.302
	P <sub>4</sub>	1.2035	.1386	49	1.2411	.1570	47	3.124
	P <sub>5</sub>	1.1904	.1618	47	1.1719	.1643	47	-1.554
	P <sub>6</sub>	1.1530	.1192	37	1.1550	.1628	38	.173

original 144 stores in the 1981 sample, 84 were included in the 1986 sample, and 79 new stores were added for a total of 163 stores in the 1986 sample. Summary statistics from the two samples are presented in Table 3 (these are raw data without adjustments).

With respect to gallon prices, the data generally support conclusions that would be predicted by economic theory. Milk prices for gal-

lons in the non-law states appeared to drift downward between 1981 and 1986 by 5 to 10 percent in nominal terms. Gallon prices in Kentucky, the state that converted from law to non-law status, fell most dramatically of all the states between 1981 and 1986, falling by 7 to 10 percent and converging somewhat upon the gallon prices of other non-law states, a result that would be expected if the Kentucky Milk

Marketing Law had artificially supported prices in 1981. Tennessee, on the other hand, had a much different price pattern between the two years. Two of the three gallon prices actually rose, in contrast to the other states, while the third gallon price,  $P_3$ , did not fall as much as in other states. These results support the hypothesis that the milk marketing laws in Kentucky and Tennessee did, in fact, elevate prices above levels that would exist without the law.

The data for half-gallons seem to suggest that the Milk Marketing Laws of Kentucky and Tennessee may not have been very effective in raising retail prices. Half-gallon prices in Kentucky actually rose by 1 to 4 percent between 1981 and 1986 while those of Tennessee rose by about 2 to 6.5 percent. In the absence of artificial price elevation due to the milk marketing laws, the differences in price movements between gallons and half-gallons would presumably be explained by differences in demand and supply elasticities, but we had no quantity data broken down by container size to support an estimate of such elasticities.

Since the data of Table 3 do not control for differences in store type nor do they screen out differences in farm-level prices, we ran the same regression on the 1986 sample that we ran on the 1981 sample except that this time Kentucky was considered to be a non-law state, leaving Tennessee as the only law state. We also adjusted the 1986 data with the same multipliers we used earlier. Unfortunately, we did not have 1986 average farm price data from which to develop new multipliers, but it is doubtful that the multipliers would have changed much anyway. Results of this regression are presented in Table 4.

### COMPARISON OF THE TWO RESULTS AND CONCLUSIONS

Statistical results for milk sold in gallon containers seem to be consistent in direction with

our earlier findings, but we apparently underestimated the magnitude of the impact of the state milk marketing laws in elevating retail prices. In the second regression, the estimates for price elevation ranged from \$.21, or 12 percent, for low-fat milk to \$.38, or 20 percent, for two-percent milk in gallons, and all coefficients were statistically significant.

But the results for milk sold in half-gallons are inconclusive, as also suggested in Table 3. What then explains the lack of a price response in half-gallons to the abolishment of the Kentucky Milk Marketing Law? It would seem that one of the following might be plausible:

1. the milk marketing laws in Kentucky and Tennessee had little effect on the price of milk in half-gallons;
2. sufficient time had not elapsed before taking the second sample to allow the prices of milk in half-gallons to react to the abolishment of the Kentucky Law; and/or
3. the interplay of demand and price elasticities for half-gallons was such that the equilibrium price did not change very much.

Without further research and the availability of quantity data on sales of milk by container size, it is impossible to isolate the explanation for the half-gallon results.

In summary, we believe that our original study (Thompson and Edwards, 1981) underestimated the impact of the Kentucky Milk Marketing Law in elevating the price of milk in gallons and that this impact was on the order of 12 percent to 20 percent. The latest study is inconclusive with respect to half-gallons. Since it seems safe to assume that by far the greatest quantity of milk moves through the gallon market, it follows that milk prices in general do tend to be elevated by the kind of milk marketing laws in effect in Tennessee and formerly in Kentucky. But are milk producers better off in the longer run as a result of the state milk

TABLE 4. REGRESSION RESULTS FOR 1986 DATA<sup>a</sup>

Dependent Variable	Coefficient of D	t Statistic	n	Adjusted R <sup>2</sup>
$P_1$ = Price, whole milk, gallons	.2762	5.02	163	.1719
$P_2$ = Price, 2% milk, gallons	.3750	6.46	155	.2261
$P_3$ = Price, low-fat milk, gallons	.2062	2.45	108	.1128
$P_4$ = Price, whole milk, half-gallons	.0262	.81	158	.0952
$P_5$ = Price, 2% milk, half-gallons	.0285	.81	151	.0977
$P_6$ = Price, low-fat milk, half-gallons	.0152	.29	111	-.0023

<sup>a</sup>Functional Form:  $P_i = \alpha + \beta D + \xi_j S_j$ ,  $j = 1, \dots, 4$ , where  $D = 1$  for law state, 0 otherwise; and  $S_j$  = dummy variables to control for store type.

marketing laws? This seems rather doubtful, as stated by Masson and Debrock:

... At the onset of regulation all firms benefit. Over time, entry and non-price competition drive profits back to [normal levels]. The next result is an enhanced capital value based on increased transitory returns to the initial market participants. However, regulation is retained to avoid the symmetric capital losses that would occur if markets were deregulated. Thus, the social costs continue while there is no current gain to the firms (p. 261). If the Masson and Debrock conclusion is cor-

rect and if our conclusion is correct, then the long-run gainers from state milk marketing laws such as those we've discussed are the factor owners who enjoy the enhanced capital values and the regulators who draw their income from administering the regulation. The long-run losers are consumers. Milk producers, while enjoying a temporary benefit at the outset of regulation, nevertheless are left in a neutral position in the long run. And all taxpayers are long-run losers because of the increased regulatory costs.

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