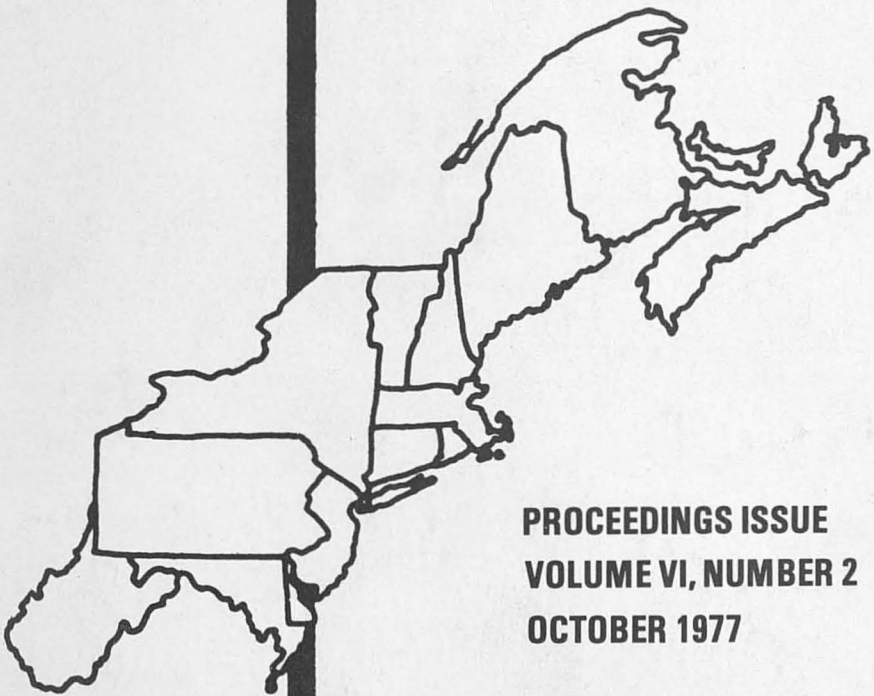
JOURNAL OF THE

Northeastern Agricultural Economics Council



PROCEEDINGS ISSUE
VOLUME VI, NUMBER 2
OCTOBER 1977

GOALS AND RESULTS OF FEDERAL MILK REGULATION: A REEVALUATION*/

Robert T. Masson
Associate Professor
Department of Economics
Cornell University
concurrently
Economist
United States
Department of Justice

and

Philip Eisenstat
Economist
United States
Department of Justice

I. Introduction

Federal regulation of various commodities is under attack by critics who take the position that regulation no longer achieves public interest goals. The critics have been more successful in the realm of changing degrees of control by reducing or refocusing regulation than they have been in eliminating regulation. In this paper we take the position that reduction of regulation in the dairy industry would be socially beneficial and consistent with the original goals of the regulation. The policy variable we consider is the amount by which the regulated price for milk for fluid uses is elevated above that for manufacturing (cheese, etc.) uses.

In order to determine the extent of reduction in regulation which would be beneficial we examine both the prospective behavior of an unregulated market, and the effects of marginal changes in current regulation. Our analysis proceeds by identifying three goals of the current regulation of sales of milk from farmers to processors. We then compare the operation of the currently regulated market with our model of an unregulated market in achieving these goals. The scope of this paper is limited to consideration of classified pricing regulation (regulated price discrimination for raw product based on final product use) in milk markets. We assume the continuation of price supports for milk, import quotas, and the verification of weights and tests.

Our basic conclusion is threefold: (a) that the level of restrictiveness of the current regulations is far greater than that which is

---

*/ Nothing herein is meant to represent or should be construed as representing official opinion or policy of any agency of the United States government.

necessary to achieve two of the three major goals of milk regulation; (b) that this restrictiveness must, therefore, be attributable to the attainment of the third goal, namely increasing producer income; (c) that whereas, at the time of implementation of classified pricing this third goal was justified, current conditions call for reevaluation.

II. Goals of Regulation

The goals of dairy regulation enunciated by the regulators are:

1. Raising farmers' incomes,
2. Assuring an adequate supply of milk, and
3. Providing for an orderly market.

The criterion of "public interest" serves to balance these three goals against the interests of the consumer. The balancing test in particular is open to a variety of interpretations.

Milk regulation entails social costs, and these costs are positively related to the regulated price level for milk used in fluid bottling. Since there is a marginal social cost in raising the regulated price for fluid milk, the regulation is not operated in the public interest if there is not, at the current margin, positive marginal benefits to raising the milk price further. It is our position that at the current margin the marginal benefits of raising price are nil, whereas the marginal costs are positive. Thus we conclude that even assuming arguendo that the total benefits of regulation exceed its social costs the level of regulation is one which, at the margin, has costs exceeding benefits. The implication is that in the balancing test the public interest is not being served. This may be due more to the obsolescence of the law under which the USDA operates, rather than inappropriate balancing on the part of the USDA.

III. A Model of Regulated Markets

The system of regulatory price discrimination in agriculture is based on the principles of monopolistic price discrimination. This model was presented by Gaumnitz and Reed in 1937 [3]. In their context they are discussing cooperative market power in the years preceding the AMAA Act of 1937. The Act codified their explanation of coop market power.

Their model is a representation of the markets for raw (unprocessed) milk sold by farmers to milk processors, or handlers, who process it for human consumption as fluid milk or as manufactured milk products such as cheese, butter, and dry milk powder. Milk marketing order regulations impose classified pricing on the market, defining Class I milk as milk purchased by processors for use as fluid milk and Class II milk as milk purchased by processors for use in manufactured milk products. The regulations apply only to Grade A milk. This milk is eligible to be sold as both Class I milk and Class II milk, having

passed the sanitary standard for fluid milk. Grade B milk is not suitable for fluid use but may be used for manufactured milk products. Farmers who produce and sell Grade B milk do so in an unregulated market but must compete with Grade A milk producers whose milk is sold for Class II uses. Class II prices for Grade A milk in markets regulated by milk marketing orders are set close to or at the prices for Grade B milk in unregulated markets.

This paper presents an extension of the Gaumnitz-Reed model. We begin with the assumption that raw product demand for fluid use is inelastic, and that for processed use the demand is elastic. We first show a solution where supply is perfectly inelastic. To avoid complex modeling it may be assumed that the milk marketing order regulation sets a Class I or fluid use price and lets the Class II price for processing be market determined. The model thus becomes representative of an equilibrium at a single point in time, and does not indicate the process of change between equilibria. This is because, contrary to our assumption, Class I price is set as a fixed markup over the Class II price. There is no loss of generality in this method of analyzing long run static equilibria.

In Figure 1 we analyze the demand and supply conditions for raw Grade A milk. Regulated farmers will receive a blend price based on averaging total receipts over the total milk supply. This price, P_b, is shown as a function of total quantity by the AR (or average revenue to the farmer) curve. It is defined as:

$$P_b = \frac{\bar{P}_I \bar{Q}_I + P_{II} Q_{II}}{Q_T}$$

where: P_i is the i^{th} use class' price. The bar over P_I indicates that it is fixed by regulation.

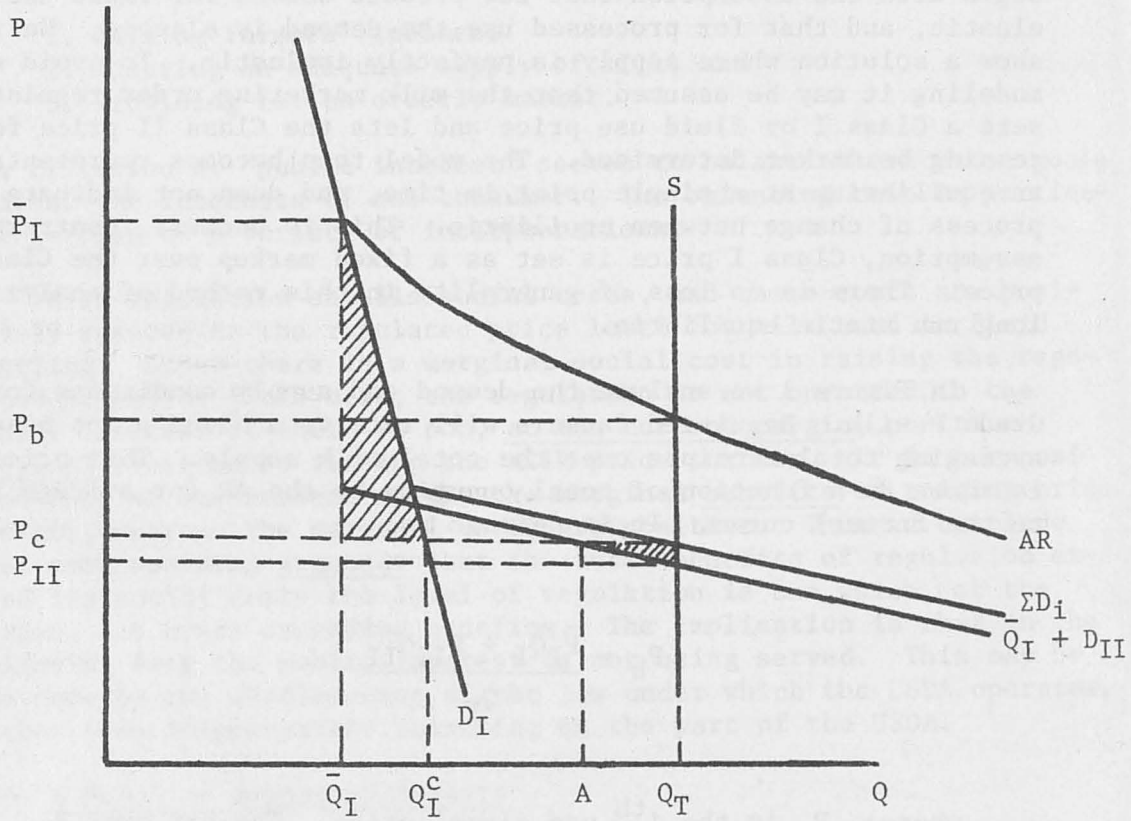
Q_i is the i^{th} use class' quantity. The bar over Q_I indicates that $\bar{P}_I$ determines Q_I.

Q_T is total Q which is equal to $\bar{Q}_I + Q_{II}$.

The curve ΣD_i shows the total demand curve in a competitive equilibrium, the sum of the Class I and II demands. The curve $(\bar{Q}_I + D_{II})$ shows the price paid by buyers for all units in excess of $\bar{Q}_I$. Competitive Q_I is Q_I^c. Point A is derived by construction on the $\bar{Q}_I + D_{II}$ demand curve so that $(A - \bar{Q}_I)$ represents the competitive Q_{II}, at the competitive price, P_c. Thus the regulation-induced change in the Class I quantity is $\Delta Q_I = (\bar{Q}_I - Q_I^c)$ and the change in the Class II quantity is $\Delta Q_{II} = (Q_T - A)$. Obviously $\Delta Q_I = -\Delta Q_{II}$.

Figure 1

Classified Pricing with a Vertical Supply Curve



The higher price for Class I product has consumer surplus losses of the area under D_I between $\bar{Q}_I$ and Q_I^c. The benefit to consumers from lower Class II prices is the area under $(\bar{Q}_I + D_{II})$ between A and Q_T. The net social cost to society is the difference between these two areas. Since $\Delta Q_I = -\Delta Q_{II}$ this net loss is shown by the sum of the two cross-hatched areas, one between P_c and D_I and the other between P_c and $(\bar{Q}_I + D_{II})$.

The farm price increases from P_c to P_b, yielding higher incomes. Since these incomes are associated with fixed factors, they will be capitalized as Ricardian rents equal to $(P_b - P_c)Q_T$. Farmers in the long run earn zero profits; however, the value of fixed factors owned by owner-farmers or farm landlords increases by the present value of these rents.

Figure 1 shows the farm supply curve as vertical, whereas for other than instantaneous time it is actually upward sloping. Were we to start at P_c and Q_T and allow supply to increase in response to higher farm prices we would see that some of these farm rents will be eroded. In Figure 2 we show the change in equilibrium if the supply curve is not vertical. The increased supply is measured by $\Delta Q_T = (Q_T' - Q_T)$. In Figure 2 the cross hatched areas represent the same social costs as in Figure 1.

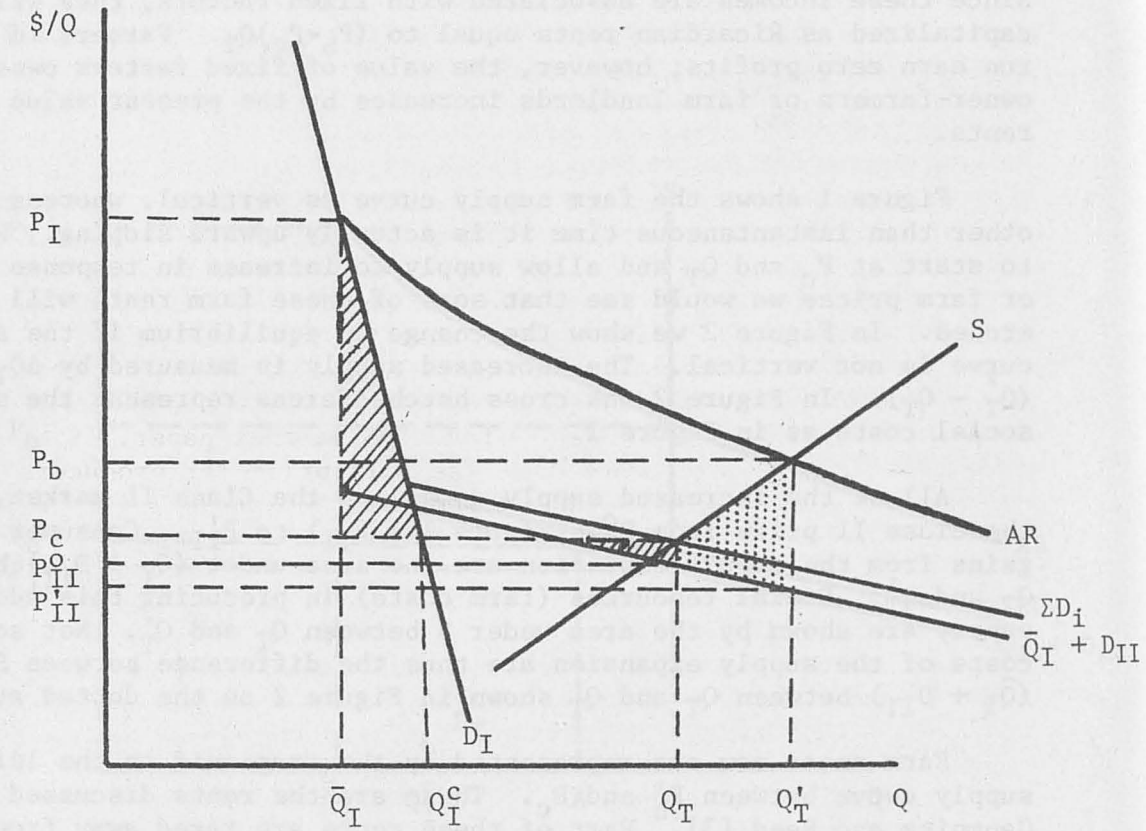
All of the increased supply goes into the Class II market, dropping the Class II price from P_{II}^o (Figure 1's P_{II}) to P_{II}'. Consumer surplus gains from the supply expansion are the area under $(\bar{Q}_I + D_{II})$ between Q_T and Q_T'. Social resources (farm costs) in producing this additional supply are shown by the area under S between Q_T and Q_T'. Net social costs of the supply expansion are thus the difference between S and $(\bar{Q}_I + D_{II})$ between Q_T and Q_T' shown in Figure 2 as the dotted area.

Farm rents now are represented by the trapezoid to the left of the supply curve between P_b' and P_c. These are the rents discussed by Gaumnitz and Reed [3]. Part of these rents are taxed away from farmers by the USDA to help pay for the system of regulation. These taxes are supplemented by a portion of the general tax revenues to pay for the administration of the regulatory programs. It can easily be seen that the more elastic the supply, the lower the farm rents, and the higher the social costs. Thus although supply expansion reduces farmer benefits from regulation, it increases one of the primary regulatory costs to society. Too often the reverse is claimed: that in the long-run regulation is costless because supply expansion prevents any permanent farm price increase. Resource waste due to overproduction should not be set aside so lightly.

Another key point to note is that because the regulation leads to producer rents, it is the farmers who owned the fixed resources at the time regulation commenced (or P_I was raised) who benefit. Future farmers pay more to purchase these resources and non-owning farmers (about 25% of dairy farmers) get little or no gains in either the short or

Figure 2

Classified Pricing with an Upward Sloping Curve



long run. While rents dissipate any increased net farm income in the long run, social costs are never dissipated and remain in perpetuity. If, once rents have dissipated returns, prices are raised to generate increased incomes again, a vicious cycle develops with no end in sight but the unwillingness to pay. One other point which flows directly from the model is that Grade B farmers who receive approximately P'_{II} for their milk, may receive lower farm incomes/rents while the Grade A farm owners get the benefits.

The model as presented suppressed spatial elements, which was less of a problem when Gaumnitz and Reed wrote. In 1937 most milk was not pasteurized, refrigeration was rare, transport was slower, etc. In Ippolito and Masson [5] this theory is extended to at least partially adjust for milk transport and find a theoretical industrywide solution. In this work an estimated minimum bound is derived for social costs and producer rents. The estimates show social costs of about $60 million per annum and producer rents of about $210 million per annum. Consumer costs are set at about $333 million per annum for fluid milk and there is a subsidy of about $120 million per annum for consuming processed products. Finally it is estimated that Grade B producers' rents suffered by about $100 million per annum. All but this final figure may be understated by a factor of two or even up to three because of the conservative estimation techniques discussed in that paper. Still, the estimates per unit are moderate. The milk price for producers is estimated to be raised only about 25¢ per hundredweight (2.1¢ per gallon) and for fluid consumers only about 63¢ per hundredweight (5.4¢ per gallon). Per capita social costs are only about 30 cents per annum and producer rents per farm only about $750 per annum.

However if society ignored all economic problems with social costs below $60 million per annum, monopoly, featherbedding, and restrictive practices would run rampant through various industries. Thus we must examine what benefits we derive from such regulations. If the benefits are negligible when compared to less restrictive alternatives which achieve the same goals, the restrictions should be reduced or eliminated.

IV. The Income Goal

In the 1930's depressed farm income was a serious social problem. Today, however, increased milk prices result in the flow of money from less affluent consumers to more affluent producers. In addition, depressed farm income posed the risk of an abrupt over exit of farmers from the industry with fewer than is optimally desirable remaining after the recovery. Today almost four decades later, this risk is no longer present.

Although the AMAA Act refers to raising farmers incomes, certainly the factors underlying this goal have changed. The price which would best serve the public interest is open to question, but the current level is a socially costly method which transfers money from

poorer to richer, and is thus not, in our opinion, in the public interest.

Before the 1960's, regulatory programs transferred income from consumers with generally higher incomes to producers with generally lower incomes. Over the years technological change in agriculture led to ever increasing efficiency which in turn led to transitory farm gains. However, the ability to produce more with less labor input drove down the incomes to be earned in farming after the initial development phase disappeared. Farmers with specialized human capital experienced capital losses on human capital, and younger people tended at the margin to move to develop skills in more lucrative pursuits. Labor market equilibrium responded slowly due to the embodied human capital. Many farmers, too old to find it advantageous to develop new skills, stayed on the farm. Some other farmers absorbed their human capital losses and took alternative employment at jobs with lower incomes than what would have been available to them in their youth. But over the years the labor market has been moving towards equilibrium. While older farmers retired, depressed farm incomes led younger people to choose other occupations. Average farmer age increased relative to the population.

Finally in the 1970's by which time almost all milk is regulated, average farm income per capita has become virtually equal to average urban income per capita, and even exceeded it in 1973 [8]. If there are fewer equivalents of the Rockefellers in farming than in the urban sector, then the typical farmer's net income exceeds that of his urban counterpart.

Currently then, classified pricing has the probable effect of taxing lower income people and subsizing higher income people, the reverse of even one decade ago. To show this assume that the ratio of dairy fluid to processed milk consumption is invariant to income and that total milk consumption displays the usual Engel's curve relationship for food, that a lower proportion of income is spent on milk by more affluent consumers. The program effectively imposes a regressive tax: poorer consumers pay a higher proportion of their income in subsidy. And since consumers with below-average incomes thereby have incomes below the average farm level as well, it is clear that the average dollar flow is from poorer to richer.

However, we must recognize that the ratio of consumption of fluid milk to the consumption of manufactured milk products may vary with income level. The conclusion that dollars flow from poorer to richer would be invalid if the income elasticity of fluid milk consumption exceeds that of manufactured products consumption by an amount sufficient to offset the greater value of fluid consumption and the general tendency for total consumption to follow this Engel's relationship. The elasticities estimated by Thraen and Buxton [7] show that our first conclusion is not overturned on these grounds. The income elasticity for fluid milk is above the income elasticities of only a few of the

twelve Class II products studied--some ice creams, processed cheese, and canned milk. Average family income of fluid milk consumers is shown to be about equal to that of products consumers. In fact, in non-linear estimates they find that as income exceeds $16,200 total fluid consumption falls, whereas for most manufactured products consumption is still rising; higher income people will reap more of the benefits of the manufacturing milk "subsidy."

Moreover, the marketing orders help large farmers more than small farmers. The orders raise farm incomes by raising price. Therefore, the larger the quantity of output a farmer sells, the larger his benefit from the order. In general, if a farmer whose sales are $5,000 per year has his income augmented by $1,000, a farmer with sales of $100,000 will have his income augmented by about $20,000. About 3 percent of total dairy farmers account for about 25 percent of total dairy output and thus receive at least 25 percent of the subsidy dollars. By the same logic, the 15 percent smallest farms receive no more than 6 percent of the subsidy. Thus, not only is the tax on the consumer regressive, but the benefits to farmers generally are captured by the more affluent farmers with incomes that exceed the national average.

The marketing orders have uneven impacts among different groups of farmers in other ways as well. Those farmers who specialize in producing for the secondary market are penalized by the classified pricing system. For example, Grade B milk producers, who are generally smaller than average, are hurt by the system's depressant effect on the price of manufacturing milk. In one study [5] it was estimated that the price of raw milk for Class II uses would rise by about 40¢ per hundredweight in the absence of the Class II price-depressing effect of the order system. Furthermore, Grade A producers in low utilization markets whose blend prices fall short of Class II plus 40¢ (e.g., most Minnesota and Wisconsin producers) are having their incomes depressed by the system. These farms too are usually smaller than the national average. If our equity goal is to help the small family farmers, we are doing so with only a minor portion of each dollar of regulated monopoly milk revenues.

In addition, younger farmers and non owner farmers do not benefit from the regulation. Free entry dictates that in the long run producers will not earn excess profits. However, producers will enjoy an increase in wealth measured by the higher value of the productive assets they own.[1/] The increased wealth

---

[1/] Some farm lands are earning revenues at a rate below the normal rate of return, which they could earn if the land were developed in conjunction with expanding urbanization. Consider land that would [footnote continued]

will be reflected in higher income streams for those participants who own land (or other specialized inputs) at the time the regulation is put into effect. They will realize a windfall gain whenever they sell their land. The "second generation" of producers-- those who purchase land after the regulation is in effect -- will not gain since the price they pay for the land reflects the fully capitalized value of the benefits of the regulation. Rents will not be reflected in farm worker wages (including the implicit wage an owner-producer "pays" himself) since labor, even skilled labor, is not in fixed supply in the long run. To the extent that the average owners of farmland are, presumably, more affluent than non-owner farmers, this magnifies the influence of this program as a transfer from poorer to richer.

If programs which raise farmers' incomes proportionally to output can still be justified today, the justification must either be to subsidize the most well-to-do farmers at the expense of the least well-to-do consumers, or as an intermediate goal, a means to achieve adequate supplies or orderly marketing.

In summary, the goal of raising farmer incomes has flaws in today's world. First, the income effect has been dissipated through land markets into farmer rents, helping almost exclusively those who were farmland owners (farmers and non-farmers alike) when the programs were instituted or expanded. Second, labor markets have dissipated most of the losses on human capital which were due to rapid labor saving technological shifts, so that now the programs only succeed on average in channeling funds from the poorer consumers to the richer farmers. Richer consumers pay little more than poorer consumers; at best, poor farmers get much lower benefits than richer farmers, while many grade B farmers are hurt. Third, the program which has evolved contains substantial market distortions and social costs. If the farmer income goal of regulation is to transfer income from the more affluent members of society to the less affluent members, the correct regulations have gone beyond the point where marginal benefits are equal to marginal social costs. Indeed, by this criterion, marginal benefits are likely to be negative. However, it could be argued that the farm income goal could be an intermediate goal in the process of achieving the alternative final goals of adequate supplies or orderly marketing. These final goals

---

[footnote continued] be optimally exploited by development ten years hence. If this land were to remain fallow for that period, owning the land for speculation would be marginally profitable at some price of land, p*. If during the interim the land can be used to generate farm revenues in excess of variable costs (even if below full costs including a rate of return based on the land price paid), then the land will be worth p* plus the capitalized value of farm revenues net of variable costs. The returns to specualtive land holdings are increased by regulation which raises farm product prices, and rents accrue even when the land's primary value is based on its prospective development value.

may have social benefits which offset the social costs of the regulatory programs. The next two sections discuss why this is substantially incorrect.

V. The Adequate Supply Goal

One of the three goals enunciated by Congress is to assure an "adequate supply" of milk. The concept of an "inadequate supply" or a shortage does not make sense for the milk markets under the normal economic definitions; and inadequate supply exists only when supply is less than demand at the market price. This can only occur with a price ceiling.

For this industry there is a popular conception of inadequate supply. It appears to be a supply which is short of normal, and hence causes a substantial price rise. This definition appears to be applied both to the price effects of normal seasonal supply cycles and unanticipated changes in supply factors. However if one accepts this definition, one finds that regulation as currently constituted creates substantial surpluses in excess of merely adequate supplies. Thus, under the popular conception, the degree of restriction cannot be justified. Even under a conception which focuses on what the consumer must pay rather than on fluctuations in price, the regulations themselves do not help achieve an adequate supply. Simply stated, the system works by raising consumer prices which raises producer returns. Consumers demand less and producers produce more, creating a reserve supply in excess of demand. This enables the regulators to set a stable price with a sufficient reserve that they will not have to raise price yet further during short production periods.

A real problem in milk marketing is that the product is highly perishable. This product cannot be stored as a hedge against future price changes. This leads to a need to generate continual surpluses to have a reserve cushion for time periods when supply is short. Allowing for a reasonable cushion (a popular number is 20% in excess of fluid milk sales), the system has generated not simply adequate supplies, but massive surplus supplies.

The orders in the Upper Midwest are a case in point. Both the Chicago and the Upper Midwest orders produce massive surpluses even in the fall months. Clearly the fluid differential, the amount by which P_I exceeds P_{II}, could be narrowed substantially in this area without experiencing any probability of insufficient milk for fluid uses at prices reasonably close to order prices. If the height of these Upper Midwestern orders' fluid differentials is based on the adequate supply criterion, one must look beyond that geographical area to find a rationale.

Let us look instead at a short supply area like Florida: can it be used to justify the high Chicago price? At first the answer appears to "yes", but upon further analysis, the answer is clearly "no".

Regulated milk prices throughout much of the U.S. are approximately the Upper Midwest price plus freight cost from this area. 2/ To abstract, let us suppose that Class I prices are aligned by freight costs and that milk could flow from Chicago to Florida if the Florida price were higher. (In fact "dominoing" is more likely: a high Florida price will attract Georgia milk; the higher Georgia price will attract Tennessee milk; and so on, up the line to Chicago.)

During the fall months the Florida area only generates about 10% Class II milk. Even most of this probably does not represent "surplus" milk, but rather fluid milk "returns" which are down-graded to Class II, joint production from the removal of butterfat, and the manufacture of those Class II products which are more perishable and more costly to transport. If inadequate supplies are ever to be a problem, they are most likely to occur in Florida, assuming that all other order provisions are well designed.

Remaining with our abstraction on long distance milk movement, one might argue that a lower Chicago price would not lead to inadequate supplies in Chicago, but rather in Florida. If the Chicago Class I price were lowered, the delivered cost of Chicago milk to Florida would then be below the regulated Florida Class I price; fluid bottlers would use Chicago milk; Florida milk would go into surplus uses; Florida production would fall; and Florida would have inadequate supplies. However this logic is faulty.

If the price in Chicago which brings forth massive surpluses is justified as necessary in order to maintain adequate supplies in Florida, it can only be so justified because this milk is at the margin of feasible shipment (or indirect "dominoing") to Florida. If so, neither Florida nor Chicago supplies are inadequate--a supply decline in Florida would be met by shipment from Chicago. The Chicago reserve would therefore be a meaningful part of the Florida market. Thus, if Chicago and Florida were insulated markets the Chicago price would be too high on an adequate supply criterion. If they are (directly or indirectly) not insulated, both prices are too high by the adequate supply criterion taken alone. Finally, if the markets are partially insulated, e.g., Chicago milk costs 50¢ per hundredweight more in Florida than Florida milk, then the Chicago price could be dropped by 50¢ without threatening Chicago's supply adequacy. Further, making Chicago milk available at reasonable prices in Florida would

---

2/ More recently transport costs are higher. This change raises the complexity of the basic relationships reported here, but not the core substance. Thus we analyze these markets as if transport costs were at their pre-energy crisis level.

better assure adequacy in Florida by making the Chicago "reserves" an economically useful backup supply. Thus, whether or not markets are insulated, the systemwide surplus of about two-thirds over fluid demand means that some or all prices are leading to excessive supplies rather than adequate supplies.

The surplus supply is about two-thirds above fluid uses. This is based on monthly data. Often the use of monthly data is criticised as biased, due to a factor called "daily balancing." The daily balancing problem (or nonproblem as we shall see) is the problem of intraweek demand fluctuations. Bottlers often do not accept weekend milk nor milk on one midweek date. Supermarket demand fluctuates widely over the week, so, absent a price discount, there is no reason to accept as much milk on some days as on others, and therefore some of the excess of Class II milk may reflect daily fluid demand fluctuations. This logic is faulty. The daily balancing problem is caused by regulation and in some cases cooperative monopoly power. Fluid processors would buy milk every day of the week if they received a discount on low demand days. Fluid milk can be stored for a few days, so a "weekend price discount" would suffice to remove the daily balancing problem. Minimum price regulation prohibits such discounting and thus leads to the appearance of a problem. Other federal order regulations further exacerbate this "problem." In a competitive, unregulated market the daily balancing problem would simply be one of who stores the milk and at what charge rather than one in which extra milk constantly produced to meet the need of short days must then go into Class II products on the other days. Thus it can be seen that via regulation, prices are elevated above the level necessary to maintain an adequate supply of milk. Prices could be lowered in most markets, if not all markets, without endangering the adequacy of the Florida milk supply.

While thus far this argument has rested on simple economic reasoning, to assess how much the Class I price can be lowered or whether deregulation is feasible, a set of more complex questions must be addressed. We look at the dynamics of supply adequacy in order to evaluate whether total deregulation would continue to lead to adequate supplies. Although in our opinion, socially desirable supplies would exist, supplies needn't be "adequate" as the term appears to be defined. Opponents of deregulation charge that if a market were deregulated, the market demand would fall, which would lead to a lower supply and thus higher prices. Clearly in a static framework this statement can only reflect an ignorance of the basic theory of supply and demand. In a dynamic framework, however, it might be valid under certain restrictive conditions. The following analysis will be twofold: first, we will examine the economic efficiency criteria for a price cycle; we will then briefly examine the problem.

Milk production has a natural biological annual cycle and a demand cycle which runs counter to the production cycle. In such

cases the economically desirable price cycle would equate the marginal rate of transformation, MRT, between time periods to the marginal rate of substitution, MRS, between time periods by equating the price ratio between time periods to MRT=MRS.

With perfect information and anticipations of price cycles the optimal price cycle would evolve, risk aversion would not affect production decisions, and no cobweb type stability problems would occur.

For a market with demand conditions as depicted in Figure 1 and sufficient supply that there will be year around production of Class II products from grade A milk, as supply shifts through its annual cycle then farm prices would cycle less without regulation than with it (i.e., the AR curve is by necessity "steeper" than the ΣD_i curve). Any market that must import milk from such a market on a year around basis will also have a smaller farm price cycle because its price will be this market's price plus transport, and that price will vary by less than it would from the movement of its supply along its AR curve.

Fluid consumer prices would fluctuate much as they do today at a lower price, because the competitive price and the regulated price will vary along with the manufacturing grade price. Moreover, the order system itself does not stabilize the nation's manufacturing price. However there may be several other "intermediate" markets which are somewhere between being a surplus or deficit market on a year around basis and thus have wide fluctuations. The fall price could rise to an import price and decline to a manufacturing grade price in the spring. In these markets both producer and consumer prices could fluctuate more than in the regulated case. But if there were perfect anticipations these price cycles would be desirable, reflecting societal evaluation of supplies. Also, Class I and bottled milk final prices would be on average lower through the whole cycle than current prices. Since prices cannot exceed a milk import price, and without regulation prices must fall in the markets which have surplus supplies, the price cycle cannot exceed this, now lower, import price. Producers in these markets would have an accurately anitcipated annual income to apportion through the months of the year in the same manner as farmers of seasonal crops and many college professors who are paid on a 9 month basis.

The only economic costs of price cycles are those associated with risk aversion and dynamic overshooting of equilibria (the cobweb problem). The order system itself currently does not stabilize the Class II price. Thus, except for a minor price cycle dampening effect caused by the two month lag of the Class I price behind the Class II price, the class prices are not stabilized. Any market which would have substantial Class II production on a year around basis or be dependent upon such a market for imports year around would thus be more stable without regulation: its supply curve would cycle up and down the flatter ΣD_i curve rather

than on the AR curve. This is true for random shocks to the system affecting D_I, D_{II} or S as well as known cycles. Thus if there are stability gains from regulation they relate to the intermediate type of market mentioned above.

The gains from stability may be measured by the supply curve shift (if any) induced by risk aversion and by the deadweight loss triangle differences between the appropriate supply and demand and actual supply and demand in a cobweb cycle. The way the order system reduces risk for these markets is by making the price cycle smaller. A narrower price cycle reduces possible losses. For instance, consider the case in which supplies have led to an unusually long period of spring excess production. With a narrowed price cycle, a longer period of excess production will not create as great a depression of normal returns. Although risk can be reduced by narrowing the price cycle, the true risk and dynamic overshooting problem is caused more by the variability in the duration of the price cycle, rather than its amplitude. The means of ameliorating the problem has been to inefficiently narrow the cycle, and thus reduce the impact of interannual changes in duration on interannual changes in farmer returns.

For simplicity, first suppose there is only one such intermediate market, and assume, quite reasonably, that random factors may vary the duration of the cycle, causing risk problems. Clearly the maximum price in this market may not exceed the import price for milk from other markets, and the import price would be lower without regulation than with regulation. Returning to the charge that lowering demand will lower farmer returns which will in turn lead to lower supplies and higher (than original) prices, it can be seen that not only is this nonsense in a static model, but that this effect could not be created by risk aversion. Assume that risk aversion reduced supply sufficiently that the market depended upon imports on a year around basis. The level of the import price could not exceed the Upper Midwest manufacturing price by more than transport costs. This would be lower than the current price (except in the far west which would be generally self sufficient). In addition, the grade A price in the Upper Midwest will fluctuate along ΣD_i, not AR, so this import price will be more stable than the farm price with regulation. It follows that since price would be more stable in this eventuality, that risk aversion would not lead to a supply contraction following deregulation to a degree sufficient to create a year around dependence on outside milk unless the year around dependence would occur even in the absence of risk. This is a sufficient condition to show that the static costs of regulation exceed the dynamic benefits of stabilization. But this argument has turned on the existence of only one such intermediate market.

If there were a substantial part of the U.S. milk supply in intermediate markets, the result could be different. Consider what would happen if the bulk of the milk supply were in intermediate markets or markets which were dependent upon intermediate markets for imports on a year around basis. Because the efficient areas in

the Upper Midwest, New York, California and other areas might not produce enough to offset these cycles, dynamic instability beyond its current level could occur. There could then be associated economic costs of instability. One factor that theoretically could create several of these intermediate markets would be the possibility of farmers "reconverting" back to be grade B farmers rather than being grade A farmers. For a variety of reasons we do not see this as a major problem in today's world. One reason for this is that there is currently a regulation induced massive surplus of grade A milk. The process of shifting from grade B to grade A status entails several fixed costs. The reconversion from grade A back to grade B is unlikely to be profitable for most farmers, so the likelihood of having insufficient grade A due to reconversion to grade B is, at least, in the remote future. Other factors make this unlikely to create supply problems even were reconversion to grade B to proceed rapidly. One factor is that processors may contract with producers delivering to individual manufacturing plants for an agreement for them to maintain a reserve grade A status. This is much like the standby pool contracts which were used in this last decade but the contracts need not foreclose virtually all supplies as did the standby pool [2]. Were grade A milk to become short due to reconversion, this would be a good strategy for individual processors. Furthermore, there are a variety of governmental actions that could achieve stability despite no excess grade A milk above the grade B supply. For instance, a temporary grade A permit may be seasonally available, where the criteria to pass inspection would be based on milk quality, rather than the typical year around permit based primarily on the physicial facilities on the farm. Slightly higher inspection costs on a seasonal basis could solve any potential problem. Another factor is the possibility of using reconstituted or partially reconstituted milk. Milk powder can be made with grade B milk. Ergo, if when grade A supplies are short, consumers simply shifted to reconstituted milk, then grade B milk reconversion is not a problem. As we note below, partially reconstituted product could solve almost all stabilization problems.

Historically, radical problems of dynamic instability in milk marketing can generally be traced to monopolistic classified pricing and free riding on the monopoly price (cf., [1] and [3]). Other preregulation problems were due to massive market insulation, which no longer exists, and to monopsonistic practices based upon the massive costs of farmers knowing their correct weights and tests. Farm bulk tanks, and superior chemical testing technology, coop testing facilities, and regulated verification of weights and tests have virtually removed this latter problem.

Supply contracts of various sorts may also reduce risk. In addition, insurance schemes could be run by the government at much lower costs to society than the current regulatory scheme. The risk averse farmer could voluntarily subscribe to a pay in-pay back plan. He could agree to place x% of his output under a plan whereby if price deviates from the weighted average of past prices (e.g., five year weighted average of price over variable costs) he would be brought

to parity with this average of past prices for that percent of his milk by paying in or being paid out of the insurance pool. Various modifications of such a scheme are available depending upon goals, and the trade off between dynamic stability and risk. Such a scheme is simply a modified futures market solution to the risk problem.

Deregulation and parallel modification of state laws to permit the use of reconstituted milk could also radically reduce risk and instability. Currently, reconstituted milk is virtually prohibited in most areas. Reconstituted milk is based on intertemporally fungible milk powder. If reconstituted milk were indistinguishable from fluid milk, no price could exceed the national Class II price by more than the costs of reconstitution. We can not predict how inexpensive or realistic the product could be, because economic prohibitions have probably curbed technological progress in this area. Certainly factory reconstituted product is more realistic than home use of milk powder. This is particularly the case for a product which has only 10% or 20% reconstituted with the remainder being fresh fluid milk. Due to a recent legal decision, one bottler is producing and selling 100% reconstituted milk in North Carolina for 20¢ per gallon (about $2.25 per hundredweight) below the fluid price. If, during the fall months, ten, twenty or thirty percent reconstituted milk were acceptable and could be sold, then the raw milk and fresh milk prices would be stabilized almost to, or more than their current AR curve induced cycle level. Moderate changes in the percent of final product which is in fact reconstituted could smooth typical supply shifts even if grade B reconversion were to take place. Adequate supplies of milk (one hundred percent fresh fluid at a premium and lower percent fresh fluid for those who did not desire to pay extra) would exist in every market.

Finally, before leaving this topic, we should note that much of the U.S. milk is reconstituted in part. Fortified skim milk is legal in most states. In most of these areas the price differential between skim milk and milk is greater than in areas that prohibit this practice. Fortification is essentially the adding of powdered milk solids to non-fat milk. This procedure is less expensive than deriving the same product through direct means. In effect the final product is a partially reconstituted product and its massive use shows that consumer resistance to a partially reconstituted product is low, at least when many of them do not think of it as partially reconstituted milk.

Factory reconstituted product could potentially stabilize all markets if it were not prohibited and it were generally accepted by a significant portion of consumers. If so, its use would assure adequate supplies of both fresh fluid milk (by substitution of demand to this other product) and total milk (including reconstituted milk). The product's intertemporal fungibility could potentially smooth producer price cycles more than their current cycle as well as smooth consumer prices.

As was noted above, at the margin the Class I price in all (or almost all) markets has been raised above the level necessary to assure supply adequacy. Clearly the adequate supply goal cannot justify the current level or restrictiveness of regulation. The complete removal of regulation would imply greater price fluctations in some markets. However, sufficient supply would be forthcoming so that prices in the high point of their cycle would be below their regulated levels. If supply adequacy is defined in terms of sufficient supplies to keep prices stable, deregulation would lead to inadequate supplies in some markets. On the other hand, if supply adequacy is redefined by what prices consumers would have to pay for the amount of product farmers would be willing to produce at those prices, regulation itself, by raising prices, makes supply less adequate.

VI. The Orderly Marketing Goal

This goal is probably the worst defined of the goals. In a recent Order extension, the Order was extended because of "disorderly marketing" in the affected area, Mississippi. Herb Forest, Director of the Diary Division, listed three points, not as evidence of disorderly marketing, but as being elements of disorderly marketing [6]:

1. ". . . there was evidence that handlers were buying on a flat price regardless of utilitization . . ."

2. ". . . there had been no reliable procedure for establishing class prices . . ."

3. ". . . there was no impartial audit of handler's records to verify payment to producers and no verification of weights and butterfat . . ."

In other words, disorderly marketing was defined as the absence of monopolistic price discrimination, the presence of market determined prices, and the absence of verification of weights, tests, and payments. The final point of course does not deal with classified pricing. Verified weights and tests could be implemented even without classified pricing. Clearly if one accepted this definition of disorderly marketing then any well functioning competitive market for any product, even absent monopoly power, monopsony power, price cycles, disruptions, and fraud would be termed a "disorderly market."

This does not mean no concept of disorderly marketing is valid. In the 1930's some markets had milk withholding actions, lockouts, and violence. Disorderly marketing was not then a meaningless catchall justification. Severe localization of markets had led to some monopsony power, and coops in these markets were developing monopoly power. As the monopoly power more than offset the monopsony power surpluses arose. Surpluses and classified pricing led to disruptions and truly "disorderly marketing." Most disruption was associated with classified pricing, and the disruptions reflected the 1930's as much as it reflected characteristics peculiar to milk marketing. Many markets

weathered the 1930's without these disruptions, accepting the competitive (or even monopsonistic) price of the time which was, admittedly, below the long run equilibrium level (cf., [1] and [3]). In fact most milk regulation went into effect after the depression.

The federal order system developed along with state orders until almost all the grade A milk was regulated in the late 1960's. Coops covering vast portions of the United States have recently been sued by the U.S. Department of Justice. The allegations indicate a resurgence of something akin to the situation in the 1930's. Some alleged monopoly coops started to raise classified monopoly premiums above the regulated Class I prices. Free riders again started to abound. The monopolists allegedly developed a scheme to pay off some free riders for agreeing to stay out of the market and used "pool loading" and milk withholding as a predatory techniques to deal with competitors. This pool loading involved pooling milk on an order to create a lower utilization in the Order and a lower blend price for competitors. For instance for an extended period of time Alma Wisconsin milk was, by virtue of regulatory rulings, pooled on Oklahoma and then on Nashville. A miniscule proportion of this milk, actually left Wisconsin; it simply "traveled" on regulatory paper. In the Oklahoma market, as one of numerous examples, the percentage of milk in Class I fell from historical levels of about 60-80% to levels about 40-60%. Blend prices crashed, with the monopoly coop paying its producers about 60¢ per hundredweight (on a price of about $6.00) higher than non-members could return. This "paper pooling" of outside milk amounted to up to 45 million pounds of milk per month in a market that only had an indigenous milk supply of about 55 million lbs. Of 160 non-coop members in the market, all but 4 withdrew by mid 1971. A competing coop tried to enter, but was not able to establish any real marketing base. Radical price disruptions, milk withholding actions, and predatory sales of bottled products were instituted not only despite regulation, but by manipulation of the regulatory provisions. After a series of internal USDA memos on this problem which started as early 1968, the USDA finally took action to inhibit this disorderly marketing in 1971. Even these actions left one of the most prominent examples still in existence as of 1974 when antitrust action and a consent decree finally halted it. These allegations and support maybe found in reports from the Department of Justice [2] and [4].

More recently, inflexible regulation or other factors has led to milk disposal problems in the northeast. Certainly the order system has not succeeded in halting disorderly marketing. The question is, has it decreased disorderly marketing?

Two points should be made beyond these examples of disorderly marketing in the market order context. The first point is that if we reject the producer income goal as currently being achieved and reject the adequate supply argument for prices set as high as they are currently set, then we also find that the disorderly marketing

goal, if it is being met, is being met at price levels which are much higher than necessary. The second point is that the technology of milk marketing is radically different than in the past and no longer requires this type of regulation. Fraud, antitrust, and commercial statutes can serve equally well to achieve stable competitive markets in today's world.

When regulation was first enacted, and even up until the last decade, one might have been sympathetic to the operation of the system under the farmer income goal. If one took as granted that for political or other reasons this goal was best met by classified pricing, then one might conclude that the regulations were necessary to eliminate market disruptions caused by free riding. Classified pricing leads to free riding competition, which, in the absence of regulation, was responsible for the violence that erupted in some markets. However one cannot justify a system which inhibits disorderly marketing when monopoly classified pricing is used once the need for monopoly pricing no longer exists. Also, at the margin, the desire to avoid disorderly marketing cannot explain the level of restrictiveness of the regulation. Clearly all the protection against free rider disruptions of the system could be maintained through pooling of receipts if all Class I prices were decreased by 10¢, 50¢ or even more. Disruptions (e.g., milk dumping or cow killing) would probably occur during transition to lower prices because some farmers will react to such changes exactly as they have to other adverse changes by attempting political protest through publicity of such actions. Leaving transition problems for another paper 3/, all protection against disruptions would exist even with lower class prices.

Beyond the fact that disorderly marketing cannot explain the level of the Class I price, in the last several decades the likelihood of disruptions in even unregulated markets has been markedly reduced. For a deregulated market, todays technology reduces the chance of market disruptions. Today's sanitary regulations deposit cleaner milk in refrigerated farm bulk tanks. Todays large coops through internal mechanisms, brokers, and high speed telecommunications know virtually instantaneously which places are, and are not, in need of milk. Efficient bulk over-the-road haulers can easily move milk hundreds of miles. The farmer is no longer forced to dump milk for which he cannot find a nearby outlet rapidly. Often, even in the past, the farmer's milk was not dumped when a market disappeared. Instead it went into "low value" manufacturing uses, leading to lower incomes and fighting in the marketplace. Without the need for monopoly pricing, these outlets would be paying a price close to the same price as fluid outlets and the costs to the farmer, or coop,

---

3/ A proposal for phased deregulation designed to minimize these problems maybe found in [4].

of such diversion to manufacturing use would be small. In short, absent large regional conspiracies that could generally be reached under antitrust laws, farmers and producers can be little affected by monopoly or monopsony power. Interregional arbitrage can rationalize today's markets.

VII. Summation

Milk marketing regulations were first imposed during a period when farmer income was depressed, supply adequacy was threatened, and some markets were in disruption. Today, however, farmer incomes and marketing technologies have changed, but milk regulation persists. In this paper we examine the goals of milk regulation. We find that if one of its stated goals, raising farmer income, were interpreted as to be actually an intermediate goal, a means of transferring intended income from more affluent people to less affluent people, the milk regulations are no longer operated in the public interest. We observe that today, at the margin the raising of the Class I price leads to more money transfered from the less affluent to the more affluent. We also find that at the margin, the level of the Class I price is above that needed for adequate supplies or for orderly marketing. These are powerful reasons to question the level of milk regulation in today's economy.

We have also argued that technological change along with a refocusing of the definition of adequate supplies to center on the level of price the consumer must pay, rather than on fluctations in prices or quantities, enables us now to remove all classified pricing without violating the basic goals of milk regulation as we have defined them. Alternative government programs which entail lower market distortions could be used if needed to handle remaining problems.

References

1. Black, J. D., The Dairy Industry and the AAA, The Brookings Institution, Washington, D.C., 1935.

2. Eisenstat, P., Masson, R. T., and Roddy, D., An Economic Analysis of the Associated Milk Producers, Inc. Monopoly, U.S. v. Associated Milk Producers, Inc. (394 F. Supp. 29 (W. D. Mo. 1975), Aff'd., 534 F. 2d 113 (8th Cir. 1976)), 1974.

3. Gaumnitz, E. W., and Reed, O. M., Some Problems Involved in Establishing Milk Prices, AAA, USDA, 1937.

4. Hall, J., Fonz, R. and Masson, R. T., Milk Marketing, United States Department of Justice, GPO, Washington, D.C., 1977.

5. Ippolito, R. and Masson, R. T., "The Social Cost of Government Regulation of Milk," forthcoming, Journal of Law and Economics, 1977.

6. MAP, Marketing Assistance Program et al v. Butz, Secretary of

Agriculture, Appellant's Brief, Civil Action No. 76-1696, 1976.

7. Thraen, C. S. and Buxton, B. M., "An Analysis of Household Consumption of Dairy Products," University of Minnesota Ag. Exp. Sta. Bull. 515, June 1976.

8. USDA, Agricultural Statistics, 1975, 1975.