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The Structural Effects of State Regulation of Retail Fluid Milk Prices Author(s): Robert Tempest Masson and Lawrence Marvin DeBrock Source: *The Review of Economics and Statistics*, Vol. 62, No. 2 (May, 1980), pp. 254-262 Published by: The MIT Press Stable URL: <u>http://www.jstor.org/stable/1924752</u> Accessed: 10/03/2010 16:19

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## THE STRUCTURAL EFFECTS OF STATE REGULATION OF RETAIL FLUID MILK PRICES

Robert Tempest Masson and Lawrence Marvin DeBrock\*

#### I. Introduction

CONOMISTS have long recognized the desirable qualities of a competitive market. The milk industry, although it might appear to be a prototype competitive market, is far from competitive. This is due in part to locational factors and in part to a vast network of federal and state governmental regulations and controls. Over 95% of raw milk sales to processing plants are regulated, and in 1972 about a quarter of all wholesale and retail sales of fluid milk products, the concern of this paper, were regulated (USDA, 1972). As a result of increased interest in regulation in general, economists have become increasingly concerned with milk regulation.<sup>1</sup> Furthermore, some states have recently dropped wholesale and retail price regulation. The implications of these various government controls are important to both consumers and public policy makers.

Some studies have found that state retail price regulation leads to higher prices.<sup>2</sup> Economic theory also predicts that insulation from price competition may have significant effects on the number of participants and the efficiency of production in an industry. The previous studies have failed to consider the structural implications of wholesale and retail price regulation.

\* Cornell University and University of Illinois, respectively.

The authors would like to thank an anonymous reviewer for detailed and helpful comments.

<sup>1</sup> See, for instance, Buxton (1977) or Ippolito and Masson (1978) concerning raw milk regulation; Shaw (1973) concerning retail milk regulation; and Heien (1977) concerning a simultaneous treatment of raw milk price and retail milk price. Heien's study is concerned with regulatory programs affecting raw milk price whereas the present study takes such prices as predetermined and examines retail milk price regulations.

 $^2$  See, for example, Shaw (1973), Manchester (1974), or Bartlett (1965).

#### II. Objectives of Retail Price Regulation

Regulation of retail milk prices was first instituted in 1933 in an attempt to remedy various problems exacerbated by the Great Depression. Federal control of retail prices was extremely short-lived while such regulations at the state level have persisted in some states. The apparent motivation behind such regulation was protection of the public interest. It is currently argued that in order to continue protection of the public interest, regulation must be maintained. The argument asserts that regulation serves multiple purposes, the two most important being (1) deterrence of destructive price competition providing a stable market free of monopoly influences and (2) helping consumers by protecting extra services (such as home delivery) made possible by higher prices.<sup>3</sup>

Further examination of these goals lends doubt to the contention that they are in the public interest. We show that deterrence of price competition leads to higher prices and a less efficient market, contrary to the implications of the first point. We also find it doubtful that, if apprised of the full costs of such a program, society would vote in support of continued cross-subsidization of services.

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Received for publication July 20, 1978. Revision accepted for publication July 9, 1979.

This research was funded in part by the United States Department of Justice; however, the views expressed are solely those of the authors. This is not meant to represent, and should not be construed as representing, the policies or opinions of any agency of the U.S. government.

This paper notes the announced and implied objectives of state retail fluid milk price regulation. Application of the Chamberlinian monopolistic competition model will aid in heuristically contrasting unregulated and regulated equilibria. Empirically, a simultaneous equations model will be used to study the effects of regulation upon both the performance and structure of the fluid milk industry. Further, an estimate of the social cost of regulation will be deduced from the empirical results. Finally, the implications for public policy will be presented.

<sup>&</sup>lt;sup>3</sup> The list of arguments presented as "evidence" of the need for regulation is probably endless. For a more extensive listing and analysis of various reasons currently cited in support of regulation in the processed fluid milk industry, the reader is referred to our working paper.

The authors hypothesize that the basis for maintaining regulation, rather than being predicated upon ideals of efficiency, may be found by looking at the milk processing industry's own interests. Regulation serves to insulate the industry from competition; it is desired by industry members to enhance their own interests. Added evidence in favor of this hypothesis is provided by the events of California in early 1977 (*Wall Street Journal*, Feb. 3, 1977). During hearings on a proposed reversal of the state's retail price laws, the groups who pressed for repeal of regulation were consumer interest groups while those arguing for the retention of regulation were milk industry organizations and members.

#### **III. Regulation and Excess Capacity**

It is useful to heuristically describe milk markets in the monopolistic competition framework of Chamberlin. Pricing under a regulatory constraint will be characterized by equilibrium at a point of excess capacity.

It has been established that in the late 1960s (the years of our data set) total per unit costs of milk processing dropped sharply up to a production level of nearly 40,000 quarts per day (Parker, 1973 and Mueller et al., 1976). On the demand side, each firm faces a demand curve with some downward slope to it; this small, individual market power is due to spatial location advantages and brand or quality identification.<sup>4</sup>

This market structure can be represented in the standard monopolistic competition diagram (figure 1). Each firm believes it operates along the more elastic demand curve, dd; however, the steeper *DD* demand curve, representing total market demand divided by the number of firms, is the real demand curve for each firm as it shows the effect on sales when all firms simultaneously change price. Starting from an initial, unregulated, zero-profit equilibrium at point *A*, imposition of a regulated price floor will result in movement to point *B*, with each firm earning positive profits.<sup>5</sup> The positive profits will attract FIGURE 1.—STRUCTURAL AND PRICE EFFECTS OF PRICE REGULATION



entry, shifting each firm's demand curve leftward to D'D'. At point R, per unit costs are just equal to price, implying zero profits and the end of entry. Industry "excess capacity" has increased (i.e., more firms operate with less efficient, smaller-scale operation).

At the regulated equilibrium, each firm has an incentive to expand along its perceived demand d''d'' but is prohibited by law from such actions. If deregulation were to occur, each firm would suddenly be able to lower price in an attempt to utilize the excess capacity, moving down the real demand curve D'D', and resulting in a price below  $P_0$  and negative profits. Over time, exit will cause industry profits to return to zero as D'D' shifts rightward toward DD and equilibrium at A.

The private incentives to obtain and maintain regulation are clear. The onset of regulation can create a period of positive profits prior to entry. This enhances the existing firms' present values. Although entry will return long-run profits to zero the incentive to maintain regulation is not correspondingly reduced. The onset of deregulation would cause negative economic profits and

<sup>&</sup>lt;sup>4</sup> The reader may note that we are using the terms "plant" and "firm" interchangeably, for simplicity of exposition. In the context of our sample and our geographic markets, these two concepts are close to interchangeable.

<sup>&</sup>lt;sup>5</sup> Note that while each firm is earning supernormal profits, it would be able to earn more if it could expand along d'd'. Absent regulation such simultaneous expansion would, through a series of changes, return the market to point A (Chamberlin, 1959, p. 91).

the negative present value of these losses would never be recouped.

By holding price above the free market level, regulation attracts entry leading to excess capacity and support of an inefficient number of firms.<sup>6</sup> Our empirical tests will examine prices, numbers of plants and economies of scale. The tests establish that wholesale and retail price regulations have led to higher prices and by so doing have caused costly excess capacity.

#### IV. The Empirical Model

It has been hypothesized that the social cost of regulation has two sources: (1) higher prices for consumers and (2) the existence of too many firms indicating excess capacity and protection of inefficient competitors. In this light we employ the following simultaneous equation system:

$$Q = f(P, y, E)$$
  
(demand relationship) (1A)

$$M = g(N, Q, P_r, R)$$
  
(marketing margin relationship) (1B)

$$N = h(Q, L, R)$$
  
(market structure relationship) (1C)

$$P = P_r + M$$
(supply price relationship). (1D)

Equation (1A) is a demand curve in which quantity demanded, Q, is a function of market price (P), income (y), and exogenous regional characteristics (E). Market price is endogenously determined through equation (1B) and identity (1D). By identity (1D) the market price of milk, P, is made up of  $P_r$ , the price of raw milk, and M, the margin of costs and profits between the raw milk price and the retail price. M is noted as the dependent variable in equation (1B) because  $P_r$ varies geographically so margins are generally the focus of the regulators. In any single market raw milk is assumed to be available with infinitely elastic supply at the price  $P_r$ .<sup>7</sup> Holding the number of plants constant, the margin may be a rising function of the endogenously determined Q. The regulated raw milk price varies widely throughout the United States due to relative availability of milk. Relative scarcity may affect the technology employed in processing. Thus the raw price is included in the margin equation to account for such technological differences and the possibility that margins include a percentage mark-up over raw price.<sup>8</sup> The margin is also potentially affected by the number of competitors (N) in the market. For a given market, fewer competitors may mean a higher price.<sup>9</sup> Finally, we expect margins to be affected by the regulatory climate (R).

The number of firms in the market is endogenously determined through the market structure equation (1C). The number of firms should rise with total market output. Also, if the market encompasses more land area (L), high transport costs imply more plants in any equilibrium. Finally, as hypothesized in the previous section, the state of regulation in the market may affect market structure; minimum retail price regulation should lead to more firms.

### A. Data and Variables

This study uses the data presented in Shaw (1973). The original source of the data was a survey conducted by the Northeast Dairy Marketing Project (NEM-40) in late 1969 (Shaw, 1973). The markets surveyed are those listed regularly in *the Fluid Milk and Cream Report* of the U.S. Department of Agriculture (USDA).<sup>10</sup> While 150 markets were originally surveyed, complete information is available for less than half of them. Data complete enough for our study were available for only 69 markets.

Table 1 lists the variables used in the analysis. As noted above, this study uses a measure of

<sup>8</sup> For an investigation of the relationship between raw milk prices and marketing margins, see Beck and Mather (1976).

<sup>&</sup>lt;sup>6</sup> The higher price may also cause firms not located in the market to "enter" by shipment. Such shipping adds greater transport costs. The effects on prices and costs are qualitatively similar to those we note above.

<sup>&</sup>lt;sup>7</sup> The raw milk price is exogenous to the model. Its primary component is set by regulation, at either the Federal or State level.

<sup>&</sup>lt;sup>9</sup> For the markets involved, the number of plants is generally between 6 and 15 which means the number of plants will be highly correlated with the concentration ratio, a correlation that is not necessarily true in other types of markets.

<sup>&</sup>lt;sup>10</sup> More recent survey data on plants are unavailable. Also, the USDA stopped publishing its *Fluid Milk and Cream Report* in the early 1970s. Although fluid bottling is experiencing technological changes toward greater economies of scale, lending a temporal component to the point estimates, the economic process demonstrated here is an atemporal process.

TABLE 1.—LIST OF VARIABLES USED AND DESCRIPTION (1969 data)

Variable	Description
М	current weighted margins for milk sold through stores
Ν	number of plants supplying packaged fluid milk in the market
С	per capita consumption of whole milk (half gal- lons)
Q	total consumption of whole milk in the market (half gallons)
R	dummy variable for a regulated market
D	dummy variable for a deregulated market
POP	population of the market, in thousands
у	per capita (disposable) income, in dollars
L	land area of the market, in square miles
$P_r$	raw milk price paid by bottling plants
Р	price paid by consumers; i.e., $P_r + M$
E <sub>i</sub>	$i = 1, \ldots, 8$ , dummy variables to delineate nine regions

margins (M). Given that the raw milk price is exogenous, this measure should be the most effective available for comparing the effects of regulation on prices and both productive and distributive efficiency across markets. The measure of margins used in this study is a weighted average across fluid product categories and container sizes, indexed to half gallons.

The other variables are self-explanatory in nature, with the possible exception of the region dummies and presence of two regulation dummies. To allow for regional demand characteristics such as temperature, demographic patterns, etc., we separated the United States into nine regions. The state of regulation (R) in equations (1B) and (1C) is described by two dummy variables, R and D.<sup>11</sup> R signifies a regulated market; the dummy variable D denotes a deregulated market, to distinguish those markets which changed from regulated to unregulated status a few years prior to the 1969 date of data collection. It is hypothesized that structural changes in those markets would not be completed by the date of observation, putting these states somewhere between a regulated and unregulated market structure. Also included in the deregulated category are all New Jersey observations. While New Jersey had a retail price regulation law on its books, a new law and litigation had caused minimum retail prices to drop and remain unchanged since 1964 (USDA, 1972). Given the general upward drift in milk prices, the New Jersey regulated prices were not a binding constraint in 1969 so we treat it as deregulated.

#### B. The Structural Form

The structural form of the model is the estimating form for the equations (1A)-(1C). A linear additive form shall be assumed and the demand function will be estimated on per capita consumption (C) using per capita income (y). A linear additive formulation of total, rather than per capita, demand would lead to spurious elasticity predictions due to population differences. Thus, structural estimates are based on equations (2A)-(2C) where M, C, N, P, and Q denote the variables endogenous to the system.<sup>12</sup> The equations are<sup>13</sup>

$$C = \gamma_0 + \gamma_1 P + \gamma_2 y + \gamma_3 E1 + \gamma_4 E2 + \ldots + \gamma_{10} E8 + \epsilon_1$$
(2A)

$$M = \alpha_0 + \alpha_1 N + \alpha_2 Q + \alpha_3 P_r + \alpha_4 R + \alpha_5 D + \epsilon_2$$
(2B)

$$N = \beta_0 + \beta_1 Q + \beta_2 L + \beta_3 R + \beta_4 D + \epsilon_3.$$
(2C)

The endogenous variable P is defined as  $M + P_r$ and the endogenous variable Q is defined as C times population.

Given the existence of such functions of endogenous and predetermined variables, especially given that Q is a function of C and is nonlinear in the exogenous variables, the structural equations will not be linear transformations of the reduced form. This implies a difficulty in using conventional two stage least squares (2SLS) techniques. Estimating techniques have been developed for such non-linear models and are discussed in Kelejian (1971) and Edgerton (1972). They have shown that under certain con-

<sup>13</sup> All three structural equations pass both the rank and order test for identification in a simultaneous system.

<sup>&</sup>lt;sup>11</sup> Out of the 69 total observations, the number of observations in regulated markets is 13 while deregulated market observations total 7. These relative proportions are a fair approximation of the actual percentage breakdowns.

<sup>&</sup>lt;sup>12</sup> Region dummies are included only in the demand equation. Outside of the systematic regional factors captured in using the raw milk price in the margin equation, technological and marketing possibilities probably do not vary as much across regions. If one includes the region dummies in the first two equations, the basic predictions on the effects of regulation are still verified, but the estimates are unreasonably strong.

ditions, consistent estimation can be performed with such nonlinear combinations.<sup>14</sup> By this process the hybrid variable Q is estimated directly in the first stage and used in the second stage. The reduced form equations will include population (POP) as an exogenous variable even though POP does not enter by itself as an exogenous variable in the second stage-structural estimation, but enters in the composite variable Q. In the Edgerton estimating technique the reduced forms of the hybrid variables are not reduced forms of the theoretical model; however, they are reduced forms yielding instruments that may be used for consistent estimation of the structural form.

#### C. Estimation and Results<sup>15</sup>

Structural estimation allows consideration of the demand curve, margin, and market structure equations assuming, in each case, that the other two relationships are held constant. To find the changes in equilibrium values due to a change in an exogenous variable, each curve must be allowed to shift and the net effect of all three

<sup>14</sup> Whereas traditional 2SLS builds its instruments from reduced form estimation involving regressing each dependent (i.e., endogenous) variable,  $Y_i$ , on the entire set of predetermined variables, X, the present procedure involves regressing  $Y^*$  on X where  $Y^*$  contains both the endogenous variables  $Y_i$ , in this paper C, M, and N, and the functions of predetermined and endogenous variables,  $g(Y_i, X)$ , in this paper  $Q = C \cdot$ *POP*. Proof of the consistency properties of such a procedure is detailed in both Kelejian (1971) and Edgerton (1972). The conditions required for applicability of the procedure are met by our model. The reader is referred to the above-mentioned papers for details on the required conditions.

<sup>15</sup> The results presented here differ somewhat from those presented in our Cornell University Working Paper 171 due to a format error. Additionally, consumption data were converted to half gallon units from the pounds used in the previous version. These changes resulted in small quantitative differences only. changes on the equilibrium must be calculated. The reduced form estimates may be used directly to indicate changes in equilibrium levels of the endogenous variable induced by changes in exogenous variables. Thus, to examine whether the results validate the form of the simultaneity embodied in the theory, the structural equations are used. However, to examine the theoretical predictions the reduced form estimates are used. The reduced form and structural results may be found in tables 2 and 3, respectively.

Examination of the reduced form results in table 2 shows that the signs of the coefficients support the predicted effects of regulation on the price level. The existence of retail price regulation plays a major role in the size of the marketing margin. The coefficient on regulation is significant and its size shows that in markets where regulation is present, milk margins are about 5¢ higher than in markets that lack state retail price regulation. In a market with average margins, 25¢ per half-gallon of milk, retail price regulation results in a 20% higher margin (about a 9.5% higher price). These states have significantly higher prices than would have existed had they not been regulated. Deregulation of retail prices was significant at the 90% level in the determination of equilibrium margins. This implies that a deregulated market should have a price 2¢ to 3¢ below a market that has been consistently unregulated. By using the covariance matrix, it can be shown that the decline in price from the regulated equilibrium to the deregulated short-run equilibrium is significant at the 99% level.

The excess capacity hypothesis predicts that with deregulation, price will fall below the unregulated level until market structure can adjust back to an unregulated long-run equilibrium structure. The fact that the price decline when

 

 TABLE 2.—REDUCED FORM ESTIMATION RESULTS (t-values in parentheses)

Independent Variables Variables	R	D	POP	у	L	P <sub>r</sub>	Constant and Region Dummies
С	-3.77 (2.20)	-1.14 (0.517)	0.00003 (0.073)	-0.0009 (0.764)	0.0002 (0.713)	-3.98 (1.85)	Available from the
М	5.19 (4.13)	-2.58 (1.60)	0.0002 (0.651)	-0.001 (1.28)	-0.0002 (1.02)	1.51 (0.965)	authors upon request
Ν	6.08 (2.81)	6.06 (2.18)	0.0027 (5.24)	0.0003 (0.212)	-0.0003 (0.918)	-6.37 (2.35)	

#### STATE REGULATION OF MILK PRICES

	(r-values in parentneses)											
C	=	77.29 (5.54)		0.54P (2.50)		0.0014y (1.29)	÷	22.3 <i>E</i> 1 (7.15)	+	13.78 <i>E</i> 2 (5.68)	+	5.14 <i>E</i> 3 (1.84)
			+	1.59 <i>E</i> 4 (0.529)	+	9.90E5 (3.46)	+	3.66E6 (1.31)	+	3.97 <i>E</i> 7 (1.51)	+	5.88E8 (1.68)
М	=	27.54 (3.54)	+	5.99 <i>R</i> (4.13)	-	0.919D (0.539)	-	0.2470 <i>N</i> (1.37)	+	0.00001 <i>Q</i> (0.959)	-	$0.205P_r$ (0.202)
N	=	7.24 (6.47)	+	4.08 <i>R</i> (2.38)	+	2.32 <i>D</i> (1.04)	+	0.00005 <i>Q</i> (5.41)	+	0.0001 <i>L</i> (0.294)		

 
 TABLE 3.—2SLS RESULTS OF STRUCTURAL EQUATION ESTIMATION (t-values in parentheses)

states deregulated was  $7.8\varphi$  in the average market, greater than the  $5\varphi$  increase that regulation caused,<sup>16</sup> is one of two tests that confirm that regulation does distort more than just prices—it also creates excess capacity.

The excess capacity hypothesis is also verified directly. The reduced form estimates show that regulation has a marked effect on the equilibrium number of milk plants. The coefficient on the regulation variable is 6.08 and is significant at the 99% level. With a mean number of plants of 13.6 in regulated markets, about 6 plants, or 45%, can be attributed to the regulation! The consequent increase in suboptimal capacity is marked. The average daily output per plant in a regulated market was 26,300 quarts per day, well below the minimum optimal scale of 40,000 quarts per day. With the estimated change in the number of plants and per capita consumption we may predict the change in capacity utilization caused by regulation. We find that had these markets not been regulated then per plant daily output would have been 50,600 quarts per day. This is a direct confirmation of the hypothesis of excess capacity generation in regulated markets.<sup>17</sup>

It is also instructive to look at the market structure effects of deregulating a regulated market. The coefficient on D in the reduced form has a point estimate value of 6.06. This implies that, on average, there are (nearly) as many plants in a deregulated market as there are in a regulated market. The *t*-value comparing the difference between deregulated and unregulated markets is 2.18 whereas that for testing the significance of the decline from regulation to the deregulated short-run equilibrium, computed from the variance-covariance matrix is only 0.004. Thus, as posited, there was insufficient time for the structural changes resulting from the removal of regulation to have occurred.

Finally, we may calculate the impact of state retail price regulation on milk consumption. The effect is to lower per capita consumption by 3.77 half gallons per capita per year. The *t*-value on this is 2.20.

Theoretical validation of our hypothesized form of the simultaneity can be derived from the structural estimates. Looking first at the margin equation, it appears that the effects are as expected; only regulation, however, is significant. If the size of the market and the degree of regulation are held constant, more plants lead to lower margins. Similarly, for a given number of plants a greater total quantity has a positive effect. As hypothesized, the presence of retail price regulation has a significant, positive effect on margins, while removal of regulation causes prices to fall to levels below even an unregulated market as excess capacity built up during regulation is utilized.

Looking next at the plants equation, it should be noted that Q is a strong predictor of the number of plants, exactly as would be expected. Also, R is a strong positive predictor, indicating that for any Q (and market land area) retail price regulation leads to a greater number of plants. The estimated coefficient on D is 2.3, which means the number of plants in a deregulated market, while less than in regulated markets, has still not returned to what is supported at an unregulated long-run equilibrium.

Finally the demand equation is examined. The region dummies are included to pick up differing regional effects on milk consumption. The

<sup>&</sup>lt;sup>16</sup> The markets in this study are being examined a few years after deregulation took effect; that is to say, the price did not merely collapse momentarily in a price war, but, rather, stayed at a low level.

<sup>&</sup>lt;sup>17</sup> We wish to thank an anonymous referee for suggesting this comparison. The actual utilization in unregulated markets was 36,600 quarts per day, with a predicted regulated capacity of 21,000 quarts per day.

coefficient on price is negative and significant as expected. The elasticity of demand in the present model evaluated at the sample mean is 0.57. Other studies estimating the price elasticity of demand for milk have generally shown that demand is inelastic, falling approximately into the 0.1 to 0.5 range (Bartlett, 1964). Milk income elasticities are generally measured to be close to zero, and even negative for households with income above \$16,900.<sup>18</sup> Our estimated income elasticity is a negative 0.08 and insignificant.

#### V. Implications of the Results

The results have confirmed the initial conjectures. The hypotheses that state retail price regulation had no effect on margins and that state retail price regulation had no effect on the number of plants in a market are rejected. Significant regulation-induced excess capacity has been demonstrated. These estimates may be further evaluated to assess the implied costs of the regulation to society. Imposing regulation causes a shift in equilibrium price and quantity. This can be measured as the familiar deadweight loss triangle,  $T = 1/2 \Delta p \cdot \Delta Q$ , and the rectangle R = $\Delta p \cdot Q^1$  (where  $Q^1$  is the regulated quantity). Traditionally the area R was treated as an increase in producer surplus offsetting that portion of the decrease in consumer surplus. More recently, however, economists have emphasized that this approach is seriously lacking. Authors such as Tullock and Posner (Tullock, 1967; Posner, 1975) have argued that it is naive to think that producer surplus will increase by such an amount; such analysis neglects real social costs involved in achieving and maintaining the supracompetitive price. Social costs are certainly involved in establishment and administration of regulation let alone the lobbying costs spent in maintaining regulatory control over prices.

Further social costs occur due to the regulated price being above marginal production costs. Firms will compete to make additional sales through such methods of nonprice competition as (offsetting) branded advertising, sales promotion, home delivery and expensive cross-hauling.

These involve real costs. Additionally, entry will result in excess capacity and higher per-unit costs. Posner has suggested, and the Chamberlin model predicts, that all of the excess profits available (R) will, on average, be eroded by private/social costs. It is possible to get a lower limit estimate as to how much of the increased price will be eroded by increased costs through examination of engineering estimates of average production costs (Parker, 1973). Recalling that average output per day was 26,000 quarts in the regulated market, production costs should be approximately 9% above the per-unit production costs at minimum optimal scale. If margins went up by 9%, about 2.25¢ per half gallon, profits would not increase. Since margins in regulated markets were found to increase by 5¢ per half gallon, private profits may have increased by roughly one half of R, at a maximum.<sup>19</sup> Since this increased private cost is only one of the various costs mentioned above, we can feel confident that one half of the rectangle is a lower limit of the social loss; it is an understatement of the loss in consumer surplus not offset by a concurrent gain in producer surplus.

Using the estimated demand function, it is possible to arrive at approximate dollar figures for the size of areas R and T at \$173,840,776 and \$5,005,755, respectively. Finally the lower limit of the extent of social loss due to regulation, evaluated as T plus one-half R, is \$91,926,143, a number most certainly an underestimate as it neglects such costs as regulatory budgets, legislative time, non-price competition, crosshauling, etc. This amounts to more than 5% of total expenditures on fluid milk in regulated states and \$1.60 per consumer per year in expenditures on milk.

The remaining policy question is whether there are offsetting benefits. Clearly, these estimates indicate that the sometimes touted benefit of protecting firms to avoid monopoly power and a yet higher price is spurious. Another view, that price cutting leads to lower retail prices and hence to lower prices paid to farmers, can only be true if the lower prices simply cancel out farmer

<sup>&</sup>lt;sup>18</sup> Most studies do not allow for non-linearities in the income elasticity. One study which did, arrived at this switching result (see Thraen and Buxton (1976)).

<sup>&</sup>lt;sup>19</sup> We would expect profits to increase by a lesser amount, if at all, due to non-price competition and entry. We note that Mueller, Hamm and Cook (1976, p. 113) present weak evidence (significant at the 80% level) that independent dairies earn slightly higher profits in regulated states. However, they treat capacity utilization as exogenous.

monopoly power.<sup>20</sup> In fact, the derived demand for raw milk inputs falls as the retail price is raised; farmers can sell less milk for fluid use at their regulated raw milk prices. Furthermore, the argument that without regulation market chaos will lead to inadequate milk supplies is false. Adequate supplies of milk are found daily on the supermarket shelves in unregulated states where the majority of U.S. consumers purchase milk. There are only two remaining justifications for regulation: (a) the "socially desired service" motive (e.g., retention of home delivery milk routes) and (b) the populist goal of maintaining small businessmen, not for competition but as a social value in their own right. The first of these motives requires a social desire to maintain services to benefit certain consumers who would not themselves be willing to pay for the additional costs of these services. The high cost to society of achieving this goal should be considered. The second motive may be examined in like fashion. The high costs of achieving the goal should be noted, and the possibility of alternatives, such as small business grants, should be considered.

#### VI. Conclusion

Proponents of state wholesale and retail price regulation claim that such control is necessary to assure an adequate supply of milk, to maintain stability in the industry, to guard against monopoly, to assure some services, and/or to protect small businessmen. These arguments are professed to be for the protection of the public interest.

More careful analysis of the incentives and distortions present under regulation leads to a rejection of the first three motives as viable. The latter two motives could represent viable explanations if these motives are worth their high costs to society. Given the costs and benefits, however, it appears that the true motive is simply to achieve what the firms acting alone cannot—a quasi-monopoly price. At the onset of regulation all firms benefit. Over time, entry and non-price competition drive profits back to zero. The next result is an enhanced capital value based on increased transitory returns to the initial market participants, but no current return to current 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.

If the goal of policy makers is really to protect competition, repeal of regulatory constraints is called for. If the goal of regulation is actually one of aiding the industry or a populist goal of protecting smaller less efficient plants, regulation has been successful. Only if these latter goals are acknowledged by society as goals worthy of these costs, should regulation be retained.

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<sup>&</sup>lt;sup>20</sup> Lower retail prices require greater quantities of purchases of raw milk to satisfy the greater quantity demanded. In a competitive raw milk market, or in one with regulation as currently constituted, this requires a raw milk price at least as high as would exist without higher regulated retail prices. This is explained in more detail in Masson and Eisenstat (1978).

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