ALTERNATIVE PRICING POLICIES FOR CLASS 1 MILK UNDER FEDERAL MARKETING ORDERS—THEIR ECONOMIC IMPACT

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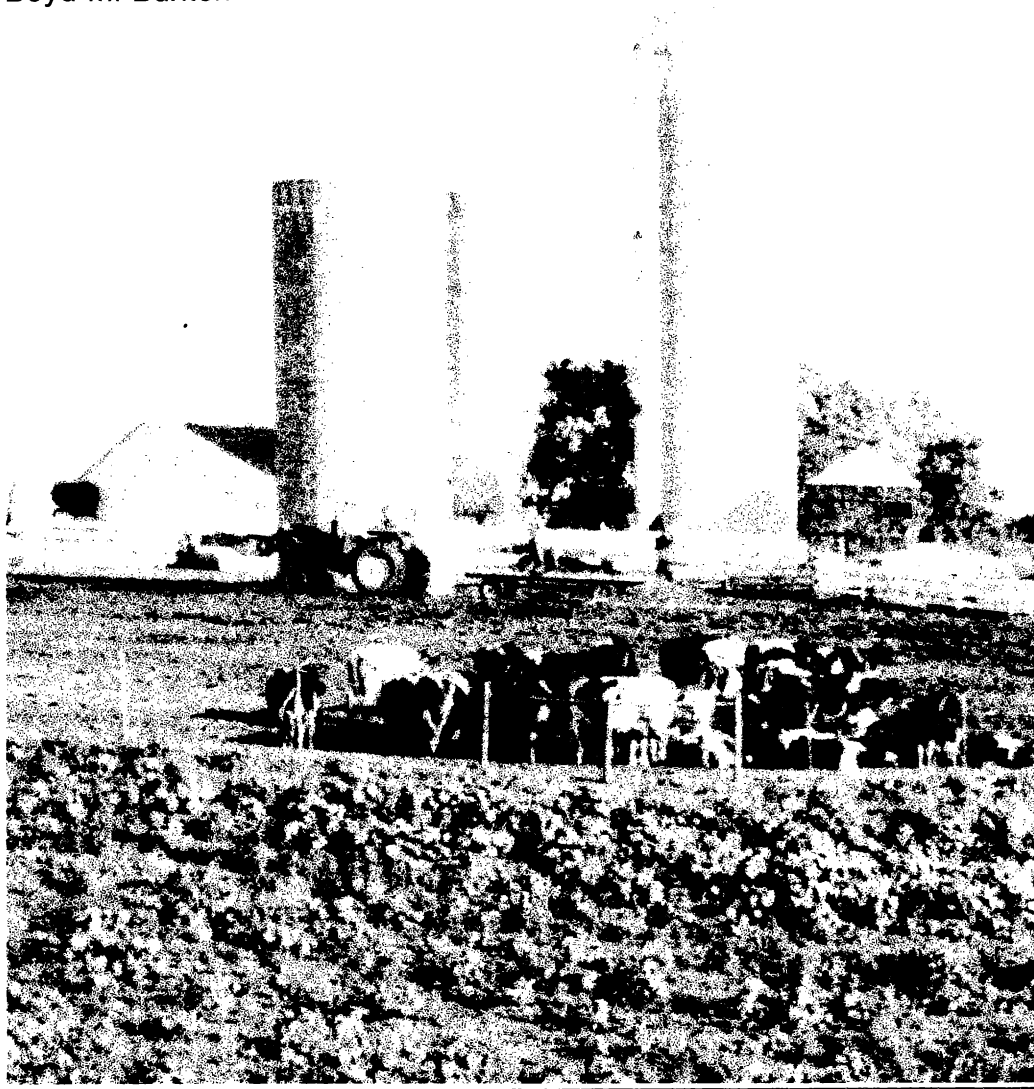

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ABSTRACT

Four alternative Class I price structures are examined for the U.S. dairy industry: (1) continuing current programs and policy, (2) increasing Class I differentials 45 cents in all regions, (3) decreasing Class I differentials 75 cents in all regions, and (4) eliminating minimum Class I differentials. The estimated impact of these policies is shown on the Minnesota-Wisconsin (M-W) price (the basic determinant of all prices), regional and aggregate farm prices and income; milk production; fluid milk and manufactured dairy product prices; and industry structure.

Keywords: Dairy products, Regulation, Prices.

PREFACE

There has been a growing concern in recent years about the impacts of government regulations in the dairy industry. One aspect of this concern is the impact of Federal (and State) milk marketing orders that establish and enforce classified pricing where milk is priced according to its final utilization.

This study analyzes the impacts of alternative Class I pricing policies and elimination of pricing and pooling under milk marketing orders. All projections in the main body of this report were made prior to the Dairy Price Support Announcement effective April 1, 1977. Impact estimates of the four alternatives during the 1977-85 period are intended to illustrate the direction of change rather than the precise magnitude.

The study was made by the Dairy Program Area Commodity Economics Division, Economics, Statistics, and Cooperatives Service. Richard Fallert and Boyd Buxton were project leaders. Other analysts working on the report were John Hanes, Floyd Lasley, George Frick, Harold Lough, Gary Frank, David Cummins, W. Webster Jones, Lynn Sleight, Patrick Moast, Charles Shaw, and James Miller.

On January 1, 1978, three USDA agencies —the Economic Research Service, the Statistical Reporting Service, and the Farmer Cooperative Service — merged into a new organization, the Economics, Statistics, and Cooperatives Service.

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SUMMARY AND IMPLICATIONS

Government regulations in the dairy industry have direct impacts on the production and consumption of fluid milk. Among these are Federal (and State) milk marketing orders which establish and enforce classified pricing of milk according to its final use.

Four alternative policies under Federal (and State) milk marketing orders are analyzed, and direct impacts of each policy on the dairy industry are discussed. The alternatives are: (1) continuing current policy, (2) increasing Class I differentials 45 cents in all regions, (3) decreasing Class I differentials 75 cents in all regions, and (4) eliminating minimum Class I differentials.

The alternatives do not represent changes which have been proposed, nor do they represent changes which would appear by themselves to be feasible. The three different levels of Class I price structure adjustments provide outside limits of the effects of the respective adjustments. If decisionmakers feel that less drastic changes would be more feasible or desirable, interpolations between the impacts of the respective alternatives and the alternative of continuing current policy (alternative 1) could be made.

A serious problem facing policymakers is whether minimum intermarket Class I price differentials should be adjusted to reflect increased transportation costs. In each of the first three alternatives it is assumed that the current transportation differential of 15 cents per hundredweight (cwt) per 100 miles is not effective, but the prevailing Class I price structure does account (through over order payments) for real transportation costs to closest available supplies of milk for the fluid market. Economic rationale suggests that before it is appropriate to consider changing Class I differentials to reflect increased transportation costs, a more realistic set of basing points (as opposed to a single basing point at Eau Claire, Wis.) might be considered. Another option would be to lower the differential at the basing point along with tilting the pricing surface to more distant markets to more nearly reflect transportation costs. Results of alternative 4 (eliminating minimum Class I differentials) give some insight as to what the geographic price structure would look like in the absence of administered minimum prices. Further research on a more disaggregated basis is needed to more precisely develop alternative Class I price surfaces and the likely consequences of implementing these pricing systems in milk marketing orders.

Alternative 4 illustrates the underlying economic forces that probably would be operative in the absence of Federal (and State) classified pricing and pooling policies. Without classified pricing and pooling under Federal orders, pressures probably would develop for States and/or cooperatives to operate their own classified pricing programs. This study does not address the question of the likely outcome of these efforts in the real world, but assumes that the real world is sufficiently competitive that only cost justified Class I differentials would prevail.

Indications are that the impacts of the alternative policies would be substantially different when purchases of dairy products are made under the price support program than when no purchases are made. The main body of this report assumes that no products are being purchased under the price support program during the 1977-85 period. This assumption is made in order to better isolate the direct implications of alternative policies under the market order program. A separate analysis is done under the assumption that substantial purchases are being made under the price support program.

Milk Production

Based primarily on projected consumption, milk production would be expected to increase from 120.2 billion pounds in 1976 to 124.9 billion pounds in 1985 under continued programs. Although aggregate U.S. milk production would not be significantly different under any of the four alternatives, substantial regional shifts in production would occur.

Three regions would produce more milk under a policy of eliminating Federal (and State) minimum Class I prices. Nearly 80 percent of the gain would occur in the Lake States (Minnesota and Wisconsin). Six regions would produce less milk, with nearly 40 percent of the overall loss occurring in the Northeast.

Milk Prices

Eliminating minimum class prices under milk marketing orders would lower the effective price paid by handlers for milk used in fluid milk products (Class I under milk orders) across the country. The greatest reductions would be in the Northeast, South, and West. In addition to lowering the general Class I price surface, a multibasing point Class I price surface would be

expected to evolve with possible basing points (pockets of excess reserve Grade A milk) at several locations — especially the upper Midwest, Northeast, and West. This approach to pricing is substantially different from past and current U.S. Department of Agriculture pricing policy. It would allow establishing intermarket Class I price differentials more closely reflecting increased transportation costs and more in conformance with location theory.

In general, eliminating minimum Class I differentials would increase the Minnesota-Wisconsin (M-W) manufacturing milk price (the basic determinant of all prices), and would have only a minor impact on the average U.S. milk price received by dairy farmers. However, the regional price effects would be substantial. Manufacturing-grade milk producers and Grade A dairy farmers in regions such as the Lake States, Corn Belt, and Plains, with a high proportion of milk used in manufactured dairy products, would receive a higher price and higher net farm income than under continued current policy. Conversely farmers in the Northeast, South, and West would receive somewhat lower prices. The trend to milk being pooled under marketing orders and to one grade of milk (Grade A) would be slowed or possibly reversed until some of the problems of price and market instability associated with marketing Grade A milk under relatively tight supply-demand conditions would reappear.

Impacts of decreasing Class I differentials 75 cents per cwt under existing milk marketing orders would generally be in the same direction as indicated above for eliminating minimum Class I differentials. However, they would be of lesser magnitude. The impacts of increasing Class I differentials would be similar, but in opposite directions, to the impacts of decreasing Class I differentials.

Geographic Class I Price Structure

A major conclusion of this study is that the current Federal order pricing and pooling system administratively undergirds the Eau Claire, Wis., plus transportation cost system of pricing. This would not likely continue in all regions in the absence of milk marketing orders. This evidence suggests that prices paid by handlers for milk used in fluid milk products would tend to fall towards the manufacturing milk price in any region where Grade A production exceeded fluid demand in its own region, plus demand by other regions, and a necessary reserve. The regional structure of prevailing Class I prices would be sufficiently higher than the manufacturing milk price to entice a sufficient National Grade A milk production for fluid milk product needs plus an adequate reserve for seasonal and daily fluctuations in supply and demand. A structure of Class I prices similar to those in alternative 4 would likely evolve in the absence of minimum Federal order pricing and pooling provisions.

Consumer Prices

Increasing Class I differentials tends to decrease manufacturing milk prices. Decreasing or eliminating minimum Class I differentials tends to increase manufacturing milk prices.[1] Results show that eliminating minimum Class I differentials would probably lower Class I U.S. prices about $1 per 100 pounds of milk. At the same time, the U.S. manufacturing milk price would increase 65 cents by 1985. This is equivalent to about a 5-cent lower price for a half gallon of fluid milk, a 7-cent higher price for a pound of cheese, and a 7-cent higher price for a pound of butter.

Consumption

When the manufacturing milk price is above the support level, a policy of increasing Class I differentials results in decreased fluid milk product consumption, but due to the depressing impact on the M-W price, consumption of manufactured dairy products and total milk is increased. The opposite is true under a policy of decreasing Class I differentials or of eliminating minimum Class I differentials. However, if the manufacturing milk price is at the support level rather than at a market clearing level, the impact on commercial consumption would be quite different. Increasing the Class I differential under this set of conditions would decrease fluid milk product consumption, but the manufacturing milk price and manufactured product consumption would be unchanged and total milk consumption would decrease. The opposite would be true for decreasing Class I differentials.

Selected groups of U.S. households who are heavy (or light) consumers of fluid milk relative to the U.S. average tend to be heavy (or light) consumers of manufactured dairy products. Thus, a decrease in fluid milk prices relative to manufactured dairy product prices would not greatly advantage one group relative to any other group within the U.S. population.

Impacts on Industry Structure

The major impact of regional price changes would be on regional farm income, the location of milk production, and the location of manufactured dairy processing plants — especially

[1] This assumes that manufacturing milk prices are above support levels.

cheese and butter plants. The cheese industry would be faced with the most severe structural adjustments under any change in classified pricing policy. It is estimated that about 25 fewer cheese plants would be needed in the Northeast and South Central regions under a policy of eliminating minimum Class I differentials compared with continued programs. This would be offset by the need for an estimated 15 additional plants in the Lake States and the Corn Belt.

Milk Market Orders and Price Support Program

The impact of the policy alternatives considered in this report would be quite different if the manufacturing (M-W) price were at the support level rather than at a market clearing level. Producers in all regions would receive lower prices if Class I differentials were lowered at a time when the M-W price was at the support level. The net impact would be lower producer prices, returns, milk production, and government purchases of manufactured dairy products. Fluid milk product and total milk consumption would increase since manufacturing milk prices and manufactured dairy product consumption in commercial channels would remain unchanged.

Milk Market Orders and Import Quota Policy

Eliminating minimum Class I differentials or decreasing prevailing Class I differentials when market prices are above support levels would put upward pressure on the manufacturing-grade milk price, and increase the price of manufactured dairy products relative to fluid milk product prices. This would make the United States less competitive in dairy products (primarily nonfat dry milk, butter, and cheese) in world markets.

ALTERNATIVE PRICING POLICIES FOR CLASS I MILK UNDER FEDERAL MARKETING ORDERS—THEIR ECONOMIC IMPACT

Richard F. Fallert and Boyd M. Buxton

INTRODUCTION

Pricing milk according to use (classified pricing) is a basic part of Federal and State milk marketing orders. At present, more than 95 percent of the milk meeting sanitary standards for fluid use (Grade A) is priced under one or both marketing orders.[1] Thus, pricing policies under milk marketing orders can have a substantial impact on the U.S. dairy industry.

Under classified pricing, there are three key prices in determining production and consumption of milk: (1) the Class I price paid by processors for fluid-grade milk used in bottled fluid milk products, (2) the Minnesota-Wisconsin (M-W) manufacturing milk price paid by processors for milk used in manufactured dairy products, and (3) a weighted all-wholesale milk (or blend) price reflecting an average price received by all dairy farmers in a specified market or area. The specified minimum difference between the Class I price and the M-W manufacturing price (referred to as the Class I differential) is a policy variable established under Federal milk marketing orders. Specified minimum Class I differentials can only be changed after receiving evidence at Federal order hearings. The absolute level of Class I differentials and the basic structure of minimum Class I prices have remained essentially the same since 1968 even though transportation charges have increased substantially.

The M-W manufacturing milk price increased from an annual average of $4.17 per cwt at a 3.5 percent butterfat test in 1968 to $8.48 in 1976. Since the minimum Class I differential remained the same during this period, the Class I differential as a percentage of the M-W price has declined substantially in recent years (see appendix table 19).

The object of this study is to analyze the likely effects of continuing current levels of Class I differentials to 1985, or of increasing, decreasing, or having no minimum Class I differentials. Effects of these four pricing policies on regional farm prices and income, milk production, prices and consumption of fluid milk and manufactured dairy products, and implications for the number, size, and location of dairy farms and processing plants are presented.

BACKGROUND

In 1976, 121.1 billion pounds of milk were produced in the United States. About 44 percent of this total milk supply was consumed in the form of bottled fluid milk products measured on a fat solids basis. About 4 percent was used on the farm where it was produced, with the remaining 52 percent used for manufactured dairy products. These percentages have remained quite stable over the past decade.

Since milk is a bulky and highly perishable product, it must be cooled quickly and handled under specified sanitary conditions to minimize bacterial contamination. If milk is marketed in the form of bottled fluid milk products, it must be on consumers' tables within days from the time it is produced. Milk sold to plants for producing manufactured dairy products (such as butter, dry milk powder, and cheese) must be processed into these products within a short period of time, but the products themselves can be stored.

There are two types (grades) of milk at the farm level—fluid grade (commonly called fluid

[1] A glossary of terms specific to the dairy industry is presented in appendix C.

eligible or Grade A) and manufacturing grade (sometimes called Grade B). Designated health authorities (Federal, State, or municipal) generally require that fluid-grade milk used in packaged fluid milk products be produced under higher farm sanitary standards than milk used to produce manufactured dairy products. These higher standards reflect the interest of public health authorities in controlling milk-borne diseases. Fluid milk is more subject to bacterial contamination in the marketing process than manufactured dairy products. Stricter sanitary requirements for fluid milk also exist because high quality milk has a longer shelf life and better flavor.

If production of fluid-grade milk exceeds the amount needed for bottled fluid milk products, it may be and is used to produce manufactured dairy products even though its quality exceeds the standards established for milk used to produce these products.[2] (Fluid-grade milk that is actually used for fluid consumption is Class I milk. Fluid-grade milk that is reverted for use in manufactured products is Class II milk.) On the other hand, manufacturing-grade milk (Grade B) may only be used to produce manufactured dairy products, because it does not meet the sanitary standards for bottled fluid milk products.

One justification—mentioned more often in the past—for a Class I differential is that higher quality standards result in higher production costs for fluid-grade milk than for manufacturing-grade milk. Over time, the differences in quality standards between the two grades have narrowed and technological development in the industry has changed. These have substantially narrowed the cost differences in producing the two grades of milk (*2*).[3] As long as the difference in cost of producing and distributing the two grades of milk exceeds the benefits of producing and marketing only one grade, one approach to establishing the level of Class I price differentials is to set the minimum differential at a level that will ensure a sufficient supply of fluid-grade milk to meet bottled fluid milk product demand plus a necessary reserve. However, given the variation in supply and the inelastic nature of milk supply and demand, the industry is susceptible to substantial price and market instability.[4] (Other factors affecting the structure of Class I prices, and a different point of view on criteria used to establish the level of Class I differentials, are presented later in the text.)

Fluid milk production and consumption vary seasonally and in opposite paths. Production reaches a peak in May and June, and a low in the fall. Consumption, however, is higher in the fall and winter than in spring and summer. During 1973-76, for example, daily milk production in Federal order markets was 13 percent lower in November than in June, but daily fluid milk product sales in Federal order markets were 13 percent higher in November than in June (appendix table 2).

Potential market instability for fluid-grade milk producers is illustrated in figure 1. During the low production months of the year, fluid milk needs in an isolated market would require that milk be shipped to the central city market from both nearby zones A and B. (Only manufacturing-grade milk producers would be located in zone C, and their milk would be used to produce storable manufactured dairy products. Their milk would not be associated with the fluid milk product market.) However, as milk production increases seasonally, the fluid supply zone would decrease until only Grade A milk from producers in zone A and selected producers in zone B would be needed to meet fluid demand. Some producers in zone B would find it difficult to market their milk for fluid use during the high seasonal production months. In the absence of classified pricing and pooling systems, competition among Grade A producers in zone B for the higher priced fluid sales in the central city would cause downward pressure on Grade A milk prices that would fall until manufacturing plants could compete with fluid bottlers for this milk. At that point, the farmer would be indifferent as to whether his milk was used as fluid or for manufactured dairy products. That is, the price of Grade A milk would be about the same as manufacturing-grade milk in zone B during the high production months. This illustrates that producers of Grade A milk over time must receive an economic incentive (higher return) to produce milk under higher sanitary standards so it will be eligible for fluid consumption.

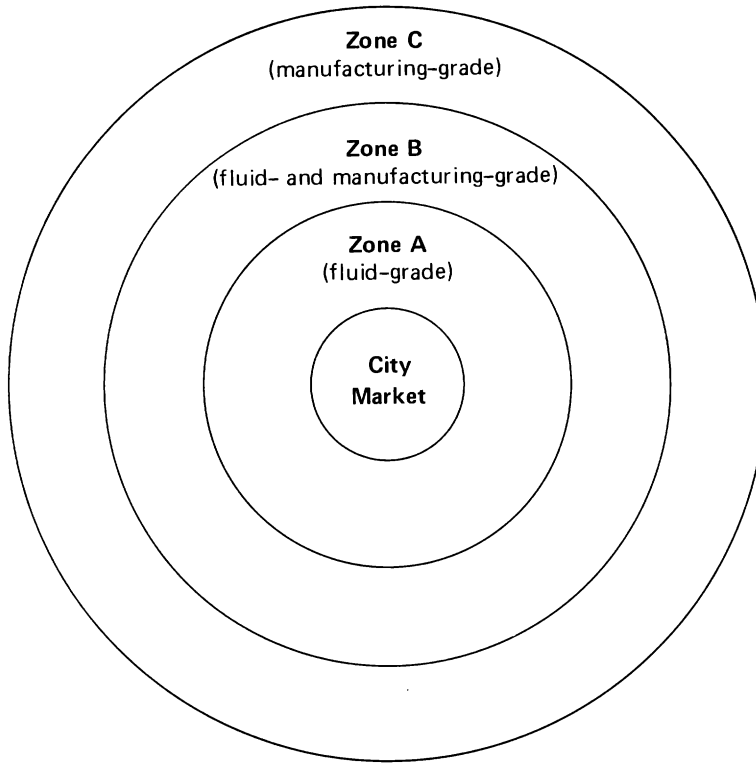
In addition to seasonality in milk production, there are substantial differences in needs for fluid-grade milk for bottling purposes on different days of the week. This is brought

[2] In 1976, for example, about 60 percent of the fluid-grade milk in Federal milk orders was used in bottled fluid milk products. The remaining 40 percent was used to produce manufactured dairy products (including cottage cheese, ice cream, yogurt, etc., which local health authorities are increasingly requiring to be made from fluid-grade milk). On a seasonal basis, about 49 percent was used to produce manufactured dairy products in June, but only about 32 percent in October.

[3] Italicized numbers in parentheses refer to references cited at the end of this report.

[4] Large price changes are required to either increase or decrease milk production and consumption. Alternatively, small changes in the quantity of milk produced or consumed result in large changes in prices if supply and demand in an industry are characterized as being inelastic.

Figure 1
Hypothetical fluid milk market supply zones



about because bottling plants usually bottle milk only 4 or 5 days a week. Federal order data show that for the 1963-76 period, sales of whole milk items on a Sunday are only 5 percent of an average sales day, whereas sales on a Friday are 132 percent of an average sales day (appendix table 2).

These two major factors of month-to-month and day-to-day variation in supply and demand for fluid-grade milk necessitate the production of fluid-grade milk in excess of actual fluid milk product bottling requirements. The extent of fluid-grade milk reserves on an annual average basis necessary to adequately service the the fluid milk market is a debatable issue. This study, however, bases the analysis on the assumption that an annual U.S. average Grade A reserve of 30 percent above fluid milk product sales is a workable reserve for analytical purposes. About one-third of the Federal order markets operated with less than 30 percent reserve in 1976.

Characteristics of products made from milk, features of milk markets, and the basic marketing system lend themselves to differentiating the milk pricing structure such that fluid-grade milk used in bottled fluid milk products (Class I milk) commands a higher price than if this same milk is used to produce manufactured dairy products (Class II milk). In this study, the term "Class I price" is used to denote the price fluid milk product bottling handlers pay for fluid-grade milk used for bottled fluid milk products (Class I milk). The term "Class II price (M-W)" is used to denote the price paid by handlers for any excess fluid-grade milk that winds up being used to produce manufactured dairy products (Class II milk).[5] The difference or price spread between Class I and Class II prices is called the Class I differential.

Individual dairy farmers receive a weighted average (blend) price for their milk—the Class I price times the proportion of the market's milk used to produce Class I products, plus the Class II price times the proportion of the market's milk used to produce Class II products. Aggregating returns from milk used in Class I and Class II products to arrive at a blend price paid to farmers is termed pooling. This allows all fluid-grade farmers in zone B of figure 1 to be associated with the fluid milk market during all months of the year.

[5]Some Federal order markets differentiate products into more than two classes, but the price differential between the lowest price class and these other classes is small.

Because of the relatively low consumption response to price changes and added costs of marketing fluid milk products, along with difficulties of buying milk on a flat price basis, fluid milk products handlers adopted differentiated pricing schemes. Dairy farmers then pushed for formalizing the system in order to share in the revenue from fluid milk product sales and in order to be assured of a year-round market. By the 1920's, most major fluid markets adopted a classified price system in which handlers paid for fluid-grade milk according to use (7). These pricing systems deteriorated during the depression of the 1930's. The cooperatives asked for government programs to assist in raising milk prices and stabilizing milk marketing conditions. Current legislation authorizing Federal milk marketing orders had its roots in the Agricultural Adjustment Act of 1933, with further amendments to the basic legislation in 1935 and 1937. Current Federal milk orders exist under the authority of the Agricultural Marketing Agreement Act of 1937, although administrative changes in order operations have been made over time in adapting to changing industry conditions.

Federal Milk Market Order Regulations

A Federal milk marketing order requires fluid milk handlers to pay specified minimum prices according to use of the milk. Milk used for fluid consumption (Class I milk) is placed in the highest price use.[6] Milk used in manufactured products is placed in one or two lower price classes. The lowest price class is usually the Minnesota-Wisconsin (M-W) manufacturing milk price.[7] This M-W price is the basis for setting the minimum Class I price in all Federal orders. The Class I price increases or decreases as the M-W price increases or decreases. The differential by which the Class I price exceeds the M-W price is determined in each market on the basis of evidence presented at a public hearing.

The main objectives of milk marketing orders are: (1) to provide stable and dependable markets for farmers who sell milk for consumption in fluid markets, (2) to assure consumers of adequate and dependable supplies of pure and wholesome milk, and (3) to provide an efficient mechanism which will operate in the public interest for establishing prices for milk sold in fluid markets. These objectives are to be achieved through the implementation of five major programs:

(1) Establishing uniform prices to handlers for milk received from producers according to a classified price plan based on the use made of milk. Hearings on the level of Class I prices provide opportunities for all interested parties to be heard;
(2) Pooling the proceeds of sales, usually on a marketwide basis, so that producers can be paid a uniform blend price;
(3) Impartially auditing handlers' records to verify the use and payment of required prices;
(4) Verifying the accuracy of weights and butterfat content of milk sold by producers; and
(5) Providing available statistical information concerning market supplies, demand, prices, and movement of milk so that interested parties can evaluate the market situation.

Growth in Federal Milk Orders

In 1956, the Federal order system regulated over 50 percent of the Nation's Grade A milk, and about 33 percent of all milk. In 1976, Federal orders regulated about 80 percent of the Grade A milk, and 65 percent of all milk marketed (*11*). Statistics on the growth in Federal milk orders are shown in appendix table 3.

State Milk Marketing Regulations

Many individual States became involved in milk marketing regulations about the same time and under the same circumstances as the Federal Government. State legislation establishing authority to control prices is limited to the State boundaries. It often involves control of resale milk prices at either the wholesale or retail level. The problems of setting producer prices are similar to those of Federal milk marketing orders. Seventeen States established minimum prices at the producer level in 1976, and 15 States were authorized to establish minimum prices at the wholesale and/or retail levels (appendix table 4). A more detailed discussion and comparison between State and Federal regulations, and extent of regulation by individual States, is presented in (*11*).

Justification for a Class I Differential

As described above, pricing Grade A Milk according to its use and pooling returns to pro-

[6] Class I generally includes whole milk, skim and low-fat milk, milk drinks, flavored milk, and buttermilk.

[7] The Minnesota-Wisconsin manufacturing milk price, announced monthly by the U.S. Department of Agriculture, is an estimate of the average price paid by unregulated handlers for manufacturing-grade milk in the two States. In this report, it is used as a measure of the general level of prices for manufacturing-grade milk throughout the United States, and is referred to as the M-W price.

ducers—generally on a market-wide basis—is a basic part of current Federal Milk marketing orders.

An important justification for Class I differentials has been to ensure adequate supplies of fluid-grade milk by ensuring that these prices are in proper alignment with manufacturing prices.

Classified pricing and pooling of returns for Grade A producers are mechanisms that are used to encourage Grade A milk production and for orderly disposition of reserves. They can create a reserve of Grade A milk which helps avoid shortages of a perishable product, and probably reduces instability of Class I prices and markets. If the differential is set too high above a cost-justified level, there is additional incentive for producers to produce Grade A Milk and join the pool rather than produce milk strictly for the manufacturing milk market.

Depending upon the policy objective, there are several criteria which could be used to indicate whether a specific Class I differential is appropriate. For analytical purposes, this study assumes the major criterion for adjusting the Class I differential is whether the Grade A milk supply on a regional or national basis is sufficient for fluid consumption plus a necessary reserve, so that unstable marketing conditions might be avoided. In this framework of analysis, if the Grade A supply of milk is insufficient for fluid consumption plus a reserve, but the overall supply of milk (both Grades A and B) is sufficient to meet both fluid and manufactured dairy product consumption, then an appropriate policy option might be to raise the Class I price differential. However, if the overall supply of milk for all uses (fluid and manufacturing) is insufficient to cover the total demand for fluid milk and manufactured products, then market forces would be expected to raise the M-W and Class I prices. If further price assurance is needed, a proper policy option might be to increase the price support level.

This approach differs from that under which the Department of Agriculture has operated since the late 1960's. Because the Federal order and dairy price support programs are interrelated, the Department has increasingly looked to the combined effects to ensure an adequate supply of milk for both fluid and manufacturing uses. Also, the distinctions which have been made in the past between Grade A and manufacturing-grade milk are considered less meaningful by those administering the milk order program.

Under the assumptions used in this analysis, the growth in the quantity of surplus Grade A milk available over fluid consumption plus a 30-percent reserve increased from 12 billion pounds in 1965 to 20 billion pounds in 1975. An increase projected to over 32 billion pounds in 1985 suggests that the Class I differential has been higher than needed—especially in selected high production areas—to attract sufficient Grade A milk for fluid use plus a 30-percent reserve (tables 1 and 2).[8] Thus, Class I differentials would likely fall in the absence of current Federal order minimum Class I prices. The regional and aggregate trend to Grade A Milk is shown in appendix tables 12, 13, and 14.[9]

General Impact of Classified Pricing

Most demand research shows that for a given percentage change in price, consumers of fluid milk will alter their purchases to a lesser degree than will consumers of manufactured dairy products.[10] If this is true, classified pricing can increase total returns to dairy farmers by increasing the Class I differential—and in turn the price of fluid milk products—without causing a drastic decline in fluid milk product consumption. Therefore, a classified pricing scheme designed to ensure an adequate supply of Grade A milk relative to fluid consumption, and to help alleviate some of the instability problems of marketing fluid milk, can also be used to enhance producer returns in some areas beyond what might be justified based on supply and demand for Grade A milk.

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[8]The 30-percent annual average reserve is considered by the analysts to be a reasonable overall figure for analytical purposes. Some markets—especially in the South—operate with a considerably lower reserve.

[9]Some analysts contend that factors—other than mere economic incentive—such as higher manufacturing-grade milk standards, adoption of bulk tanks and new technology, and the added costs of operating dual intake facilities are encouraging the trend to one grade of milk (Grade A). Persons with this point of view maintain that the former criterion of fluid consumption plus an adequate reserve is no longer appropriate for establishing the level of Class I differentials. Further research is needed to ascertain the costs and benefits of maintaining two separate markets for milk—especially in the upper Midwest. If the costs of maintaining two separate industries are greater than the benefits, much of the concern over excess Grade A milk would be unfounded. Even with only one grade of milk, however, there would still be the question of equity among producers in different locations and among the different types of plants and firms—bottling plants, plants servicing the fluid milk market, and strictly manufacturing plants. An important policy question would be whether or not the set of milk marketing problems would best be dealt with under a system of two separate milk markets as exist in the upper Midwest today, or alternatively, encouraging the trend to Grade A (only one grade of milk) and dealing with the pricing and marketing problems under one overall marketing system. These considerations, however, go beyond the scope of this study.

[10]Research shows the elasticity of demand to be more inelastic for fluid milk than for manufactured dairy products.

Table 1--Grade A milk marketings, product demand plus reserve, excess reserves, and percent excess reserves of Grade A marketings

Region	Grade A milk marketings 1/			Fluid milk product demand plus 30-percent reserve			Excess Grade A reserves			Percent of total Grade A marketings that were excess reserves		
	1965	1975	1985 2/	1965	1975	1985	1965	1975	1985	1965	1975	1985
	Million pounds									-- Percent --		
Northeast	30,421	28,478	30,718	24,354	24,340	26,417	6,067	4,138	4,301	20	15	14
Corn Belt	12,987	13,035	13,839	12,489	12,625	13,827	498	410	12	4	3	3/
Lake States	9,511	15,122	23,493	3,307	3,415	3,770	6,204	11,707	19,723	65	77	84
Southeast	3,887	5,005	6,009	5,212	6,028	7,050	-1,325	-1,023	-1,041	-34	-20	-17
South Central	7,749	8,421	8,975	8,845	9,376	9,924	-1,096	-955	-949	-14	-11	-11
Plains	1,906	2,292	2,184	1,671	1,618	1,589	235	674	595	12	29	27
Mountain	1,936	2,327	2,648	2,026	2,312	2,860	-90	15	-212	-5	1	-8
Southwest	7,884	10,860	15,945	6,903	7,586	8,602	981	3,274	7,343	12	30	46
Northwest	2,758	3,634	4,688	2,019	2,273	2,435	739	1,361	2,253	27	37	48
Continental United States	79,039	89,174	108,499	66,826	69,573	76,474	12,213	19,601	32,025	15	22	30

1/ Grade A milk sold to plants and dealers plus milk sold directly to consumers by farmers.
2/ Conversion to Grade A was projected to 1985 based on continuation of recent trends.
3/ Less than 0.5 percent.

Table 2--Total milk marketings, product demand plus reserve, excess reserves, and percent excess reserves of total marketings

Region	Total milk marketings 1/			Fluid milk product demand plus 30-percent reserve 2/			Excess total milk reserves			Percent of total milk marketings that were excess reserves		
	1965	1975	1985	1965	1975	1985	1965	1975	1985	1965	1975	1985
	Million pounds									---- Percent ----		
Northeast	31,854	29,141	31,015	24,354	24,340	26,417	7,500	4,801	4,598	24	16	15
Corn Belt	21,991	17,739	16,146	12,489	12,625	13,827	9,502	5,114	2,319	43	29	17
Lake States	28,045	27,063	30,409	3,307	3,415	3,770	24,738	23,648	26,639	88	87	88
Southeast	4,010	5,033	6,009	5,212	6,028	7,050	-1,202	-995	-1,041	-30	-20	-17
South Central	9,121	9,081	9,217	8,845	9,376	9,924	276	-295	-707	3	-3	-8
Plains	4,271	4,738	3,913	1,671	1,618	1,589	2,600	3,120	2,324	61	66	59
Mountain	2,204	2,588	2,843	2,026	2,312	2,860	178	276	-17	8	11	-1
Southwest	8,823	11,588	15,945	6,903	7,586	8,602	1,920	4,002	7,343	22	35	46
Northwest	4,061	4,706	5,408	2,019	2,273	2,435	2,042	2,433	2,973	50	52	55
Continental United States	114,380	111,677	120,905	66,826	69,573	76,474	47,554	42,104	44,431	42	38	37

1/ Milk sold to plants and dealers plus milk sold directly to consumer by dairy farmers.
2/ Based on fluid demand within the respective regions--does not include prevailing out-of-area movements.

An analysis of whether there is more Grade A milk than is needed according to the criterion used in this study requires an evaluation of the supply and demand situation for fluid milk region by region and for the entire system of markets. At least two criteria could be used to determine if the Class I differential has been too high. First, has any market developed a surplus of Grade A milk beyond the amount needed to service the effective fluid demand (considering the concepts of competitive equilibrium and trade) in that market year-round; and second, is the Class I differential in any market higher than the price needed to pay for and transport fluid milk from the closest alternative supply source in instances where the market is deficit for its fluid needs?[11]

Even though there is an upper bound where Class I prices between regions cannot get significantly out of alignment as determined by transportation costs, important distortions in regional prices and supplies can occur because of specific Class I milk pricing policies.

Classified pricing also raises the issue of the appropriate relationship between fluid-grade and manufacturing-grade milk prices. The Class I price differential above the manufacturing price is based on information obtained through the public hearing process. The level it is set at in each and among all orders has an important impact on regional supplies and producer returns. This level is somewhat arbitrary, because any excess Grade A milk at an established price can always be diverted to the manufacturing milk market at some lower price. An important dimension of this study, then, is tracing through the impact of alternative Class I pricing policies on the M-W price—the basic determinant of all prices.

Although this study focuses on the impacts of altering the minimum Class I differentials under Federal milk orders, policymakers should be aware of the interdependency of consequences of policy actions under the import quota, price support, and Federal milk order programs, and producer cooperatives. Results from a policy decision in any of these areas depends heavily upon what is taking place elsewhere in the overall system. The contrasting impacts of changing Class I differentials under alternative price support policies is a prime example of this interdependency and the impact of price support changes on Class I price levels.

ANALYSIS OF ALTERNATIVE PRICING POLICIES

The estimated impacts of varying Class I milk pricing policies under Federal milk marketing orders are presented in this section. The M-W milk price (which is closely related to the U.S. manufacturing milk price), regional milk production, fluid consumption, and Class I and producer prices are compared for the 1977-85 period for four alternatives: continuning current pricing policies, and increasing, decreasing, and eliminating minimum Class I milk price differentials.

Assumptions

Many factors influence the dairy industry. Important factors affecting milk supply include milk prices, feed and other input prices, beef prices, employment, inflation, and technological development. Demand is affected by milk price, prices of substitutes, changes in taste and preference, meals away from home, population, per capita disposable income, and other demographic variables such as age, sex, race, and household composition of the population (*1*). For purposes of this study, many of these factors, considered exogenous to what happens within the dairy industry, are projected to 1985 (appendix table 1). These projections of milk prices, production, and consumption provide a baseline set of forecasts under the assumption that policies of the past—including classified pricing under the Federal milk order program—would continue through 1985. An economic model of the dairy industry was developed to help trace the impact of changing classified pricing policies. The impact of a policy change is then described in terms of the deviation of prices, production, and consumption from the forecast baseline which assumes a continued policy.[12]

Broad assumptions made in this study are: (1) manufacturing milk prices would be at a price above the support level,[13] (2) continuation of import quotas for dairy products, (3) continuation of present sanitary requirements for Grade A and manufacturing grade

[11] This does not imply that each market should fully provide its fluid milk and balancing needs on a year-round basis.

[12] Continued policy is restricting dairy product imports to about 1.5 percent of domestic milk production; supporting manufacturing milk prices in the range of 75-80 percent of parity (near market clearing levels); and continuing operation of the Federal Milk Marketing Order Program establishing minimum classified price differentials to handlers at the absolute levels of the recent past.

[13] This isolates the impact of actions under the milk order program from a quite different impact if milk prices are at the support level. A section is also developed to contrast the impact of actions under milk orders when prices are at the support level.

milk, (4) continuation of Federal order provisions pertaining to reconstitution of milk, and (5) continuation of current cooperative pricing and marketing policies.

Method of Analysis

The continental United States was divided into nine geographic regions (figure 2). Projected milk production within each region was balanced against projected fluid milk consumption. These baseline projections of regional supply and fluid demand for the continued policy alternative were made using updated supply and demand models, trend analysis, subjective evaluation by specialists of factors that are difficult to quantify, and the exogenous factors outlined in appendix table 1.

An economic model (appendix B) was developed to estimate the impact of changing the Class I pricing policy on regional milk supplies and fluid demands, regional producer and Class I milk prices, and the level of manufacturing milk prices as reflected by the M-W milk price.

Forecasted fluid milk consumption and the forecasted Class I milk prices represented a point on the expected effective demand curve for fluid milk in each of the nine regions for the 1977-85 period.[14] If Class I prices deviate from this forecasted level, fluid consumption would change according to the elasticity of demand outlined in appendix table 15. A similar procedure was used for regional supply where regional all-wholesale milk price and production was forecast for each year over the 1977-85 period. These price-production forecasts represent points on the regional supply curve and reflected exogenous supply shifts such as changes in beef prices, input prices, and inflation and employment rates in the economy generally. If the all-wholesale milk price deviated from the forecasted level in any year, production would change according to the elasticity of supply reported in appendix table 15. In addition to a change in production during the same year that a price changes, it was assumed that production in subsequent years would also change. This lagged effect on production of lower and higher prices than those forecasted on the baseline are represented in the economic model by shifts in the supply curves in subsequent years. The results presented in the main body of this paper assume that a deviation in the all-wholesale milk price in any year will shift all future supply curves through 1985. Appendix table 16 presents results assuming a 5-year distributed lag on supply curves.

[14] Population, income, and other shifts in the demand curves from one year to the next are reflected in the forecasted price and consumption.

Each region is assumed to sell both Grade B milk and that Grade A milk which is not used as fluid at a U.S. manufacturing price that is determined in a national manufacturing milk market. Class I prices are tied to the U.S. manufacturing milk price by Class I differentials set under Federal (State) milk marketing orders.

Continuing Current Class I Pricing Policies

Presently, there are three basic prices that determine milk supply and utilization in the United States: (1) the Class I price paid by processors for milk used in fluid milk products (this price affects the retail price and, therefore, consumption of fluid milk); (2) the M-W price paid by processors for milk used in manufactured dairy products such as cheese, butter, and nonfat dry milk (this price directly affects retail prices of these products and, therefore, consumption of manufactured dairy products); and (3) a weighted all-wholesale milk price reflecting an average price received by all dairy farmers in specified regions and for the United States (this price is a major determinant of both regional and total milk supply).

Class I Milk Prices

Minimum Class I milk prices are established under the Federal milk marketing order program. The minimum Class I price established in each Federal order is set by adding a fixed differential above the M-W price.

In 1974, minimum Class I prices per cwt set in most Federal milk marketing orders exceeded the M-W price by about 90 cents at Eau Claire, Wis., plus 15 cents per 100 miles distance from Eau Claire (line AB in figure 3). The only significant regional exceptions were Federal orders in the Far West where Class I differentials above the M-W price were less than 90 cents plus 15 cents per cwt per 100 miles from Eau Claire. Prices in these areas reflect the fact that the Far West tends to be a milk surplus area, is geographically separated by the Rocky Mountains, and is generally not considered to be dependent upon milk supplies for fluid needs from the upper Midwest. Therefore, it would be reasonable to set the Class I milk price in this area below the M-W price plus transportation. The structure of Class I prices for 1975 is presented in figure 4.

Prevailing Class I prices[15] per cwt in 1974 exceeded the M-W price by about $1.20 plus

[15] The structure of effective Class I prices paid by handlers which includes the minimum price established under Federal milk orders and State regulations plus additional service charges by cooperatives and firms servicing the fluid market.

Figure 2

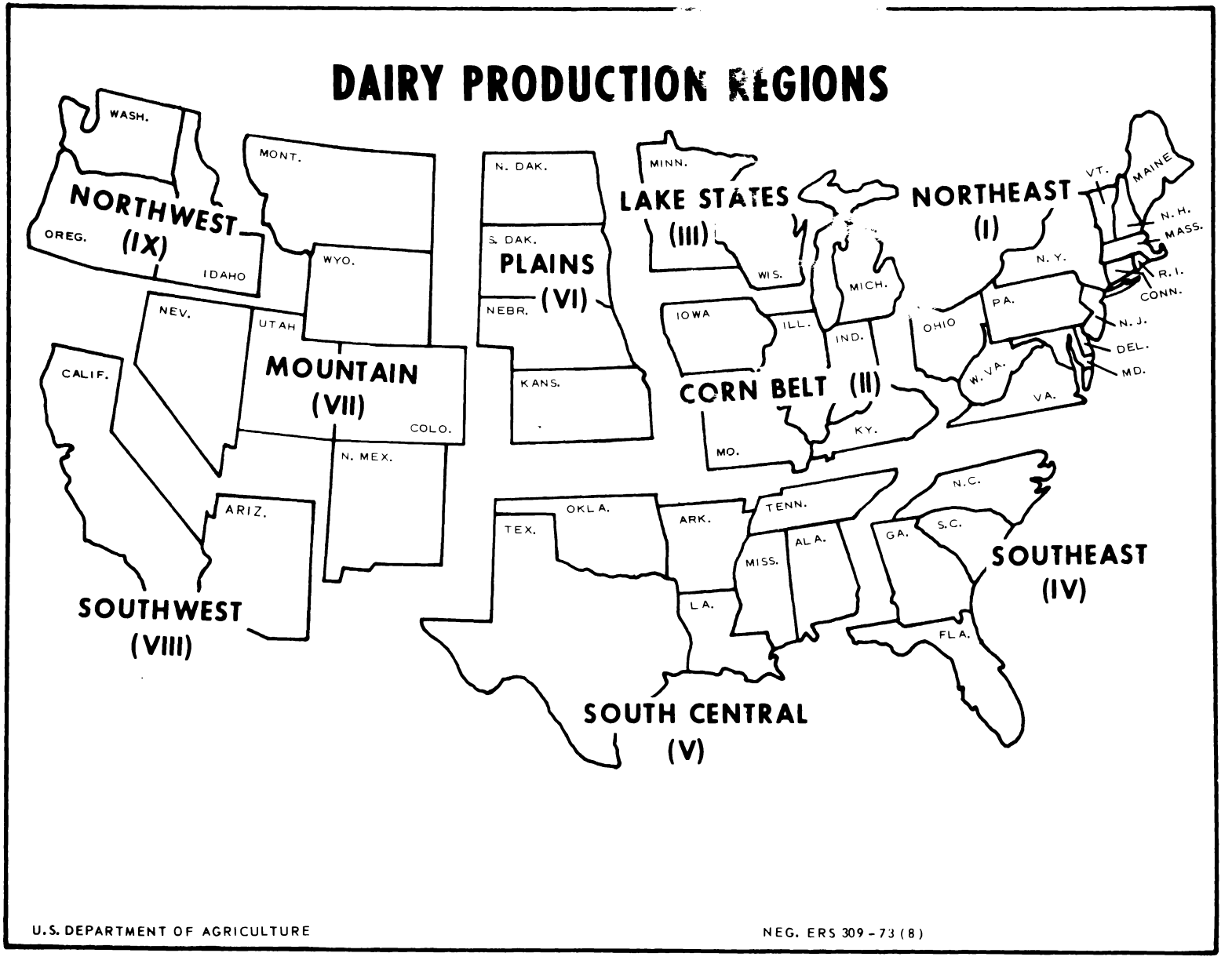
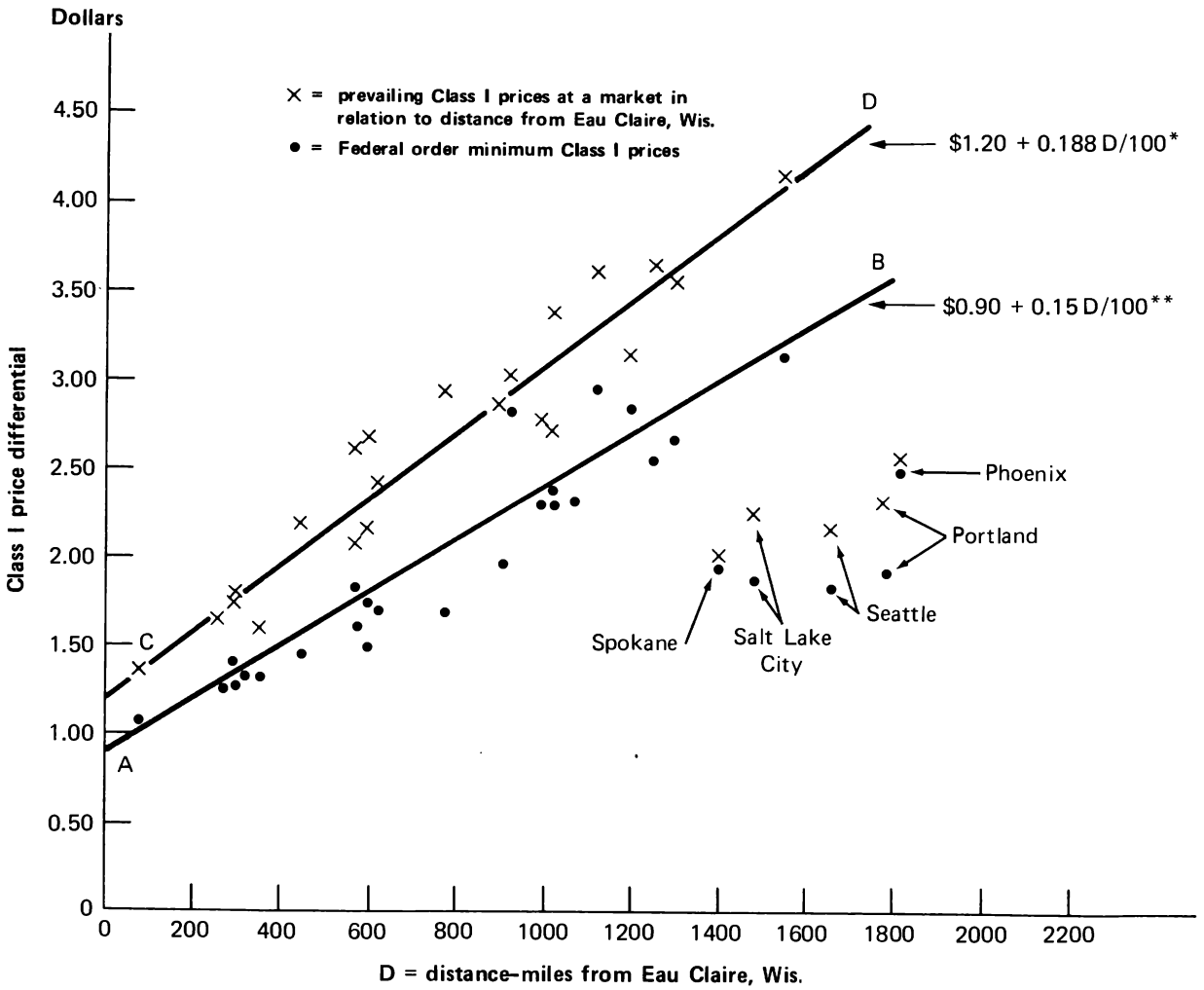

DAIRY PRODUCTION REGIONS
WASH.
OREG.
IDAHO
NORTHWEST
(IX)
MONT.
WYO.
NEV.
UTAH
CALIF.
MOUNTAIN
(VII)
COLO.
N. MEX.
ARIZ.
SOUTHWEST
(VIII)
N. DAK.
S. DAK.
NEBR.
PLAINS
(VI)
KANS.
MINN.
WIS.
MICH.
LAKE STATES
(III)
IOWA
ILL.
IND.
OHIO
CORN BELT (II)
MO.
KY.
W. VA.
VA.
PA.
N. Y.
VT.
MAINE
N. H.
MASS.
R. I.
CONN.
N. J.
DEL.
MD.
NORTHEAST
(I)
OKLA.
TEX.
ARK.
LA.
TENN.
MISS.
ALA.
GA.
FLA.
N. C.
S. C.
SOUTHEAST
(IV)
SOUTH CENTRAL
(V)
U.S. DEPARTMENT OF AGRICULTURE
NEG. ERS 309-73 (8)

Figure 3

Relationship between prevailing and Federal order minimum Class I prices and distance from Eau Claire, Wis., 1974



*Line CD is a least squares regression (R^2 = 0.91) excluding Spokane, Salt Lake City, Seattle, Portland, and Phoenix markets.
**Line AB is not a least squares regression. It is drawn to reflect the current pricing policy of Federal orders.

Source: Calculated from data provided by the Agricultural Marketing Service, USDA.

18.8 cents per 100 miles from Eau Claire (line CD in figure 3). The difference between Federal order minimum and prevailing Class I prices in any market, called "over order charges," is largely explained by the following factors.

First, to get milk to move from a surplus to a deficit market, the price in the deficit market must exceed the price in the surplus market by transportation costs between the markets. If the minimum Class I price set under Federal orders in two such markets does not reflect these transportation costs, prices in the deficit market would be expected to rise above the Federal order minimum price. As 15 cents per cwt per 100 miles currently used by Federal orders does not cover actual transportation costs, part of the over order charges that tend to be larger in markets more distant from Eau Claire could be used to cover the actual transportation cost (compare the widening difference between lines AB and CD in figure 3 as the distance from Eau Claire increases).

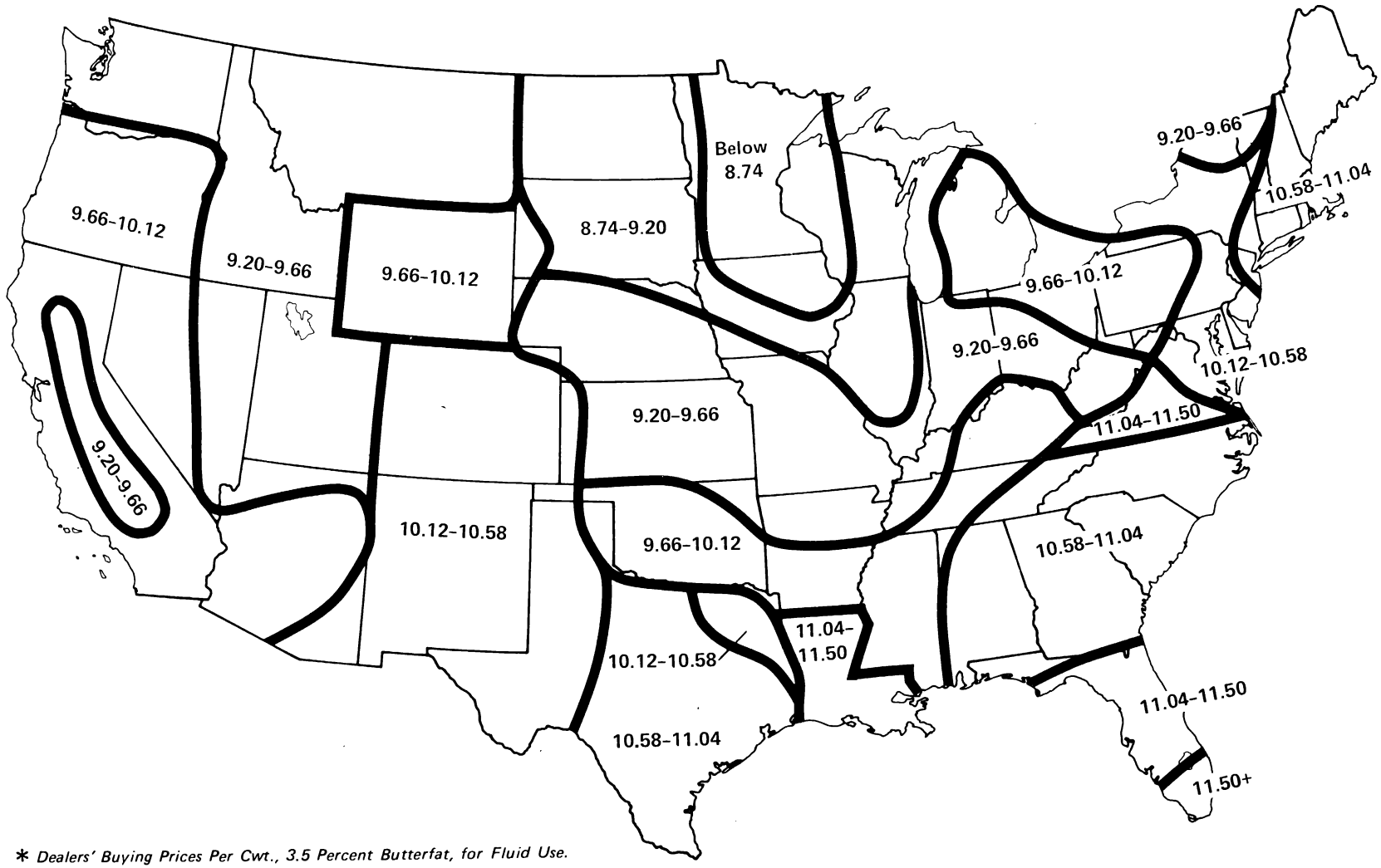
A second reason for over order charges is the cost of servicing the fluid market by performing such functions as standardizing the butterfat test, storage, balancing volume to processors' needs, and maintaining facilities for handling reserve supplies.

A third reason would be a milk give-up charge by manufacturing plants. For example,

Figure 4

PRICE STRUCTURE FOR MILK*

1975 Equal Price Lines



* *Dealers' Buying Prices Per Cwt., 3.5 Percent Butterfat, for Fluid Use. Based on Prices in 125 City Markets.*

a plant (after qualifying as a pool plant) participates in the Federal order pool. It can then pay its producers the pooled blend price regardless of the amount of milk (above that needed to qualify as a pool plant) that it ships to the fluid market. If a fluid bottler needs more milk, there is no incentive for the pooled plant to provide it unless a payment is received above the Federal order minimum price. The pooled plant's cost structure for manufactured dairy products such as butter, nonfat dry milk, and cheese suggests that in the interest of profit maximization, a pooled plant would want to keep the milk for processing so it can benefit by keeping the plant running as close as possible to full capacity. Part of a possible over order payment by fluid milk bottlers could then reflect a milk give-up charge. The more profitable it is to produce manufactured dairy products and the easier it is for plants to qualify to participate in the Federal order pool, the more pronounced the give-up charge.

A fourth possible explanation might be market power by producer cooperatives within a particular region. For example, Class I prices within any region could be increased to the amount needed to bring fluid milk in from an alternative supply region. A major alternative supply in one area then effectively sets an upper limit on the Class I price in other regions. The upper limit Class I price in any of the regions is the Class I price in the supplying region plus transportation costs. Market power within a region could raise the Class I prevailing price above the Federal order minimum, but could not exceed the upper limit price without cooperatives restricting the movement of milk.

The reasons for over order charges as discussed above under current marketwide pooling conditions are largely cost justified and independent of the level at which the Class I differential is set (*12*). It is recognized that during certain periods (such as 1973-75, when prices were falling and costs were rising) atypical conditions can substantially alter the difference between the minimum and prevailing Class I prices (appendix table 20). However, for purposes of this study, it is assumed that if minimum Class I prices set by Federal milk orders decreased (or increased), the prevailing Class I price would be expected to decrease (or increase) since the over order charge would be expected to remain about the same.

Assumed Class I Differentials

Continuing the current Class I pricing policy for the 1977-85 period assumes, for purposes of this paper, a minimum Federal order Class I differential equal to 90 cents in Eau Claire, plus 15 cents per cwt per 100 miles in all markets east of the Rockies. Class I differentials in those markets west of the Rockies are assumed constant like those in Eau Claire. It is also assumed that the prevailing Class I price structure accounts (through over order charges) for real transportation costs to closest available supplies of milk for the fluid market.

The supply and demand for Grade A milk must be evaluated region by region in order to determine what prevailing Class I prices might exist to 1985. Given these minimum Federal order prices, over order charges likely would appear in regions where Grade A milk production was less than fluid consumption plus needed reserves (tables 1 and 2).

The Southeast and South Central are the major deficit regions. Thus, Class I prices in these regions will be in close alignment with Class I prices in the Northeast and Corn Belt—the principal sources of milk to meet this deficit. Also, because of expected rising transportation costs (*6*), assumed Class I differentials would be expected to increase in deficit regions distant from the basing point (see table 3).[16] As the Grade A milk supply is expected to exceed fluid demand plus a necessary reserve in all other regions, prevailing Class I prices would be expected to remain at or near the assumed minimum Federal order Class I price.

The above conclusions assume that State regulations would not be used, nor would cooperatives raise Class I prices above the Federal order minimums. Similarly, the conclusions assume that Class I price differentials in California will increase only moderately from 1977 to 1985.

Projections to 1985

Regional milk supply and all-wholesale milk prices for 1974 to 1976, and projected for 1977, 1980, and 1985, are shown in table 4. Total U.S. milk production is expected to increase from 120.2 billion pounds in 1976 to 124.9 in 1985. Production is expected to increase from 1976 to 1985 in all regions except the Corn Belt, South Central, and Plains where it will decline.

The M-W price, which reflects the basic level of all milk prices, is expected to decline slightly to $8.45 per cwt in 1977, but then increase to $11.91 by 1985 (table 4).[17] The all-wholesale milk price, which is the weighted average of all milk prices received by farmers, follows the same pattern. The implication of this price is that real purchasing power of farmers'

[16] This is the expected differential of the prevailing Class I price, not the Federal order minimum.

[17] All projections in the main body of this report were made prior to the dairy price support announcement effective April 1, 1977.

Table 3--Prevailing and expected Class I price differentials above the Minnesota-Wisconsin manufacturing milk price under continued policy 1/

Region	1974	1975	1976	1977	1978	1979
			Dollars per cwt			
Northeast	3.30	2.61	2.95	2.95	2.95	2.95
Corn Belt	2.37	1.78	2.05	2.10	2.17	2.23
Lake States	1.78	1.22	1.60	1.60	1.60	1.60
Southeast	3.87	3.48	3.50	3.56	3.61	3.67
South Central	3.43	2.78	2.72	2.79	2.88	2.96
Plains	2.33	1.69	2.02	2.07	2.14	2.20
Mountain	2.88	2.37	2.53	2.53	2.53	2.53
Southwest	2.36	2.08	1.35	1.75	1.78	1.90
Northwest	2.47	1.98	2.17	2.17	2.17	2.17
	1980	1981	1982	1983	1984	1985
			Dollars per cwt			
Northeast	2.95	2.95	2.95	2.95	2.95	2.95
Corn Belt	2.29	2.35	2.41	2.46	2.53	2.59
Lake States	1.60	1.60	1.60	1.60	1.60	1.60
Southeast	3.72	3.78	3.83	3.89	3.94	4.00
South Central	3.03	3.12	3.19	3.27	3.36	3.43
Plains	2.25	2.32	2.37	2.43	2.49	2.55
Mountain	2.53	2.53	2.53	2.53	2.53	2.53
Southwest	1.97	2.05	2.11	2.19	2.28	2.35
Northwest	2.17	2.17	2.17	2.17	2.17	2.17

1/ Assumes a policy of keeping minimum Class I differentials at 15 cents per cwt per 100 miles from Eau Claire, Wisc., in all markets except those in the Far West.

Table 4--Actual and projected milk price, production, and consumption for continued policy

Item	Actual			Projected			Actual			Projected		
	1974	1975	1976	1977	1980	1985	1974	1975	1976	1977	1980	1985
	Dollars											
M-W mfg. milk price	7.06	7.62	8.48	8.45	9.83	11.91						
	All-wholesale milk price (dollars)						Prevailing Class I price (dollars)					
Northeast	8.78	9.11	10.19	9.94	11.32	13.40	10.36	10.23	11.43	11.40	12.78	14.86
Corn Belt	7.99	8.40	9.48	9.13	10.51	12.59	9.43	9.40	10.53	10.55	12.12	14.50
Lake States	7.55	8.03	9.01	8.69	10.07	12.15	8.84	8.84	10.08	10.05	11.43	13.51
Southeast	10.54	10.65	11.15	11.19	12.57	14.65	10.93	11.10	11.98	12.01	13.55	15.91
South Central	9.19	9.38	10.34	10.16	11.54	13.62	10.49	10.40	11.20	11.24	12.86	15.34
Plains	7.59	8.06	9.10	8.94	10.32	12.40	9.39	9.31	10.50	10.52	12.08	14.46
Mountain	8.62	8.93	9.97	9.74	11.12	13.20	9.94	9.99	11.01	10.98	12.36	14.44
Southwest	8.24	9.03	9.29	9.49	10.87	12.95	9.42	9.70	9.83	10.20	11.80	14.26
Northwest	8.00	8.56	9.54	9.30	10.68	12.76	9.53	9.60	10.65	10.62	12.00	14.08
United States (wtd. avg.)	8.33	8.75	9.67	9.46	10.85	12.93	10.02	10.00	10.98	11.02	12.51	14.77
	Milk production (million pounds)						Fluid consumption (million pounds)					
Northeast	29,416	29,880	31,006	31,292	31,186	31,785	19,264	19,286	19,376	19,467	19,738	20,322
Corn Belt	18,590	18,233	18,866	19,223	18,302	16,805	9,890	10,004	10,072	10,144	10,348	10,638
Lake States	28,095	27,846	29,535	29,728	29,802	31,294	2,660	2,706	2,723	2,747	2,797	2,904
Southeast	5,114	5,269	5,525	5,502	5,736	6,285	4,627	4,776	4,823	4,870	5,011	5,423
South Central	9,789	9,466	9,725	9,940	9,787	9,608	7,258	7,429	7,413	7,397	7,350	7,634
Plains	5,402	5,223	5,332	5,174	4,766	4,227	1,269	1,282	1,271	1,260	1,226	1,222
Mountain	2,713	2,686	2,737	2,824	2,865	2,986	1,785	1,833	1,871	1,909	2,024	2,200
Southwest	11,406	11,693	12,457	12,852	13,936	16,256	5,858	6,010	6,045	6,079	6,183	6,617
Northwest	4,871	4,867	5,009	5,105	5,244	5,605	1,756	1,802	1,804	1,806	1,812	1,874
United States	115,396	115,163	120,192	121,640	121,624	124,855	54,177	55,128	55,398	55,679	56,489	58,834

net cash income will decline in 1977, but will be about the same in 1980 and 1985 as it was in 1974.

Fluid milk consumption is expected to increase about 6 percent on a product pound basis in 1985 as compared to 1976. This is primarily due to increased population more than offsetting the declines in per capita consumption. All regions except the Plains are expected to have increased fluid milk consumption.

Although there are some regional shifts anticipated in per capita fluid milk consumption, the most important factors affecting consumption are growth and regional shifts in population. Population growth is expected to be highest in the South and West from 1975 to 1985 (appendix table 5). A growth of 20 percent is expected in the Southeast by 1985, 16 percent in the Mountain States, and 15 percent in the Southwest. A smaller rate of population growth is expected in the Northeast, Corn Belt, and Lake States—with the Plains experiencing a growth of less than 1 percent.

Given the regional changes in milk production and population (consumption) levels, annual milk production above fluid consumption plus reserves is expected to change substantially in the next decade (table 2). For example, in the Lake States, Southeast, Southwest, and Northwest, milk production is expected to increase more than fluid consumption plus reserves between 1975 and 1985. The opposite is true for the other regions.

Increasing Class I Differentials

The option of increasing the Class I price differential under Federal orders is evaluated in this section. For purposes of this study, the differential between the minimum Class I and the M-W prices is increased 45 cents per cwt in all regions over those assumed under a continued policy (table 5).[18] It is assumed in this study that the prevailing Class I prices would increase a like amount (over order charges would remain the same).

Changes in Milk Prices

The 45-cent higher prevailing Class I price differential at the beginning of 1977 would result in a lower M-W milk price of 10 cents per cwt in 1977 and 17 cents in 1985 from what the price would be under the continued policy alternative (table 6). The average all-wholesale milk price received by U.S. dairy farmers would increase 7 cents per cwt in 1977 and decline 1 cent in 1985 from what the price would be under the continued policy alternative. The regional impact is to lower the average price received by farmers in surplus milk producing areas—primarily Wisconsin and Minnesota—and increase prices received by farmers in regions with a high Class I use—generally the South and Northeast.

Producer prices in 1985 would be slightly higher under the increased Class I differential alternative than under the continued policy alternative in five of the nine regions. Producer prices would be lower in the remaining four regions with the greatest decrease (10 cents) in the Lake States (table 6).

The 45-cent increased differential would not be fully reflected in the Class I price. Results of increasing the Class I differential 45 cents above the differentials assumed under a continued policy show that in 1977 the M-W price would be 10 cents lower and the Class I price 35 cents higher, and by 1985 the M-W price would be 17 cents lower and the Class I price only 28 cents higher than under a continued policy (table 6). The combined change in M-W price and Class I price will always equal the 45-cent change in Class I differential. An important contribution of this study is illustrating how changes in the Class I differential affects the M-W price—and in turn the Class I price structure.

Milk Production

Total U.S. milk production would be affected relatively little in 1977 through 1985 under the increased differential alternative compared with a continued policy (table 7). By 1985, production in the Lake States would be an estimated 282 million pounds (0.90 percent) lower, but production in all other regions except the Corn Belt and Plains would be slightly higher.

Fluid Consumption

The higher Class I milk prices under the higher Class I differential alternative would reduce fluid milk consumption somewhat in all regions in 1977 through 1985 (table 7). In total, U.S. fluid consumption would be an estimated 196 million pounds less in 1985 with the higher differentials assumed in this analysis than with the continued policy alternative.

Decreasing Class I Differentials

A Federal order pricing policy of decreasing the minimum Class I price differential 75

[18] An increase in the Class I price differential of 45 cents per cwt was used in this study because the analysts felt it was a workable differential change for analytical purposes.

Table 5--Prevailing and expected Class I price differentials above the Minnesota-Wisconsin manufacturing milk price under continued policy and increased Class I differentials

Region	Actual 1974-76 average	Continued policy			45-cent increased differentials		
		1977	1980	1985	1977	1980	1985
		Dollars per cwt					
Northeast	2.95	2.95	2.95	2.95	3.40	3.40	3.40
Corn Belt	2.07	2.10	2.29	2.59	2.55	2.74	3.04
Lake States	1.53	1.60	1.60	1.60	2.05	2.05	2.05
Southeast	3.62	3.56	3.72	4.00	4.01	4.17	4.45
South Central	2.98	2.79	3.03	3.43	3.24	3.48	3.88
Plains	2.01	2.07	2.25	2.55	2.52	2.70	3.00
Mountain	2.59	2.53	2.53	2.53	2.98	2.98	2.98
Southwest	1.93	1.75	1.97	2.35	2.20	2.42	2.80
Northwest	2.21	2.17	2.17	2.17	2.62	2.62	2.62

1/ This alternative assumes the prevailing Class I differential would increase 45 cents per cwt compared to the continued policy alternative in each region for the years 1977 to 1985 (table 7).

Table 6--Estimated milk prices under increased Class I differentials, with comparative differences from continued policy

Item	45-cent increased differential			Change from continued policy					
	1977	1980	1985	1977	1980	1985	1977	1980	1985
	Dollars per cwt						Percent		
Prevailing Class I price:									
Northeast	11.75	13.07	15.14	0.35	0.29	0.28	3.07	2.27	1.88
Corn Belt	10.90	12.41	14.78	.35	.29	.28	3.32	2.39	1.93
Lake States	10.40	11.72	13.79	.35	.29	.28	3.48	2.54	2.07
Southeast	12.36	13.84	16.19	.35	.29	.28	2.91	2.14	1.76
South Central	11.59	13.15	15.62	.35	.29	.28	3.11	2.26	1.83
Plains	10.87	12.37	14.74	.35	.29	.28	3.33	2.40	1.94
Mountain	11.33	12.65	14.72	.35	.29	.28	3.19	2.35	1.94
Southwest	10.55	12.09	14.54	.35	.29	.28	3.43	2.46	1.96
Northwest	10.97	12.29	14.36	.35	.29	.28	3.30	2.42	1.99
United States (wtd. avg.)	11.37	12.80	15.05	.35	.29	.28	3.18	2.32	1.90
All-wholesale milk price:									
Northeast	10.06	11.37	13.44	.12	.05	.04	1.21	.44	.30
Corn Belt	9.18	10.49	12.55	.05	-.02	-.04	.55	-.19	-.32
Lake States	8.66	9.98	12.05	-.03	-.09	-.10	-.35	-.89	-.82
Southeast	11.33	12.71	14.73	.14	.14	.08	1.25	1.11	.55
South Central	10.32	11.61	13.64	.16	.07	.02	1.57	.61	.15
Plains	8.98	10.29	12.36	.04	-.03	-.04	.45	-.29	-.32
Mountain	9.86	11.17	13.24	.12	.05	.04	1.23	.45	.30
Southwest	9.65	10.93	12.96	.16	.06	.01	1.69	.55	.08
Northwest	9.36	10.68	12.75	.06	.00	-.01	.65	.00	-.08
United States (wtd. avg.)	9.53	10.85	12.92	.07	.00	-.01	.74	.00	-.08
M-W mfg. milk price	8.35	9.67	11.74	-.10	-.16	-.17	-1.18	-1.63	-1.43

Table 7--Estimated milk production and fluid consumption under increased Class I differentials, with comparative differences from continued policy

Item	45-cent increased differentials			Change from continued policy					
	1977	1980	1985	1977	1980	1985	1977	1980	1985
	Million pounds						Percent		
Milk production:									
Northeast	31,317	31,309	31,985	25	123	196	0.08	0.39	0.62
Corn Belt	19,232	18,321	16,788	9	19	-17	.05	.10	-.10
Lake States	29,727	29,713	31,012	-1	-89	-282	1/	-.30	-.90
Southeast	5,470	5,744	6,361	-32	8	76	-.58	.14	1.21
South Central	9,956	9,867	9,723	16	80	115	.16	.82	1.20
Plains	5,176	4,768	4,218	2	2	-9	.04	.04	-.21
Mountain	2,826	2,877	3,005	2	12	19	.07	.42	.64
Southwest	12,870	14,014	16,373	18	78	117	.14	.56	.72
Northwest	5,108	5,255	5,613	3	11	8	.06	.21	.14
United States	121,682	121,868	125,078	42	244	223	.03	.20	.18
Fluid consumption:									
Northeast	19,368	19,663	20,258	-99	-75	-64	-.51	-.38	-.32
Corn Belt	10,088	10,307	10,604	-56	-41	-34	-.55	-.40	-.32
Lake States	2,735	2,789	2,897	-12	-8	-7	-.44	-.29	-.24
Southeast	4,836	4,985	5,400	-34	-26	-23	-.70	-.52	-.42
South Central	7,348	7,315	7,604	-49	-35	-30	-.66	-.48	-.39
Plains	1,252	1,220	1,217	-8	-6	-5	-.63	-.49	-.41
Mountain	1,898	2,016	2,193	-11	-8	-7	-.58	-.40	-.32
Southwest	6,046	6,159	6,597	-33	-24	-20	-.54	-.39	-.30
Northwest	1,796	1,805	1,868	-10	-7	-6	-.55	-.39	-.32
United States	55,367	56,259	58,638	-312	-230	-196	-.56	-.41	-.33

1/ Less than 0.005 percent.

cents per cwt is evaluated in this section.[19] It is assumed that the Class I price would also decrease a like amount in all regions. Transportation costs are expected to increase about 30 percent over the 1977-85 period, and prevailing Class I price differentials in fluid milk deficit regions would reflect these increased transportation costs. Accordingly, the prevailing Class I price differential per cwt in 1985 is projected in table 8.

Changes in Milk Prices

Decreasing the Class I differential by 75 cents per cwt at the beginning of 1977 would result in a higher M-W price of 19 cents per cwt in 1977 and 30 cents in 1985 from what the price would be under continued programs (table 9). The average all-wholesale milk price received by dairy farmers in the United States would decrease 12 cents per cwt in 1977, but would be 2 cents per cwt higher in 1985 than under the continued policy alternative. The regional impact in 1977 is to lower the average price received by farmers in all regions except the Lake States where farmers receive an average of 7 cents more per cwt. However, by 1985—primariiy due to the 30-cent increase in the manufacturing milk price along with decreased milk production—farmers in four of the nine regions would receive a higher price under the decreased differential alternative than under the continued policy alternative.

Milk Production

Total U.S. milk production would be affected relatively little in 1977, and by 1985 would be only about 414 million pounds (0.33 percent) lower under the decreased Class I differential alternative than under a continued pricing policy alternative (table 10). By 1985, production in the Lake States, Corn Belt, and Plains would be slightly higher while milk production in the other six regions would be lower than under the continued policy alternative.

Fluid Consumption

The lower Class I milk prices under the decreased Class I differential alternative would increase fluid milk consumption 505 million pounds (0.91 percent) in 1977 over consumption under the continued policy alternative (table 10). In 1985, fluid milk consumption would still be higher in all regions (0.5 percent) under the decreased Class I price differential alternative.

Eliminating Minimum Class I Differentials

In the absence of Federal or State minimum class prices, the Class I prices in various regions of the United States would depend primarily on regional supply-demand conditions, additional costs of producing Grade A milk, higher costs of transporting fluid milk to more distant consumption centers, costs of balancing supplies and servicing the fluid milk market, and bargaining power of producer cooperatives.[20] Prices paid by handlers for milk used in fluid milk products (primarily whole milk, lowfat milk, and skim milk) would tend to fall toward the manufacturing milk price in any region where Grade A production exceeded fluid demand plus a necessary reserve in its own region, plus demand by other regions. The regional structure of prevailing Class I prices would be sufficiently higher than the manufacturing milk price to encourage sufficient national Grade A milk production for fluid milk product needs plus an adequate reserve for seasonal and daily fluctuations in supply and demand.

Given the current level of excess Grade A reserves in the overall system, it is assumed that the Class I differential would fall from $1.60 to $0.55 in the Lake States in 1977, but would increase to $0.65 in 1980 and beyond in order to forestall any further reversion from pooling and Grade A to manufacturing-grade milk production (table 11). Differentials in other regions are also lowered to establish a structure of Class I prices reflecting regional supply-demand conditions and transportation costs from Grade A excess supply areas to deficit fluid milk consumption centers. The expected differentials for 1977, 1980, and 1985 between the average price of milk sold as fluid at central city plants and the M-W price are shown in table 11. The differential might be expected to average only 55 cents in the Lake States. Prevailing Class I prices in the Corn Belt, South Central, and

[19] A decrease in the Class I price differential of 75 cents per cwt is considered by the analysts to be the outside limit of any possible decrease. Those administering the program consider a 40-cent reduction to be the outside limit of any possible decrease. They feel that evidence for the need of a 75-cent adjustment could not likely be obtained at a public hearing. Data for a 40-cent reduction may be derived by interpolating between comparable figures reported in table 4 and in tables 9 and 10 (see appendix tables 17 and 18 for the interpolated numbers).

[20] This is not to imply that some of these are not presently impacting the prevailing price structure. However, the analysts feel that, at least in some regions, the minimum pricing and pooling provisions of milk marketing orders insulate the marketing system from some of these underlying economic forces.

Table 8--Prevailing and expected Class I price differentials above the Minnesota-Wisconsin manufacturing milk price under continued policy and decreased Class I differentials

Region	Actual 1974-76 average	Continued policy			75-cent decreased differentials 1/		
		1977	1980	1985	1977	1980	1985
	Dollars per cwt						
Northeast	2.95	2.95	2.95	2.95	2.20	2.20	2.20
Corn Belt	2.07	2.10	2.29	2.59	1.35	1.54	1.84
Lake States	1.53	1.60	1.60	1.60	.85	.85	.85
Southeast	3.62	3.56	3.72	4.00	2.81	2.97	3.25
South Central	2.98	2.79	3.03	3.43	2.04	2.28	2.68
Plains	2.01	2.07	2.25	2.55	1.32	1.50	1.80
Mountain	2.59	2.53	2.53	2.53	1.78	1.78	1.78
Southwest	1.93	1.75	1.97	2.35	1.00	1.22	1.60
Northwest	2.21	2.17	2.17	2.17	1.42	1.42	1.42

1/ This alternative assumes the prevailing Class I differentials would decrease 75 cents per cwt compared to the continued policy alternative in each region for the years 1977 to 1985.

Table 9--Estimated milk prices under decreased Class I differentials, with comparative differences from continued policy

Item	75-cent decreased differentials			Change from continued policy					
	1977	1980	1985	1977	1980	1985	1977	1980	1985
	Dollars per cwt						Percent		
Prevailing Class I price:									
Northeast	10.84	12.32	14.41	-0.56	-0.46	-0.45	-4.91	-3.60	-3.03
Corn Belt	9.99	11.66	14.05	-.56	-.46	-.45	-5.31	-3.80	-3.10
Lake States	9.49	10.97	13.06	-.56	-.46	-.45	-5.57	-4.02	-3.33
Southeast	11.45	13.09	15.46	-.56	-.46	-.45	-4.66	-3.39	-2.83
South Central	10.68	12.40	14.89	-.56	-.46	-.45	-4.98	-3.58	-2.93
Plains	9.96	11.62	14.01	-.56	-.46	-.45	-5.32	-3.81	-3.11
Mountain	10.42	11.90	13.99	-.56	-.46	-.45	-5.10	-3.72	-3.12
Southwest	9.64	11.34	13.81	-.56	-.46	-.45	-5.49	-3.90	-3.16
Northwest	10.06	11.54	13.63	-.56	-.46	-.45	-5.27	-3.83	-3.20
United States (wtd. avg.)	10.46	12.05	14.32	-.56	-.46	-.45	-5.08	-3.68	-3.05
All-wholesale milk price:									
Northeast	9.76	11.25	13.34	-.18	-.07	-.06	-1.81	-.62	-.45
Corn Belt	9.05	10.56	12.67	-.08	.05	.08	-.88	.48	.64
Lake States	8.76	10.24	12.33	.07	.17	.18	.81	1.69	1.48
Southeast	10.73	12.28	14.44	-.46	-.29	-.21	-4.11	-2.31	-1.43
South Central	9.90	11.43	13.58	-.26	-.11	-.04	-2.56	-.95	-.29
Plains	8.88	10.38	12.49	-.06	.06	.09	-.67	.58	.73
Mountain	9.56	11.04	13.13	-.18	-.08	-.07	-1.85	-.72	-.53
Southwest	9.24	10.77	12.93	-.25	-.10	-.02	-2.63	-.92	-.15
Northwest	9.21	10.69	12.78	-.09	+.01	.02	-.97	+.09	.16
United States (wtd. avg.)	9.34	10.84	12.95	-.12	-.01	.02	-1.27	-.09	.15
M-W mfg. milk price	8.64	10.12	12.21	.19	.29	.30	2.25	2.95	2.52

Table 10--Estimated milk production and fluid consumption under decreased Class I differentials, with comparative differences from continued policy

Item	75-cent decreased differentials			Change from continued policy					
	1977	1980	1985	1977	1980	1985	1977	1980	1985
	Million pounds						Percent		
Milk production:									
Northeast	31,261	31,009	31,501	-31	-177	-288	-0.10	-0.57	-0.91
Corn Belt	19,216	18,291	16,870	-7	-11	65	-.04	.06	.39
Lake States	29,747	29,995	31,847	19	193	553	.06	.65	1.77
Southeast	5,434	5,512	5,906	-68	-224	-379	-1.24	-3.91	-6.03
South Central	9,918	9,662	9,424	-22	-125	-184	-.22	-1.28	-1.92
Plains	5,173	4,767	4,250	-1	1	23	-.02	.02	.54
Mountain	2,821	2,848	2,958	-3	-17	-28	-.11	-.59	-.94
Southwest	12,828	13,821	16,082	-24	-115	-174	-.19	-.83	-1.07
Northwest	5,102	5,232	5,603	-3	-12	-2	-.06	-.23	-.04
United States	121,500	121,137	124,441	-140	-487	-414	-.12	-.40	-.33
Fluid consumption:									
Northeast	19,628	19,856	20,424	161	118	102	.83	.60	.50
Corn Belt	10,234	10,414	10,693	90	66	55	.89	.64	.52
Lake States	2,766	2,811	2,916	19	14	12	.69	.50	.41
Southeast	4,925	5,052	5,460	55	41	37	1.13	.82	.68
South Central	7,477	7,406	7,682	80	56	48	1.08	.76	.63
Plains	1,273	1,235	1,230	13	9	8	1.03	.73	.65
Mountain	1,926	2,037	2,212	17	13	12	.89	.64	.55
Southwest	6,132	6,221	6,650	53	38	33	.87	.61	.50
Northwest	1,823	1,824	1,884	17	12	10	.94	.66	.53
United States	56,184	56,856	59,151	505	367	317	.91	.65	.54

Table 11--Prevailing and expected Class I price differentials above the Minnesota-Wisconsin manufacturing milk price under continued policy and eliminated minimum Class I differentials

Region	Actual 1974-76 average	Continued policy			Eliminated minimum differentials 1/			Change in differentials		
		1977	1980	1985	1977	1980	1985	1977	1980	1985
					Dollars per cwt					
Northeast	2.95	2.95	2.95	2.95	1.20	1.20	1.20	-1.75	-1.75	-1.75
Corn Belt	2.07	2.10	2.29	2.59	1.10	1.10	1.10	-1.00	-1.19	-1.19
Lake States	1.53	1.60	1.60	1.60	.55	.65	.65	-1.05	-.95	-.95
Southeast	3.62	3.56	3.72	4.00	2.10	2.20	2.20	-1.46	-1.52	-1.80
South Central	2.98	2.79	3.03	3.43	1.40	1.50	1.60	-1.39	-1.53	-1.83
Plains	2.01	2.07	2.25	2.55	.85	.95	1.05	-1.22	-1.30	-1.50
Mountain	2.59	2.53	2.53	2.53	1.10	1.15	1.30	-1.43	-1.38	-1.23
Southwest	1.93	1.75	1.97	2.35	.55	.65	.65	-1.20	-1.32	-1.70
Northwest	2.21	2.17	2.17	2.17	.55	.65	.65	-1.62	-1.52	-1.52
United States (wtd. avg.)					1.15	1.20	1.22			

1/ This alternative assumes that the prevailing Class I differentials would consist of a small premium to producers for continuing to produce Grade A milk, a transportation differential to cover the higher costs of transporting milk to the fluid milk product market, and a give-up charge to manufacturing plants for servicing the fluid milk product market.

Southeast regions likely would be in alignment with Class I prices in alternative supply areas—the difference primarily reflecting transportation costs. The average annual Class I differential likely would be relatively high in the deficit Southeast. During the part of the year when milk would move from other regions, the differential would be higher than the yearly averages shown in table 11. It would be lower than average during that season when no milk was brought into the region. Expected increases in transportation costs are reflected by higher differentials in 1985 than in either 1980 or 1977.

The differences in observed prices paid for milk used for fluid and that paid for milk used for manufacturing in the nine regions studied are intended to approximate the competitive forces in the absence of minimum Class I prices, and without market pooling under Federal and State regulations. The results likely would not be materially changed should the real world produce observed differentials somewhat different. The numbers are to identify the expected direction of change in prices, and provide an approximation of the relative magnitude of changes.

Results of this analysis indicate that in the absence of administered minimum prices, the effective prices paid by handlers for milk used in fluid milk products (Class I under milk orders) would be lowered across the country, and to the greatest extent in the Northeast, South, and West. In addition to lowering the general Class I price surface, a multibasing point Class I price surface would be expected to evolve with possible basing points (pockets of excess reserve Grade A milk) at several locations—especially the upper Midwest, Northeast (Vermont, upstate New York, and western Pennsylvania), and West. This is a substantial departure from the current structure of Class I prices which generally reflects a single base point at Eau Claire, Wis., and transportation costs to more distant markets.

The largest supply of milk over and above local fluid market needs is in the upper Midwest. But this analysis indicates that there are other secondary areas of reserve supply closer to major fluid milk markets sufficient to establish more than one basic pricing point. Even in the upper Midwest, there are sufficient supplies of milk closer to fluid milk markets such that pricing points south of Eau Claire may be appropriate.

Current minimum Federal order Class I differentials equal to 90 cents in Eau Claire plus 15 cents per cwt per 100 miles in all markets east of the Rockies do not reflect increases in transportation costs in recent years. A serious problem facing policymakers is whether minimum intermarket Class I price differentials should be adjusted to reflect increased transportation costs. In each of the first three alternatives it is assumed that the current transportation differential of 15 cents per cwt per 100 miles is not effective, but the prevailing Class I price structure does account (through over order charges) for real transportation costs to closest available supplies of milk for fluid markets. Increasing the transportation differential when the pricing systems are tied to a single basing point would increase prices and milk production in high-cost distant points (from Eau Claire) which, given current levels of fluid-grade milk supplies, does not conform with what would evolve in a competitive market and according to economic location theory.[21] The upshot of findings under this alternative is that before it is appropriate to consider changing the Class I defferentials to reflect increased transportation costs, a more realistic set of basing points (as opposed to a single basing point at Eau Claire) might be considered.

Changes in Milk Price

Assuming the differentials in table 11 in the absence of Federal and State minimum Class I prices, the M-W price would be an estimated 35 cents (4 percent) higher in 1977, and 65 cents (5 percent) higher in 1985 than under continued pricing policy (table 12).

The first year impact (1977) of eliminating minimum Class I prices would be to decrease the average milk price to farmers in eight of the nine regions. Only those dairy farmers in the Lake States would receive more per cwt than under continued policy. For the United States as a whole, farmers would receive an average of $9.23 in 1977 in the absence of minimum Class I prices compared with an estimated $9.46 under current policy. By 1985, however—because of the large supply response—U.S. farmers in the aggregate would be receiving 4 cents more per cwt under this alternative compared with continued current programs. However, regional impacts would still be substantial.

On a percentage change basis, farmers in the Lake States would receive about a 4-percent increase in price in 1985 in the absence of Federal and State minimum Class I prices, compared with continued current pricing policies. Farmers in the Southeast region would receive about a 4-percent decrease in price. As indicated in table 12, farmers in the other regions would receive increases or decreases between these extremes.

Results from a more disaggregated model would probably reveal that prices received by individual farmers within regions would vary

[21] Rapidly increasing energy costs (appendix table 1) could have a significant effect on optimal location of milk production and marketing systems and needs further study.

Table 12--Estimated milk prices under eliminated minimum Class I price differentials, with comparative differences from continued policy

Item	Eliminated minimum differentials			Change from continued policy					
	1977	1980	1985	1977	1980	1985	1977	1980	1985
	Dollars per cwt						Percent		
Prevailing fluid use price:									
Northeast	10.00	11.60	13.76	-1.40	-1.18	-1.10	-12.28	-9.23	-7.40
Corn Belt	9.90	11.50	13.66	-.65	-.62	-.84	-6.16	-5.12	-5.79
Lake States	9.35	11.05	13.21	-.70	-.38	-.30	-6.97	-3.32	-2.22
Southeast	10.90	12.60	14.76	-1.11	-.95	-1.15	-9.24	-7.01	-7.23
South Central	10.20	11.90	14.16	-1.04	-.96	-1.18	-9.25	-7.46	-7.69
Plains	9.65	11.35	13.61	-.87	-.73	-.85	-8.27	-6.04	-5.88
Mountain	9.90	11.55	13.86	-1.08	-.81	-.58	-9.84	-6.55	-4.02
Southwest	9.35	11.05	13.21	-.85	-.75	-1.05	-8.33	-6.36	-7.36
Northwest	9.35	11.05	13.21	-1.27	-.95	-.87	-11.96	-7.92	-6.18
United States (wtd. avg.)	9.95	11.60	13.78	-1.07	-.91	-.99	-9.71	-7.27	-6.70
All-wholesale milk price:									
Northeast	9.42	11.02	13.19	-.52	-.30	-.21	-5.23	-2.65	-1.57
Corn Belt	9.12	10.68	12.80	-.01	.17	.21	-.11	1.62	1.67
Lake States	8.87	10.49	12.65	.18	.42	.50	2.07	4.17	4.12
Southeast	10.36	12.00	14.07	-.83	-.57	-.58	-7.42	-4.53	-3.96
South Central	9.66	11.26	13.35	-.50	-.28	-.27	-4.92	-2.43	-1.98
Plains	8.89	10.48	12.62	-.05	.16	.22	-.56	1.55	1.77
Mountain	9.37	11.00	13.24	-.37	-.12	.04	-3.80	-1.08	.30
Southwest	9.12	10.74	12.85	-.37	-.13	-.10	-3.90	-1.20	-.77
Northwest	9.04	10.67	12.83	-.26	-.01	.07	-2.80	-.09	.55
United States (wtd. avg.)	9.23	10.84	12.97	-.23	-.01	.04	-2.43	-.09	.31
M-W mfg. milk price	8.80	10.40	12.56	.35	.57	.65	4.14	5.80	5.46

from the regional average reported. This deviation from the average would depend upon proximity to fluid milk markets, density of milk production, local supply-demand conditions, and the type of market system that evolves for servicing local and regional fluid milk markets.

Milk Production

Total U.S. milk production in 1985 would be an estimated 857 million pounds (0.69 percent) less under a policy of eliminating minimum Class I differentials than under a continued pricing policy (table 13). The major regional impact would be 12 percent less milk production in the Southeast. Farmers in the Lake States would produce 4 percent more milk under this alternative than under continued pricing policy. In general, milk prices and production would be lower in regions where a relatively high proportion of producer milk has traditionally been utilized in fluid milk products. They would be higher in regions where a high proportion of producer milk has been utilized in manufactured dairy products.

Fluid Consumption

The lower prevailing Class I milk prices in all regions under a policy of eliminating minimum Class I differentials would result in higher fluid milk consumption in all regions than under a continued minimum pricing policy. For the total United States, fluid milk product consumption would be an estimated 712 million pounds (1.21 percent) more in 1985. The decline in prices to consumers of fluid milk products would be offset, however, by higher prices of manufactured dairy products because of the 65-cent (5 percent) increase in the manufacturing milk price. Thus, the net impact on individual households of this pricing alternative would depend on the mix of fluid milk and manufactured dairy products consumed within the respective households. This is discussed later in the report.

Reducing Class I Differentials When Manufacturing Milk Price is at Support Level

The support price for manufacturing milk was increased from $8.26 to $9.00 per 100 pounds on April 1, 1977. This price is above the market clearing price, and will result in increased government purchases of manufactured dairy products under the price support program. With the $9.00 support price, from April to December 1977, the manufacturing milk price is expected to average $8.90 for calendar year 1977. This price will encourage increased milk production and reduce the amount of fluid and manufacturing milk consumed from those consumption levels discussed in the previous section. Therefore, the higher support price will lead to increased government purchases in calendar year 1977.

The impact of the policy alternatives considered in this report would be quite different if the manufacturing milk price was at the support level rather than at a market clearing level as assumed in the previous sections. Decreasing the Class I differentials 75 cents per cwt in 1977 where milk is expected to be in surplus at the support price will not impact the manufacturing milk price as it does when a market clearing price is assumed. The lower Class I prices will encourage increased fluid consumption by about 655 million pounds. Producers in all regions would receive lower prices, reducing milk production about 264 million pounds. The net impact of these changes would be lower government purchases of about 919 million pounds, and the manufacturing milk prices and manufactured product consumption would be unchanged.[22] This result is in sharp contrast to the results of decreasing Class I differentials under conditions where the prevailing manufacturing milk price is at a market clearing level above the support price.

Decreasing the Class I differential lowers the overall price of milk received by farmers in all regions when the manufacturing milk price is at the price support level.

SUMMARY COMPARISONS

The four alternative pricing programs studied are: (1) continuing the present program, (2) increasing Class I price differentials 45 cents per cwt (increased differentials), (3) decreasing Class I price differentials 75 cents per cwt (decreased differentials), and (4) eliminating minimum Class I price differentials altogether (eliminated differentials). The likely impacts on the M-W, all-wholesale milk, the Class I milk prices, and on milk production and fluid milk consumption are presented for the years 1977, 1980, and 1985 in table 14. Appendix tables 6 through 11 show comparisons between each of the alternatives and the continued program alternative.

[22] Decreased differentials would result in lower Government purchases because it would encourage increased fluid consumption and decreased milk production. This assumes that the Government would still be purchasing dairy products under the price support program even after reducing the Class I differential. Therefore, the M-W price would not be affected.

Table 13--Estimated milk production and fluid consumption under eliminated minimum Class I differentials, with comparative differences from continued policy

Item	Eliminated minimum differentials			Change from continued policy					
	1977	1980	1985	1977	1980	1985	1977	1980	1985
	Million pounds						Percent		
Milk production:									
Northeast	31,197	30,604	30,767	-95	-582	-1,022	-0.30	-1.87	-3.21
Corn Belt	19,225	18,386	17,103	2	84	298	.01	.46	1.77
Lake States	29,770	30,260	32,666	42	458	1,372	.14	1.54	4.38
Southeast	5,412	5,355	5,546	-90	-381	-739	-1.64	-6.64	-11.76
South Central	9,897	9,518	9,123	-43	-269	-485	-.43	-2.75	-5.05
Plains	5,173	4,778	4,293	-1	12	66	-.02	.25	1.56
Mountain	2,818	2,832	2,946	-6	-33	-40	-.21	-1.15	-1.34
Southwest	12,817	13,777	15,978	-35	-159	-278	-.27	-1.14	-1.71
Northwest	5,095	5,198	5,576	-10	-46	-29	-.10	-.88	-.52
United States	121,404	120,708	123,998	-236	-916	-857	-.19	-.75	-.69
Fluid consumption:									
Northeast	19,869	20,044	20,574	402	306	252	2.07	1.55	1.24
Corn Belt	10,249	10,437	10,741	105	89	103	1.04	.86	.97
Lake States	2,771	2,809	2,912	24	12	8	.87	.43	.28
Southeast	4,980	5,097	5,519	110	86	96	2.26	1.72	1.77
South Central	7,545	7,468	7,761	148	118	127	2.00	1.61	1.66
Plains	1,280	1,241	1,236	20	15	14	1.59	1.22	1.15
Mountain	1,941	2,047	2,215	32	23	15	1.68	1.14	.68
Southwest	6,159	6,245	6,694	80	62	77	1.32	1.00	1.16
Northwest	1,843	1,837	1,894	37	25	20	2.05	1.38	1.07
United States	56,637	57,225	59,546	958	736	712	1.72	1.30	1.21

Table 14--Estimated milk prices, production, and consumption under four alternative programs, with comparative differences from continued policy

Item	Continued policy	Increased diff. 1/	Decreased diff. 2/	Eliminated diff.	Change from continued policy: Increased diff. 1/	Decreased diff. 2/	Eliminated diff.	Increased	Decreased	Eliminated
	---------- Dollars per cwt 3/ ----------							----- Percent -----		
M-W manufacturing milk price:										
1977	8.45	8.35	8.64	8.80	-0.10	0.19	0.35	-1.18	2.25	4.14
1980	9.83	9.67	10.12	10.40	-.16	.29	.57	-1.63	2.95	5.80
1985	11.91	11.74	12.21	12.56	-.17	.30	.65	-1.43	2.52	5.46
All-wholesale milk price:										
1977	9.46	9.53	9.34	9.23	.07	-.12	-.23	.74	-1.27	-2.43
1980	10.85	10.85	10.84	10.84	.00	-.01	-.01	.00	-.09	-.09
1985	12.93	12.92	12.95	12.97	-.01	.02	.04	-.08	.15	.31
Prevailing Class I price:										
1977	11.02	11.37	10.46	9.95	.35	-.56	-1.07	3.18	-5.08	-9.71
1980	12.51	12.80	12.05	11.60	.29	-.46	-.91	2.32	-3.68	-7.27
1985	14.77	15.05	14.32	13.78	.28	-.45	-.99	1.90	-3.05	-6.70
	---------- Million pounds ----------							----- Percent -----		
Milk production:										
1977	121,640	121,682	121,500	121,404	42	-140	-236	.03	-.12	-.19
1980	121,624	121,868	121,137	120,708	244	-487	-916	.20	-.40	-.75
1985	124,855	125,078	124,441	123,998	223	-414	-857	.18	-.33	-.69
Fluid milk consumption:										
1977	55,679	55,367	56,184	56,637	-312	505	958	-.56	.91	1.72
1980	56,489	56,259	56,856	57,225	-230	367	736	-.41	.65	1.30
1985	58,834	58,638	59,151	59,546	-196	317	712	-.33	.54	1.21

1/ 45-cent per cwt increased Class I differentials across all regions.
2/ 75-cent per cwt decreased Class I differentials across all regions.
3/ Weighted averages of regional prices.

M-W Milk Price

The M-W milk price is influenced by the Class I milk price differentials set under alternative policies. Results show that in 1977 the M-W price would be 10 cents lower under increased differentials, 19 cents higher under decreased differentials, and 35 cents higher under eliminated minimum differentials than if a continued present policy were followed (table 14). By 1985, the change in the M-W price would be about 60 to 70 percent more for all alternatives than it was in 1977.

All-Wholesale Milk Price

Alternative pricing policies that increase (or decrease) the level of Class I differentials compared to continued policy tend to increase (or decrease) the U.S. average all-wholesale milk prices in 1977, but have relatively little impact on the U.S. all-wholesale milk price by 1985 (table 14). However, these producer prices are quite different by regions. In 1977, increased differentials would be expected to benefit producers (on the average) in all regions except those in the Lake States, where prices would be slightly lower (appendix table 6). Producers in the Northeast, Southeast, South Central, Mountain States, and Southwest would benefit more than producers in the other regions, as their prices would be expected to be 12-16 cents higher per cwt. The opposite would be true for decreased and eliminated differentials alternatives.

Under the eliminated differentials alternative, the 1977 all-wholesale milk price would be 18 cents higher in the Lake States but as much as 83 cents lower for Southeast producers than under continued policy (appendix table 6). By 1985, adjustments would occur so that producer prices under decreased and eliminated differentials alternatives would be higher than under continued policy in the Corn Belt, Lake States, Plains, Mountain, and Northwest regions (appendix table 8).

Class I Milk Price

Changing Class I price differentials by specified amounts as done under the alternative pricing policies does not necessarily change Class I prices by the same amount.[23] However, the change in differential would equal the combined change in the M-W price and the Class I price. For example, the results of a policy of increased differentials (45 cents in all markets) in 1977 show that Class I prices in all regions would be only 35 cents higher than under continued policy because this was accompanied by a 10-cent lower M-W price (appendix table 6).

Results show that prevailing Class I prices would be expected to be 35 cents higher in 1977 and 28 cents higher in 1985 in all regions under increased differentials. They would be 56 cents lower in 1977 and 45 cents lower in 1985 in all regions under decreased differentials. Under a policy of eliminating minimum Class I differentials, the change in prevailing fluid milk prices would be expected to be lowered by different amounts in the various regions.[24] For example, the 1977 prevailing Class I price would be expected to be 65 cents lower in the Corn Belt and $1.40 lower in the Northeast than under continued policy (appendix table 6). Regional fluid milk differentials are based on a region-by-region evaluation of Grade A milk supply and demand balances, and on transportation costs to deficit areas from the nearest alternative Grade A milk supply area.

Milk Production

Total U.S. milk production would be affected by less than 1 percent for all policy alternatives for the entire 1977-85 period (table 14). Total production would be somewhat higher under increased differentials, but somewhat lower under decreased and eliminated differentials.

Milk production in all regions would be affected more in 1985 than in 1977 for all policy alternatives. The most dramatic changes in regional production occur in the Northeast and Lake States. In 1985, expected milk production in the Northeast would be 196 million pounds higher under increased differentials, 288 million pounds lower under decreased differentials, and 1,022 million pounds lower under eliminated differentials compared to a continued policy alternative (appendix table 11). In contrast, production in the Lake States would be expected to be 282 million pounds lower under increased differentials, 553 million pounds higher under decreased differentials, and 1,372 million pounds higher under eliminated differentials. Adjustments in the absolute quantity of milk production in all other regions are less than

[23] The full change in differential would be reflected in the Class I price if the Government was purchasing substantial quantities under the price support program. That is, the M-W price would not be expected to change under any of the alternatives.

[24] Results of the study show that a structure of fluid milk prices above the manufacturing-grade milk price would exist in the milk marketing system even if minimum Class I differentials were not imposed on the system by State and Federal milk orders.

those in the Northeast and Lake States. On a percentage basis, production would be expected to be about 12 percent lower in 1985 in the Southeast under a policy of eliminated minimum differentials compared to continued policy.

Fluid Milk Consumption

Increasing (or decreasing) Class I differentials tends to increase (or decrease) Class I prices and, therefore, decrease (or increase) total U.S. fluid milk consumption (table 14). Fluid milk consumption is influenced more in 1977 than in 1985 for all alternative policies considered. In 1977, expected total U.S. fluid milk consumption would be 312 million pounds lower under increased differentials, 505 million pounds higher under decreased differentials, and 958 million pounds higher under eliminated differentials than under continued policy.

Fluid milk consumption in each region would be less than 1 percent lower in 1977 in all regions under a policy of increased differentials compared to continued programs (appendix table 9). Under policies of decreased and eliminated differentials, fluid consumption ranges from 1 to 2 percent higher.

SECONDARY IMPACTS

This section of the report presents the secondary impacts of selected policy alternatives on dairy farm and industry structure, dairy farm income, and on different consumer groups. Results of changing Class I differentials under different price support and market conditions are also shown and contrasted.

Market Structure

Pricing changes would not be expected to affect the structure and location of all sectors of the dairy industry equally. Regional changes in prices would alter regional farm income and the location of dairy processing plants, because of the effect on the location of dairy farms and milk production.

The fluid milk processing industry, with plants generally located close to consumption areas due to product perishability and high transportation costs, is generally considered to have local or regional markets. Thus, it is expected that plant location would not be greatly affected by changes in milk production location. Ice cream and cottage cheese plants (which generally have first call on raw milk after fluid needs are satisfied, and which can be made from manufactured dairy product ingredients) are often closely associated with fluid milk processing, and also would be less affected.

In contrast, cheese and butter have national or even international markets due to a longer storage life and high final product value relative to transportation costs. Consequently, plant location should be highly dependent on potential availability of residual raw milk supplies for manufacturing. The importance of having sufficient raw milk supplies for efficient plant operations is supported by findings of Lasley and Sleight (5).

Regression analysis indicates that an overall 10-percent reduction in a plant's volume results in a 14-percent increase in its average unit cost. Relative cost increases are naturally less at the upper range of capacity utilization, and more at the lower levels.

Projections to 1985 and Comparative Analysis

Results of two alternative model projections to 1985—continued minimum Federal milk order price structures and elimination of Federal milk orders—are shown in table 15. By eliminating Federal milk orders, the prevailing Class I price surface is lowered across the country, and to the greatest extent in the Northeast, South, and West. In general, lowering the Class I differential increases the M-W price (the basic determinant of all prices), and has only a minor impact on the overall U.S. milk price received by dairy farmers. However, dairy farmers in regions such as the Lake States, Corn Belt, and Plains, with a high proportion of their milk being utilized in manufactured dairy products, would receive a higher price than under continued current policy. Alternatively, farmers in the Northeast, South, and Southwest would receive somewhat lower prices.

Dairy Farm Structure

Total U.S. milk production is expected to increase from 120.2 billion pounds in 1976 to 124.9 billion pounds in 1985 under continued programs (table 15). The aggregate increase would be slightly less if Federal and State minimum Class I price differentials were eliminated, but important regional shifts in production would occur. The Corn Belt, Lake States, and Plains would increase production with nearly 80 percent of the gain occurring in the Lake States. The Northeast, South, Mountain States, and West would decrease production, with the Northeast incurring almost 40 percent of the total decrease.

Regional gains and losses in milk producers and cow numbers would closely parallel the

Table 15--Milk production, consumption, and prices under continued policy and eliminated minimum Class I differentials

Region	Actual 1976	Projected 1985			Actual 1976	Projected 1985		
		Continued policy	Eliminated diff.	Change from continued policy		Continued policy	Eliminated diff.	Change from continued policy
	Million pounds			Percent	Dollars per cwt			Percent
	Milk production				All-wholesale milk price			
Northeast	31,006	31,789	30,767	-1,022 -3.21	10.19	13.40	13.19	-0.21 -1.57
Corn Belt	18,866	16,805	17,103	298 1.77	9.48	12.59	12.80	.21 1.67
Lake States	29,535	31,294	32,666	1,372 4.38	9.01	12.15	12.65	.50 4.12
Southeast	5,525	6,285	5,546	-739 -11.76	11.15	14.65	14.07	-.58 -3.96
South Central	9,725	9,608	9,123	-485 -5.05	10.34	13.62	13.35	-.27 -1.98
Plains	5,332	4,227	4,293	66 1.56	9.10	12.40	12.62	.22 1.77
Mountain	2,737	2,986	2,946	-40 -1.34	9.97	13.20	13.24	.04 .30
Southwest	12,457	16,256	15,978	-278 -1.71	9.29	12.95	12.85	-.10 -.77
Northwest	5,009	5,605	5,576	-29 -.52	9.54	12.76	12.83	.07 .55
United States 1/	120,192	124,855	123,998	-857 -.69	9.67	12.93	12.97	.04 .31
	Fluid consumption				Prevailing Class I price			
Northeast	19,376	20,322	20,574	252 1.24	11.43	14.86	13.76	-1.10 -7.40
Corn Belt	10,072	10,638	10,741	103 .97	10.53	14.50	13.66	-.84 -5.79
Lake States	2,723	2,904	2,912	8 .28	10.08	13.51	13.21	-.30 -2.22
Southeast	4,823	5,423	5,519	96 1.77	11.98	15.91	14.76	-1.15 -7.23
South Central	7,413	7,634	7,761	127 1.66	11.20	15.34	14.16	-1.18 -7.69
Plains	1,271	1,222	1,236	14 1.15	10.50	14.46	13.61	-.85 -5.88
Mountain	1,871	2,200	2,215	15 .68	11.01	14.44	13.86	-.58 -4.02
Southwest	6,045	6,617	6,694	77 1.16	9.83	14.26	13.21	-1.05 -7.36
Northwest	1,804	1,874	1,894	20 1.07	10.65	14.08	13.21	-.87 -6.18
United States 1/	55,398	58,834	59,546	712 1.21	10.98	14.77	13.78	-.99 -6.70
M-W mfg. milk price					8.48	11.91	12.56	0.65 +5.46

1/ Weighted average.

changes in production (table 16). The trend toward fewer and larger producers would be accelerated in the Northeast and the South, and slowed in the Lake States. The rationale is that eliminating minimum Class I differentials would reduce the prevailing Class I price in the Northeast and South, decrease prices received by farmers, and increase the exodus of small inefficient producers. The reverse logic holds for the Lake States area because prices received by farmers in that region would increase.

Dairy Product Processing Structure

The 1985 projection of regional production, number of plants, and average plant size is shown for butter in table 17. Results are presented for both the continued current programs and eliminated Federal and State minimum Class I price differentials. Butter production is projected to be 865 million pounds in 1985 under continued current programs, a decline of about 12 percent of 1975 production. All regions show declines in production except the Northeast, which holds about the same, and the Southwest, which increases substantially. One factor in the Southwest increase is the continuation of past steadily increasing trends in milk production and the expectation of substantial increases in milk in excess of fluid needs in that region by 1985. In addition, future butter production is expected to be highly dependent on excess cream available as a result of the declining fat content of fluid milk products. Regions in which heavy amounts of cream from this source are expected—and which will substantially affect butter production—are the Northeast, Corn Belt, and Southwest. The amount of butter produced in the Lake States is also affected by substantial amounts of cream transported in from other regions.

The cheese industry would likely be faced with the most severe structural adjustments under any change in classified pricing policy. Regional production, number of plants, and average plant size are shown for cheese for 1975 and projected to 1985 under both continued programs and eliminated minimum class prices (table 18). Cheese production under continued programs is projected to be 4,506 million pounds, an increase of about 60 percent over 1975 production with all regions increasing production. The region with the largest proportional increase is the Southwest, which is projected to produce 230 million pounds in 1985. Although this region has a substantial established cheese industry, large increases in production are expected as a result of projected large increases in milk supplies in excess of needs for fluid milk products. However, even with the increases in the Southwest, 1985 production represents only about 5 percent of the U.S. total. Other regions with expected large increases in cheese production are the Northeast, Lake States, and Northwest. Although cheese production in the Plains has increased substantially in recent years, this trend is expected to turn around due to declining milk supplies.

The number of cheese plants under continued programs is expected to decline from 838 in 1975 to 717 in 1985. Declines are expected in all regions except the Southwest, where plant numbers have been increasing in recent years.

Under the alternative of eliminating Federal and State minimum Class I price differentials, the 1985 projections represent primarily reallocation of production among regions, although total U.S. cheese production is expected to decline slightly to 4.4 billion pounds. As a result of changes in regional supplies of excess milk, regions with the greatest gains in cheese production are the Corn Belt and Lake States. Regions with the greatest losses in production are the Northeast and South Central. Thus, the major structural adjustments in the cheese industry resulting from eliminating Federal and State minimum Class I differentials would occur in the Northeast, South Central, Corn Belt, and Lake States.

The pricing and pooling provisions under milk marketing orders have influenced the location and structure of the dairy farm and manufactured dairy products industries. Dairy farmers, analysts, industry decisionmakers, and policymakers should be aware of effects of altering the milk pricing, pooling, and marketing system. A tremendous amount of capital has already been invested—and is currently being invested—in milk production and manufactured dairy product processing facilities based on past and current policies. Any major alteration in pricing and pooling policy is likely to result in the need for a substantial new adjustment in location and investment in milk production and processing facilities.

A structure of prices more in line with long-run equilibrium conditions may be in the best interest of the industry and society. If adjustments are needed, however, it may be best to phase them in over time so the industry can anticipate the forces that will affect long-run structural adjustment. Potential social gains of altering the Class I price structure, which have been emphasized by results of welfare models, do not take into account all the losses of sunk capital that would be associated with plants leaving the industry. In the short run, costs of structural adjustments may even exceed social cost gains resulting from altering the Class I price surface.

Impacts of Varying Class I Differentials on Net Cash Income

In the Federal order marketing system, utilizing classified pricing, the blend price is the

Table 16--Farms and milk cows under continued policy and eliminated minimum Class I differentials

Item	Actual 1975	Projected 1985		
		Continued policy	Eliminated minimum differentials	Change from continued policy
		Number		
Farms reporting milk cows:				
Northeast	86,561	53,370	51,650	-1,720
Corn Belt	85,118	42,729	43,483	754
Lake States	85,924	57,663	60,189	2,526
Southeast	20,687	11,904	10,504	-1,400
South Central	59,836	28,717	27,268	-1,449
Plains	28,716	10,180	10,339	159
Mountain	14,650	8,355	8,243	-112
Southwest	6,592	5,320	5,229	-91
Northwest	14,612	5,758	5,728	-30
United States	402,696	223,996	222,633	-1,363
		Thousands		
Milk cows:				
Northeast	2,816	2,535	2,454	-81
Corn Belt	1,882	1,433	1,458	25
Lake States	2,696	2,579	2,692	113
Southeast	537	493	435	-58
South Central	1,108	826	784	-42
Plains	576	371	377	6
Mountain	239	198	195	-3
Southwest	867	984	967	-17
Northwest	419	374	372	-2
United States	11,140	9,793	9,734	-59
		Million pounds		
Milk production:				
Northeast	31,006	31,789	30,767	-1,022
Corn Belt	18,866	16,805	17,103	298
Lake States	29,535	31,294	32,666	1,372
Southeast	5,525	6,285	5,546	-739
South Central	9,725	9,608	9,123	-485
Plains	5,332	4,227	4,293	66
Mountain	2,737	2,986	2,946	-40
Southwest	12,457	16,256	15,978	-278
Northwest	5,009	5,605	5,576	-29
United States	120,192	124,855	123,998	-857

Table 17--Butter production, plants, and average plant size under continued policy and eliminated minimum Class I price differentials

Region	Actual, 1975 1/			Continued policy, 1985			Eliminated differentials, 1985		
	Production	Number of plants	Average plant size	Production	Number of plants	Average plant size	Production	Number of plants	Average plant size
	1,000 lbs.		--- 1,000 lbs. ---			--- 1,000 lbs. ---			1,000 lbs.
Northeast	83,714	50	1,674	87,000	21	4,143	73,000	20	3,650
Corn Belt	137,848	55	2,506	89,000	20	4,450	97,000	20	4,850
Lake States	432,137	105	4,116	336,000	55	6,109	346,000	55	6,291
Southeast	0	0	0	0	0	0	0	0	0
South Central	43,786	15	2,919	41,000	8	5,125	23,000	6	3,833
Plains	2/67,666	47	1,440	32,000	12	2,667	33,000	12	2,750
Mountain	15,196	20	760	14,000	8	1,750	13,000	7	1,857
Southwest	135,649	22	6,166	205,000	26	7,885	202,000	26	7,769
Northwest	53,380	36	1,483	51,000	18	2,833	51,000	18	2,833
Other 3/	11,401	16	713	10,000	8	1,250	9,000	8	1,125
United States	980,477	366	2,679	865,000	176	4,915	847,000	172	4,924

1/ Source (13).
2/ North Dakota butter production assumed at 23,000 pounds, and number of plants assumed to be 22.
3/ Other States include those for which information was not published separately. Most of these are in the Northeast.

Table 18--Cheese production, plants, and average plant size under continued policy and eliminated minimum Class I price differentials

Region	Actual 1975 1/			Continued policy, 1985			Eliminated differentials, 1985		
	Production	Number of plants	Average plant size	Production	Number of plants	Average plant size	Production	Number of plants	Average plant size
	1,000 lbs.		--- 1,000 lbs. ---			--- 1,000 lbs. ---			1,000 lbs.
Northeast	419,229	136	3,083	650,000	111	5,856	530,000	92	5,761
Corn Belt	408,561	100	4,086	530,000	76	6,974	567,000	81	7,000
Lake States	1,406,167	420	3,348	2,388,000	381	6,268	2,451,000	391	6,268
Southeast	0	0	0	0	0	0	0	0	0
South Central	60,764	26	2,337	77,000	14	5,500	43,000	8	5,375
Plains	199,250	60	3,321	270,000	44	6,136	252,000	41	6,146
Mountain	59,757	13	4,597	89,000	12	7,417	80,000	11	7,273
Southwest	92,877	34	2,732	230,000	37	6,216	221,000	36	6,139
Northwest	121,288	29	4,182	200,000	26	7,692	201,000	26	7,731
Other 2/	43,285	20	2,164	72,000	16	4,500	70,000	16	4,375
United States	2,811,178	838	3,355	4,506,000	717	6,285	4,415,000	702	6,289

1/ Source (13).

2/ Other States include those for which information was not published separately. Most of these are in the Northeast.

price received by farmers covered by the market order. Since Grade B farmers, primarily in the Lake States, are not regulated under Federal orders, they receive the price for manufacturing-grade milk rather than a pooled blend price.

For the purpose of this farm income analysis, the all-wholesale milk price—the weighted average price received by all dairy farmers in a State or region—is the decisionmaking price for use with the representative commercial dairy farm models.

It would have been ideal to have representative farm models for each of the nine regions, but data for farm models are not available for all regions. However, there are representative commercial dairy farm models for the Northeast and the Lake States (which each supply roughly 25 percent of the total U.S. milk production) which were used for analysis. In addition, these two regions are sensitive to changes in all-wholesale milk prices related to alternative Class I differential policies. Therefore, they are pertinent descriptive regions to analyze.

A simulation model was designed to estimate policy change impacts on net cash income for these representative dairy farms for the Lake States and Northeast. Net cash income is defined as the amount remaining when all cash expenses are subtracted from cash receipts. This is the amount which farm operators have available to reduce capital obligation, pay living expenses, and use for capital expansion. Net cash income was used as the indicator of the price impact associated with alternative Class I differentials.

Policy Alternatives, with Prices of January 1, 1977

Table 19 summarizes the changes in relative net cash income which are associated with policy changes in Class I differentials. The analysis is condensed to include only the years 1977, 1980, and 1985. The net cash income data are adjusted to constant 1977 dollars for all time periods and converted to index numbers with 1977 as the base. This makes comparisons between years realistic and reflective of real changes in net cash income, rather than associated with changes in the general price level. Net cash real income under continued programs is used as a base of 100 and held constant for the years 1977, 1980, and 1985.

Increased Differential

This increased differential at this level of pricing decreased net cash income of Lake States farms by 2 to 3 percent. The impact on the Northeast is to raise net cash income by a negligible amount.

Decreased Differential

The sensitivity of both regions to this large a change in the differential is apparent. Net cash income for Lake States farmers increases over 4 percent. Farmers' net returns in the Northeast decreased by 3 percent when compared to the baseline incomes.

Eliminating Minimum Differentials

Eliminating minimum differentials substantially reduces net cash income of Northeastern dairy farmers. After a 16-percent reduction in 1977, the effect recedes on an individual farm basis somewhat as aggregate production adjustments are made. By 1985, incomes are down only 7 percent. This decrease in income is structured in constant dollars, and reflects a real change, not one associated with price level.

The same reasoning can be applied to the Lake States farmers' incomes. The inverse relationship holds, and farmers' incomes increase by about 13 percent. These changes reflect a significant shift in income distribution for dairy farms in these two important production regions which produce half of the U.S. milk output.

A conversion of the percent changes in income to actual dollars will give an alternative magnitude to the impact of alternative policies. A net cash income of about $30 per month per cow would be typical of the level of income expected during 1977. A 50-cow herd would have a net cash income of about $18,000 per year. A 15-percent reduction or increase in income is equal to $2,700. Even changes at the 5-percent level are equivalent to almost $1,000. Since this is net cash income rather than gross income, it is important to the farmers involved.

Policy Alternatives with Prices of April 1, 1977

The baseline or forecast price for 1977 was significantly raised by the Secretary of Agriculture's decision to increase price support levels effective April 1, 1977. In the context of this analysis, the all-wholesale farm milk price increases for both the Northeast and Lake States. This administrative price decision increases net cash incomes for both regions. The important comparative question is what would be the impact on farmer incomes with alternative differential policies.

Eliminating Minimum Differentials with Manufacturing Milk Prices at Support Floor

With this level of prices, net cash income is depressed for both regions. Incomes for representative farms decrease by 4 percent in the Lakes States, and by 11 percent in the Northeast. Decreasing the Class I differentials when

Table 19--Index of relative net cash income for representative Northeast and Lake States dairy farms

Alternative policies	Lake States			Northeast		
	1977	1980	1985	1977	1980	1985
	Index--Baseline equals 100					
Policy alternatives assuming no price support purchases:						
Continued programs	100	100	100	100	100	100
Increased differentials	98	97	98	103	100	100
Decreased differentials	106	104	104	97	97	97
Eliminated minimum differentials	113	112	114	84	90	93
Policy alternatives assuming price support purchases:						
Continued programs	100	--	--	100	--	--
Eliminated minimum differentials	96	--	--	89	--	--

-- = not applicable.

the government is buying substantial quantities of dairy products under the price support program will not impact the manufacturing milk price as it does when a market clearing price is assumed. Thus, the all-wholesale milk price and net farm income in all regions would be reduced. Reduced government purchases of dairy products occur because there is less milk production and more fluid consumption. The manufacturing milk prices and manufactured dairy product consumption in commercial markets would be unchanged.

Overall Impact

A decrease in or elimination of Class I differentials has profound effects on farmers' net cash income. A change from the present large institutionalized differential shifts incomes and causes production adjustment changes. The two major producing regions, Lake States and Northeast, experience income changes as much as 15 percent. This is equivalent to about $3,000 in net income for a 50-cow herd. The primary income change in 1977 is toward higher producer incomes in the Lake States, and lower producer incomes in all other regions.

Changing Relative Prices of Fluid Milk and Manufactured Dairy Products

Should the Class I price differentials be lowered and the price of fluid milk decline relative to prices of manufactured milk products under alternative Federal milk marketing order policies, segments of the U.S. population might be differently affected.

Data from a 1972 National consumer panel show that substrata of U.S. households which are heavy (or light) consumers of fluid milk relative to the U.S. average, tend to be heavy (or light) consumers of manufactured dairy products (table 20). This implies that a decrease in fluid milk prices relative to manufactured dairy product prices would not greatly advantage one group relative to any other group within the U.S. population. However, the panel data indicate that relative to all other households, the nonwhite and Southern households probably would be advantaged somewhat because of their higher ratio of fluid milk to manufactured dairy product consumption. Households without children, or with older children, probably would be disadvantaged somewhat because of their higher ratio of manufactured dairy product consumption.

Table 20--Average household purchases of selected dairy products for April to September 1972

Household substrata	Fluid milk	Natural cheese	Processed cheese	Nonfat dry milk
		Index 1/		
Race:				
White	103	104	105	106
Nonwhite	59	48	37	29
Income:				
Under $4,000	49	53	41	65
$4,000-$6,999	76	77	75	97
7,000-9,999	98	85	94	84
10,000-14,999	116	113	121	115
15,000 and over	133	143	136	119
Region:				
Northeast	106	97	111	101
South	82	63	80	98
North Central	110	99	112	87
Mountain and Southwest	91	102	95	102
Pacific	101	164	87	128
Age of children:				
No children	62	94	63	75
Children less than 6 yrs. old	110	90	121	74
Children less than 6 yrs. and 13-17 yrs. old	180	123	188	75
Children 7-12 and 13-17 yrs. old	188	127	180	227
Average U.S. household	100	100	100	100

1/ An index of 100 was assigned to the U.S. average household purchases. Indexes then represent deviations of substrata considered from the U.S. average purchases of each dairy products.

Source: (8)

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(12) U.S. Department of Agriculture, "The Question of Undue Price Enhancement of Milk Cooperatives," Capper-Volstead Committee, Dec. 1976.

(13) ____, *Dairy Products Annual Summary, 1975.* Stat. Rptg. Serv.

(14) ____, *Federal Milk Order Market Statistics.* FMOS-210, Agr. Mgkt. Serv., June 1977 Summary, p. 35.

Appendix table 1--U.S. average prices received and paid for classified pricing study--Dairy Group-CED-ESCS, index values 1967=100

Item	Unit	Year												Percent change	
		1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1977-8	1984-5
Prices received:															
Beef	Dol/cwt	35.60	32.30	33.80	35.80	37.80	39.80	41.80	43.80	45.80	47.80	49.80	51.80	5.6	4.0
Cull cows	do.	24.80	19.80	24.78	26.30	27.80	29.30	30.80	32.30	33.80	35.30	36.80	38.30	5.7	4.1
Milk cows	Dol each	500	412	476	500	524	548	572	596	620	644	668	692	4.8	3.6
Corn - crop year 1/	Dol/bu	3.03	2.46	2.45	2.54	2.64	2.74	2.84	2.94	3.04	3.14	3.24	3.34	3.9	3.1
Hay - crop year 1/	Dol/ton	50.90	53.00	60.00	61.00	62.00	63.00	64.00	65.00	66.00	67.00	68.00	69.00	1.6	1.5
Corn	Dol/bu	2.93	2.69	2.50	2.60	2.70	2.80	2.90	3.00	3.10	3.20	3.30	3.40	3.8	3.0
Hay	Dol/ton	49.12	51.38	58.02	59.00	60.00	61.00	62.00	63.00	64.00	65.00	66.00	67.00	1.7	1.5
All farm products 2/	Index	192	185	187	197	208	218	229	239	249	260	270	281	5.6	4.1
Milk	Dol/cwt	8.33	8.71	9.68	9.45	9.75	10.41	10.83	11.25	11.66	12.08	12.50	12.91	3.2	3.3
Prices paid:															
16 percent dairy feed	Dol/ton	149	134	141	146	151	156	161	166	171	176	181	186	3.4	2.8
Milk cows	Dol each	500	412	476	500	524	548	572	596	620	644	668	692	4.8	3.6
Farm labor	Dol/hr	2.32	2.45	2.66	2.81	2.96	3.11	3.26	3.41	3.56	3.71	3.86	4.01	5.3	3.9
Farm machinery and repairs 3/	Index	159	186	208	221	232	245	255	266	278	289	300	311	5.0	3.7
Fuels and energy	do.	159	177	187	203	218	233	248	263	278	293	308	323	7.4	4.9
Farm and motor supplies	do.	147	168	164	172	180	188	196	204	212	220	228	236	4.6	3.5
Buildings and fencing	do.	181	206	215	231	245	259	273	287	301	315	329	343	6.1	4.2
Farm services and cash rent	do.	166	199	218	240	260	280	300	320	340	360	380	400	8.3	5.3
Seed	do.	215	245	241	254	270	286	302	318	334	350	366	382	6.3	4.4
Fertilizer	do.	167	217	185	186	192	198	204	210	216	222	228	234	3.2	2.6
Agricultural chemicals	do.	119	160	174	181	188	195	202	209	216	223	230	237	3.9	3.0
Interest	do.	227	265	303	320	340	360	380	400	420	440	460	480	6.2	4.3
Taxes	do.	154	162	176	183	190	197	204	211	218	225	232	239	3.8	3.0
Farm machinery and repairs 3/ Wt:															
Autos and trucks .2	do.	161	191	212	229	241	253	265	277	289	301	313	325	5.2	3.8
Tractors and self-propelled .3	do.	161	195	217	230	242	254	266	278	290	302	314	326	5.2	3.8
Other machinery .2	do.	159	197	225	240	253	266	279	292	305	318	331	344	5.4	3.9
Nonagricultural wages .3	do.	155	168	185	194	203	212	221	230	239	248	257	266	4.6	3.5
CPI	do.	148	161	170	180	190	200	210	220	230	240	250	260	5.6	4.0

1/ Corn and hay on crop year basis, all others calendar year.
2/ Quance guidelines.
3/ Farm machinery and repairs a weighted average.

Appendix table 2--Sales of total fluid milk items and producer deliveries in Federal milk orders

Sales				Producer deliveries	
Day	Index 1/ (1963-76)	Month	Index 2/ (1973-76)	Month	Index 2/ (1973-76)
Sunday	0.0511	January	1.05	January	0.95
Monday	1.1985	February	1.03	February	1.00
Tuesday	1.0761	March	1.03	March	1.02
Wednesday	.9810	April	1.01	April	1.06
Thursday	1.1284	May	.99	May	1.10
Friday	1.3207	June	.92	June	1.08
Saturday	1.2442	July	.92	July	1.01
		August	.95	August	.97
		September	1.02	September	.95
		October	1.04	October	.94
		November	1.04	November	.94
		December	1.01	December	.97

1/ Source (14).
2/ Computed on the basis of daily average sales and daily average deliveries of producers, respectively.

Appendix table 3--Measures of growth in Federal milk order markets

Year	Markets 1/	Population of Federal milk marketing areas 2/	Handlers 1/	Producers 3/	Producer deliveries	Producer deliveries used in Class I	Percentage of producer deliveries used in Class I	Prices at 3.5 percent butterfat content 4/		Receipts as percentage of milk sold to plants and dealers		Daily deliveries per producer	Gross value of milk at blend price adjusted for butterfat content	
								Class I	Blend	Fluid grade	All milk		Per producer	All producers
	Number	Thousands	-- Number --		-- Million pounds --		Percent	Dol. per cwt		Percent		Pounds	Dollars	1,000 dol.
1947	29	5/	991	135,830	14,980	9,808	65.5	4.65	4.34	5/	21	302	5,024	682,407
1948	30	5/	963	136,363	15,020	9,852	65.6	5.29	4.97	5/	22	301	5,713	779,079
1949	33	5/	966	142,995	17,049	10,104	59.3	4.67	4.03	5/	23	327	5,019	717,748
1950	39	5/	1,101	156,584	18,660	11,000	58.9	4.51	3.93	41	25	326	4,914	769,442
1951	44	39,891	1,343	172,327	20,117	12,718	63.2	5.13	4.59	44	27	320	5,605	965,900
1952	49	41,185	1,352	176,752	22,998	14,672	63.8	5.37	4.85	46	30	356	6,598	1,166,246
1953	49	41,506	1,308	183,479	25,896	15,436	59.6	4.91	4.31	49	31	387	6,355	1,166,015
1954	53	43,266	1,333	186,127	27,140	16,172	59.6	4.62	4.01	49	31	399	6,098	1,135,019
1955	63	46,963	1,483	188,611	28.948	18,032	62.3	4.67	4.08	51	32	420	6,510	1,227,815
1956	68	48,575	1,486	183,830	31,380	19,615	62.5	4.90	4.24	51	33	466	7,534	1,384,955
1957	68	57,297	1,889	182,551	33,455	21,339	63.8	4.87	4.51	53	34	502	8,147	1,487,153
1958	74	60,717	1,962	186,155	36,356	23,309	64.1	4.72	4.40	56	36	535	8,500	1,582,310
1959	77	67,720	2,197	187,576	40,149	26,250	65.4	4.79	4.43	60	40	586	9,466	1,775,583
1960	80	88,818	2,259	189,816	44,812	28,758	64.2	4.88	4.47	64	43	648	10,482	1,989,615
1961	81	93,727	2,314	192,947	48,803	29,859	61.2	4.91	4.45	67	45	704	11,131	2,147,656
1962	83	97,353	2,258	186,468	51,648	31,606	61.2	4.80	4.14	70	47	761	11,854	2,210,330
1963	82	100,083	2,144	176,477	52,860	32,964	62.4	4.78	4.15	70	48	821	12,814	2,261,437
1964	77	99,333	2,010	167,503	54,447	33,965	62.4	4.87	4.23	70	48	888	14,174	2,374,137
1965	73	102,351	1,891	158,077	54,444	34,561	63.5	4.93	4.31	70	48	944	15,300	2,418,526
1966	71	98,307	1,724	145,964	53,012	34,805	65.7	5.55	4.95	70	48	994	18,526	2,630,908
1967	74	103,566	1,650	140,657	53,761	34.412	64.0	5.85	5.17	71	49	1,056	20,321	2,858,351
1968	67	117,013	1,637	141,623	56,444	36,490	64.6	6.23	5.53	74.	52	1,089	22,561	3,195,087
1969	67	122,319	1,628	144,275	61,026	39,219	64.3	6.50	5.74	77	56	1,164	24,892	3,591,293
1970	62	125,721	1,588	143,411	65,104	40,063	61.5	6.74	5.95	79	59	1,244	27,636	3,963,311
1971	62	142,934	1,529	141,347	67,872	40,268	59.3	6.90	6.08	80	60	1,316	29,893	4,225,340
1972	62	142,934	1,487	136,881	68,719	40,938	59.6	7.10	6.31	78	60	1,372	32,439	4,440,288
1973	61	141,472	1,355	131,565	66,229	40,519	61.2	8.03	7.31	78	60	1,386	37,461	4,928,514
1974	61	141,546	1,312	126,805	67,778	39,293	58.0	9.35	8.36	78	61	1,464	45,736	5,753,852
1975	56	144,467	1,315	123,855	69,249	40,106	57.9	9.36	8.64	79	63	1,532	49,233	6,097,768
1976	50	149,493	1,304	122,770	74,571	40,991	55.0	10.70	9.75	80	65	1,660	60,299	7,402,949

1/ End of year. 2/ End of year; 1951-59, 1960-70, and 1971-75 according to 1950, 1960, and 1970 U.S. census, respectively. 3/ Average for year.
4/ Prices are simple averages for 1947-61 and weighted averages for 1962-76. 5/ Data not available.

Appendix table 4--States regulating milk prices and trade practices, and authorizing milk promotion, 1976

State	Minimum prices established:			Trade practice regulations	Milk promotion
	Producer level	Wholesale level	Retail level		
Alabama	x	1/ x	1/ x	x	-
Arkansas	-	-	-	x	-
California	x	2/ x	3/ x	x	x
Colorado	-	-	-	x	x
Connecticut	-	-	-	x	x
Georgia	-	-	-	-	x
Hawaii	x	-	-	-	x
Idaho	-	-	-	x	x
Iowa	-	-	-	x	-
Kansas	-	-	-	x	-
Kentucky	-	-	-	x	-
Louisiana	4/	-	-	x	x
Maine	x	x	x	x	x
Massachusetts	x	5/ -	5/ -	x	-
Minnesota	-	-	-	x	x
Missouri	-	-	-	x	-
Montana	x	x	x	x	-
Nevada	x	5/ -	x	x	-
New Hampshire	-	-	-	-	x
New Jersey	x	5/ -	x	x	5/ -
New York	x	-	-	x	x
North Carolina	x	5/ 6/ -	5/ 6/ -	x	x
North Dakota	x	6/ x	6/ x	x	x
Oklahoma	-	-	-	x	-
Oregon	x	-	-	-	x
Pennsylvania	x	x	x	-	5/ -
South Carolina	x	x	5/ -	x	-
South Dakota	-	x	x	x	x
Texas	-	-	-	-	x
Tennessee	-	-	-	x	-
Utah	-	-	-	-	x
Vermont	x	x	x	x	x
Virginia	x	1/ x	1/ 7/ -	x	-
Washington	-	-	-	-	x
West Virginia	-	-	-	-	x
Wisconsin	-	-	-	x	x
Wyoming	x	x	-	x	-
Puerto Rico	x	1/ -	1/ -	x	x

x = yes; - = no.

1/ Establishes maximum prices. 2/ Suspended in all major marketing areas. 3/ Suspended in one zone of one marketing area. 4/ Suspended. 5/ Authorized but not used. 6/ Maximum pricing authorized. 7/ Authorized only in the event of price disruption.

Appendix table 5--Population trends

Region	Resident population--				Percent of continental U.S.--				Projected increase from 1975 to 1985	
	1965	1975	1980	1985	1965	1975	1980	1985		
	Thousand				Percent				Thousand	Percent
I Northeast	68,753	72,383	74,174	76,467	35.72	34.16	33.55	32.91	4,084	5.64
II Corn Belt	34,322	36,642	37,919	39,213	17.83	17.29	17.15	16.87	2,571	7.02
III Lake States	7,824	8,533	8,856	9,265	4.06	4.03	4.00	3.99	732	8.58
IV Southeast	17,643	21,552	23,545	25,927	9.17	10.17	10.65	11.16	4,375	20.30
V South Central	27,695	31,004	32,392	34,385	14.39	14.63	14.65	14.80	3,381	10.90
VI Plains	5,018	5,131	5,150	5,169	2.61	2.42	2.33	2.22	38	0.74
VII Mountain	5,470	6,598	7,047	7,656	2.84	3.11	3.19	3.29	1,058	16.04
VIII Southwest	20,170	23,409	25,122	27,027	10.48	11.05	11.36	11.63	3,618	15.46
IX Northwest	5,590	6,652	6,900	7,277	2.90	3.14	3.12	3.13	625	9.40
Continental United States	192,485	211,904	221,105	232,386	100.00	100.00	100.00	100.00	20,482	9.67

Appendix table 6--Estimated milk prices under alternative programs with comparative differences from continued policy, 1977

Item	Continued policy	Increased diff. 1/	Decreased diff. 2/	Eliminated diff.	Change from continued policy: Increased diff. 1/	Decreased diff. 2/	Eliminated diff.	Increased diff. 1/	Decreased diff. 2/	Eliminated diff.
	Dollars per cwt							Percent		
Prevailing Class I price:										
Northeast	11.40	11.75	10.84	10.00	0.35	-0.56	-1.40	3.07	-4.91	-12.28
Corn Belt	10.55	10.90	9.99	9.90	.35	-.56	-.65	3.32	-5.31	-6.16
Lake States	10.05	10.40	9.49	9.35	.35	-.56	-.70	3.48	-5.57	-6.97
Southeast	12.01	12.36	11.45	10.90	.35	-.56	-1.11	2.91	-4.66	-9.24
South Central	11.24	11.59	10.68	10.20	.35	-.56	-1.04	3.12	-4.98	-9.25
Plains	10.52	10.87	9.96	9.65	.35	-.56	-.87	3.33	-5.32	-8.27
Mountain	10.98	11.33	10.42	9.90	.35	-.56	-1.08	3.19	-5.10	-9.84
Southwest	10.20	10.55	9.64	9.35	.35	-.56	-.85	3.43	-5.49	-8.33
Northwest	10.62	10.97	10.06	9.35	.35	-.56	-1.27	3.30	-5.27	-11.96
United States (wtd. avg.)	11.02	11.37	10.46	9.95	.35	-.56	-1.07	3.18	-5.08	-9.71
All-wholesale milk price:										
Northeast	9.94	10.06	9.76	9.42	.12	-.18	-.52	1.21	-1.81	-5.23
Corn Belt	9.13	9.18	9.05	9.12	.05	-.08	-.01	.55	-.88	-.11
Lake States	8.69	8.66	8.76	8.87	-.03	.07	.18	-.35	.81	2.07
Southeast	11.19	11.33	10.73	10.36	.14	-.46	-.83	1.25	-4.11	-7.42
South Central	10.16	10.32	9.90	9.66	.16	-.26	-.50	1.57	-2.56	-4.92
Plains	8.94	8.98	8.88	8.89	.04	-.06	-.05	.45	-.67	-.56
Mountain	9.74	9.86	9.56	9.37	.12	-.18	-.37	1.23	-1.85	-3.80
Southwest	9.49	9.65	9.24	9.12	.16	-.25	-.37	1.69	-2.63	-3.90
Northwest	9.30	9.36	9.21	9.04	.06	-.09	-.26	.65	-.97	-2.80
United States (wtd. avg.)	9.46	9.53	9.34	9.23	.07	-.12	-.23	.74	-1.27	-2.43
M-W mfg. price	8.45	8.35	8.64	8.80	-.10	.19	.35	-1.18	2.25	4.14

1/ 45-cent per cwt increased Class I differentials across all regions.
2/ 75-cent per cwt decreased Class I differentials across all regions.

Appendix table 7--Estimated milk prices under alternative programs with comparative differences from continued policy, 1980

Item	Continued policy	Increased diff. 1/	Decreased diff. 2/	Eliminated diff.	Change from continued policy: Increased diff. 1/	Decreased diff. 2/	Eliminated diff.	Increased diff. 1/	Decreased diff. 2/	Eliminated diff.
	Dollars per cwt							Percent		
Prevailing Class I price:										
Northeast	12.78	13.07	12.32	11.60	0.29	-0.46	-1.18	2.27	-3.60	-9.23
Corn Belt	12.12	12.41	11.66	11.50	.29	-.46	-.62	2.39	-3.80	-5.12
Lake States	11.43	11.72	10.97	11.05	.29	-.46	-.38	2.54	-4.02	-3.32
Southeast	13.55	13.84	13.09	12.60	.29	-.46	-.95	2.14	-3.39	-7.01
South Central	12.86	13.15	12.40	11.90	.29	-.46	-.96	2.26	-3.58	-7.46
Plains	12.08	12.37	11.62	11.35	.29	-.46	-.73	2.40	-3.81	-6.04
Mountain	12.36	12.65	11.90	11.55	.29	-.46	-.81	2.35	-3.72	-6.55
Southwest	11.80	12.09	11.34	11.05	.29	-.46	-.75	2.46	-3.90	-6.36
Northwest	12.00	12.29	11.54	11.05	.29	-.46	-.95	2.42	-3.83	-7.92
United States (wtd. avg.)	12.51	12.80	12.05	11.60	.29	-.46	-.91	2.32	-3.68	-7.27
All-wholesale milk price:										
Northeast	11.32	11.37	11.25	11.02	.05	-.07	-.30	.44	-.62	-2.65
Corn Belt	10.51	10.49	10.56	10.68	-.02	-.05	.17	-.19	.48	1.62
Lake States	10.07	9.98	10.24	10.49	-.09	.17	.42	-.89	1.69	4.17
Southeast	12.57	12.71	12.28	12.00	.14	-.29	-.57	1.11	-2.31	-4.53
South Central	11.54	11.61	11.43	11.26	.07	-.11	-.28	.61	-.95	-2.43
Plains	10.32	10.29	10.38	10.48	-.03	.06	.16	-.29	.58	1.55
Mountain	11.12	11.17	11.04	11.00	.05	-.08	-.12	.45	-.72	-1.08
Southwest	10.87	10.93	10.77	10.74	.06	-.10	-.13	.55	-.92	-1.20
Northwest	10.68	10.68	10.69	10.67	.00	+.01	-.01	.00	+.09	-.09
United States (wtd. avg.)	10.85	10.85	10.84	10.84	.00	-.01	-.01	.00	-.09	-.09
M-W Mfg. price	9.83	9.67	10.12	10.40	-.16	.29	.57	-1.63	2.95	5.80

1/ 45-cent per cwt increased Class I differentials across all regions.
2/ 75-cent per cwt decreased Class I differentials across all regions.

Appendix table 8--Estimated milk prices under alternative programs with comparative differences from continued policy, 1985

Item	Continued policy	Increased diff. 1/	Decreased diff. 2/	Eliminated diff.	Change from continued policy: Increased diff. 1/	Decreased diff. 2/	Eliminated diff.	Increased diff. 1/	Decreased diff. 2/	Eliminated diff.
	---------- Dollars per cwt ----------							--- Percent ---		
Prevailing Class I price:										
Northeast	14.86	15.14	14.41	13.76	0.28	-0.45	-1.10	1.88	-3.03	-7.40
Corn Belt	14.50	14.78	14.05	13.66	.28	-.45	-.84	1.93	-3.10	-5.79
Lake States	13.51	13.79	13.06	13.21	.28	-.45	-.30	2.07	-3.33	-2.22
Southeast	15.91	16.19	15.46	14.76	.28	-.45	-1.15	1.76	-2.83	-7.23
South Central	15.34	15.62	14.89	14.16	.28	-.45	-1.18	1.83	-2.93	-7.69
Plains	14.46	14.74	14.01	13.61	.28	-.45	-.85	1.94	-3.11	-5.88
Mountain	14.44	14.72	13.99	13.86	.28	-.45	-.58	1.94	-3.12	-4.02
Southwest	14.26	14.54	13.81	13.21	.28	-.45	-1.05	1.96	-3.16	-7.36
Northwest	14.08	14.36	13.63	13.21	.28	-.45	-.87	1.99	-3.20	-6.18
United States (wtd. avg.)	14.77	15.05	14.32	13.78	.28	-.45	-.99	1.90	-3.05	-6.70
All wholesale milk price:										
Northeast	13.40	13.44	13.34	13.19	.04	-.06	-.21	.30	-.45	-1.57
Corn Belt	12.59	12.55	12.67	12.80	-.04	.08	.21	-.32	.64	1.67
Lake States	12.15	12.05	12.33	12.65	-.10	.18	.50	-.82	1.48	4.12
Southeast	14.65	14.73	14.44	14.07	.08	-.21	-.58	.55	-1.43	-3.96
South Central	13.62	13.64	13.58	13.35	.02	-.04	-.27	.15	-.29	-1.98
Plains	12.40	12.36	12.49	12.62	-.04	.09	.22	-.32	.73	1.77
Mountain	13.20	13.24	13.13	13.24	.04	-.07	.04	.30	-.53	.30
Southwest	12.95	12.96	12.93	12.85	.01	-.02	-.10	.08	-.15	-.77
Northwest	12.76	12.75	12.78	12.83	-.01	.02	.07	-.08	.16	.55
United States (wtd. avg.)	12.93	12.92	12.95	12.97	-.01	.02	.04	-.08	.15	.31
M-W mfg. price	11.91	11.74	12.21	12.56	-.17	.30	.65	-1.43	2.52	5.46

1/ 45-cent per cwt increased Class I differentials across all regions.
2/ 75-cent per cwt decreased Class I differentials across all regions.

Appendix table 9--Estimated fluid consumption and milk production under alternative programs with comparative differences from continued policy, 1977

Item	Continued policy	Increased diff. 1/	Decreased diff. 2/	Eliminated diff.	Change from continued policy: Increased diff. 1/	Decreased diff. 2/	Eliminated diff.	Increased diff. 1/	Decreased diff. 2/	Eliminated diff.
	Million pounds							Percent		
Fluid consumption:										
Northeast	19,467	19,368	19,628	19,869	-99	161	402	-0.51	0.83	2.07
Corn Belt	10,144	10,088	10,234	10,249	-56	90	105	-.55	.89	1.04
Lake States	2,747	2,735	2,766	2,771	-12	19	24	-.44	.69	.87
Southeast	4,870	4,836	4,925	4,980	-34	55	110	-.70	1.13	2.26
South Central	7,397	7,348	7,477	7,545	-49	80	148	-.66	1.08	2.00
Plains	1,260	1,252	1,273	1,280	-8	13	20	-.63	1.03	1.59
Mountain	1,909	1,898	1,926	1,941	-11	17	32	-.58	.89	1.68
Southwest	6,079	6,046	6,132	6,159	-33	53	80	-.54	.87	1.32
Northwest	1,806	1,796	1,823	1,843	-10	17	27	-.55	.94	2.05
United States	55,679	55,367	56,184	56,637	-312	505	958	-.56	.91	1.72
Milk production:										
Northeast	31,292	31,317	31,261	31,197	25	-31	-95	.08	-.10	-.30
Corn Belt	19,223	19,232	19,216	19,225	9	-7	2	.05	-.04	.01
Lake States	29,728	29,727	29,747	29,770	-1	19	42	3/	.06	.14
Southeast	5,502	5,470	5,434	5,412	-32	-68	-90	-.58	-1.24	-1.64
South Central	9,940	9,956	9,918	9,897	16	-22	-43	.16	-.22	-.43
Plains	5,174	5,176	5,173	5,173	2	-1	-1	.04	-.02	-.02
Mountain	2,824	2,826	2,821	2,818	2	-3	-6	.07	-.11	-.21
Southwest	12,852	12,870	12,828	12,817	18	-24	-35	.14	-.19	-.27
Northwest	5,105	5,108	5,102	5,095	3	-3	-10	.06	-.06	-.20
United States	121,640	121,682	121,500	121,404	42	-140	-236	.03	-.12	-.19

1/ 45-cent per cwt increased Class I differentials across all regions.
2/ 75-cent per cwt decreased Class I differentials across all regions.
3/ Less than .005 percent.

Appendix table 10--Estimated fluid consumption and milk production under alternative programs with comparative differences from continued policy, 1980

Item	Continued policy	Increased diff. 1/	Decreased diff. 2/	Eliminated diff.	Change from continued policy: Increased diff. 1/	Decreased diff. 2/	Eliminated diff.	Increased diff. 1/ (%)	Decreased diff. 2/ (%)	Eliminated diff. (%)
	Million pounds							Percent		
Fluid consumption:										
Northeast	19,738	19,663	19,856	20,044	-75	118	306	-0.38	0.60	1.55
Corn Belt	10,348	10,307	10,414	10,437	-41	66	89	-.40	.64	.86
Lake States	2,797	2,789	2,811	2,809	-8	14	12	-.29	.50	.43
Southeast	5,011	4,985	5,052	5,097	-26	41	86	-.52	.82	1.72
South Central	7,350	7,315	7,406	7,468	-35	56	118	-.48	.76	1.61
Plains	1,226	1,220	1,235	1,241	-6	9	15	-.49	.73	1.22
Mountain	2,024	2,016	2,037	2,047	-8	13	23	-.40	.64	1.14
Southwest	6,183	6,159	6,221	6,245	-24	38	62	-.39	.61	1.00
Northwest	1,812	1,805	1,824	1,837	-7	12	25	-.39	.66	1.38
United States	56,489	56,259	56,856	57,225	-230	367	736	-.41	.65	1.30
Milk production:										
Northeast	31,186	31,309	31,009	30,604	123	-177	-582	.39	-.57	-1.87
Corn Belt	18,302	18,321	18,291	18,386	19	-11	84	.10	.06	.46
Lake States	29,802	29,713	29,995	30,260	-89	193	458	-.30	.65	1.54
Southeast	5,736	5,744	5,512	5,355	8	-224	-381	.14	-3.91	-6.64
South Central	9,787	9,867	9,662	9,518	80	-125	-269	.82	-1.28	-2.75
Plains	4,766	4,768	4,767	4,778	2	10	12	.04	.02	.25
Mountain	2,865	2,877	2,848	2,832	12	-17	-33	.42	-.59	-1.15
Southwest	13,936	14,014	13,821	13,777	78	-115	-159	.56	-.83	-1.14
Northwest	5,244	5,255	5,232	5,198	11	-12	-46	.21	-.23	-.88
United States	121,624	121,868	121,137	120,708	244	-487	-916	.20	-.40	-.75

1/ 45-cent per cwt increased Class I differentials across all regions.
2/ 75-cent per cwt decreased Class I differentials across all regions.

Appendix table 11--Estimated fluid consumption and milk production under alternative programs with comparative differences from continued policy, 1985

Item	Continued policy	Increased diff. 1/	Decreased diff. 2/	Eliminated diff.	Change from continued policy: Increased diff. 1/	Decreased diff. 2/	Eliminated diff.	Increased diff. 1/	Decreased diff. 2/	Eliminated diff.
	---------- Million pounds ----------							----- Percent -----		
Fluid consumption:										
Northeast	20,322	20,258	20,424	20,574	-64	102	252	-0.32	0.50	1.24
Corn Belt	10,638	10,604	10,693	10,741	-34	55	103	-.32	.52	.97
Lake States	2,904	2,897	2,916	2,912	-7	12	8	-.24	.41	.28
Southeast	5,423	5,400	5,460	5,519	-23	37	96	-.42	.68	1.77
South Central	7,634	7,604	7,682	7,761	-30	48	127	-.39	.63	1.66
Plains	1,222	1,217	1,230	1,236	-5	8	14	-.41	.65	1.15
Mountain	2,200	2,193	2,212	2,215	-7	12	15	-.32	.55	.68
Southwest	6,617	6,597	6,650	6,694	-20	33	77	-.30	.50	1.16
Northwest	1,874	1,868	1,884	1,894	-6	10	20	-.32	.53	1.07
United States	58,834	58,638	59,151	59,546	-196	317	712	-.33	.54	1.21
Milk production:										
Northeast	31,789	31,985	31,501	30,767	196	-288	-1,022	.62	-.91	-3.21
Corn Belt	16,805	16,788	16,870	17,103	-17	65	298	-.10	.39	1.77
Lake States	31,294	31,012	31,847	32,666	-282	553	1,372	-.90	1.77	4.38
Southeast	6,285	6,361	5,906	5,546	76	-379	-739	1.21	-6.03	-11.76
South Central	9,608	9,723	9,424	9,123	115	-184	-485	1.20	-1.92	-5.05
Plains	4,227	4,218	4,250	4,293	-9	23	66	-.21	.54	1.56
Mountain	2,986	3,005	2,958	2,946	19	-28	-40	.64	-.94	-1.34
Southwest	16,256	16,373	16,082	15,978	117	-174	-278	.72	-1.07	-1.71
Northwest	5,605	5,613	5,603	5,576	8	-2	-29	.14	-.04	-.52
United States	124,855	125,078	124,441	123,998	223	-414	-857	.18	-.33	-.69

1/ 45-cent per cwt increased Class I differentials across all regions.
2/ 75-cent per cwt decreased Class I differentials across all regions.

Appendix table 12--Milk used and marketed by farmers, United States

Year	Milk sold to plants and dealers			Milk sold directly to consumers	Farm-separated cream sold to plants 1/	Milk used on farms	Total milk produced
	Fluid-grade	Manufacturing-grade	Total				
	Million pounds						
1948	40,026	28,984	69,010	4,572	19,712	19,377	112,671
1949	43,241	30,049	73,290	4,234	19,949	18,630	116,103
1950	45,265	28,940	74,205	3,935	20,208	18,254	116,602
1951	46,178	28,302	74,480	3,738	18,530	17,933	114,681
1952	49,473	27,828	77,301	3,518	16,853	16,999	114,671
1953	53,277	31,290	84,567	3,208	16,334	16,112	120,221
1954	55,361	32,513	87,874	2,930	15,910	15,380	122,094
1955	57,305	33,655	90,960	2,672	14,688	14,625	122,945
1956	61,133	34,388	95,521	2,448	13,264	13,627	124,806
1957	62,902	35,382	98,284	2,294	11,669	12,381	124,628
1958	64,757	34,869	99,626	2,167	10,280	11,147	123,220
1959	66,534	34,275	100,809	2,071	9,073	10,036	121,989
1960	69,631	34,296	103,927	2,086	7,938	9,158	123,109
1961	72,597	35,756	108,353	2,054	6,918	8,382	125,707
1962	74,154	36,524	110,678	1,966	5,943	7,664	126,251
1963	74,501	36,694	111,195	1,889	5,060	7,058	125,202
1964	77,640	36,536	114,176	1,863	4,439	6,489	126,967
1965	77,777	34,943	112,720	1,834	3,652	5,974	124,180
1966	75,692	34,007	109,699	1,746	2,995	5,472	119,912
1967	76,603	32,830	109,433	1,760	2,374	5,164	118,731
1968	76,168	32,643	108,811	1,780	1,972	4,662	117,225
1969	79,203	29,294	108,497	1,688	1,608	4,315	116,108
1970	81,426	28,609	110,035	1,727	1,198	4,002	116,962
1971	85,273	26,928	112,201	1,577	1,011	3,743	118,532
1972	87,772	26,218	113,990	1,530	803	3,581	119,904
1973	84,564	25,259	109,823	1,507	680	3,375	115,385
1974	87,164	23,170	110,334	1,530	432	3,257	115,553
1975	88,254	22,064	110,318	1,519	387	3,234	115,458

1/ Milk equivalent.

Appendix table 13--Use of whole milk marketed by farmers

Year	Fluid milk products 1/ (Fluid-grade milk only)		Manufactured milk products from:				Total whole milk
			Fluid-grade milk 2/	Mfg.-grade milk	Total		
	Mil. lbs	Percent of total	Mil. lbs			Percent of total	Mil. lbs
1954	43,176	49.1	12,185	32,513	44,698	50.9	87,874
1955	44,712	49.2	12,593	33,655	46,248	50.8	90,960
1956	46,267	48.4	14,866	34,388	49,254	51.6	95,521
1957	47,363	48.2	15,539	35,382	50,921	51.8	98,284
1958	47,736	47.9	17,021	34,869	51,890	52.1	99,626
1959	48,240	47.9	18,294	34,275	52,569	52.1	100,809
1960	49,027	47.2	20,604	34,296	54,900	52.8	103,927
1961	49,020	45.2	23,577	35,756	59,333	54.8	108,353
1962	49,910	45.1	24,244	36,524	60,768	54.9	110,678
1963	51,227	46.1	23,274	36,694	59,968	53.9	111,195
1964	52,254	45.8	25,386	36,536	61,922	54.2	114,176
1965	53,097	47.1	24,680	34,943	59,623	52.9	112,720
1966	53,750	49.0	21,942	34,007	55,949	51.0	109,699
1967	52,968	48.4	23,635	32,830	56,465	51.6	109,433
1968	53,665	49.3	22,503	32,643	55,146	50.7	108,811
1969	53,954	49.7	25,249	29,294	54,543	50.3	108,497
1970	54,312	49.4	27,114	28,609	55,723	50.6	110,035
1971	54,669	48.7	30,604	26,928	57,532	51.3	112,201
1972	55,771	48.9	32,001	26,218	58,219	51.1	113,990
1973	55,636	50.7	28,928	25,259	54,187	49.3	109,823
1974	54,316	49.2	32,848	23,170	56,018	50.8	110,334
1975	55,263	50.1	32,991	22,064	55,055	49.9	110,318

1/ Product pounds. Includes direct-to-consumer sales by producers.
2/ Estimated fluid-grade milk sold, less usage in fluid milk products.

Appendix table 14--Percentage of whole milk sold to plants and dealers, plus milk sold directly to consumers that was Grade A

Region	1965			1975			Change in Grade A in 1975 compared to 1965	
	Total milk	Total Grade A	Percent Grade A	Total milk	Total Grade A	Percent Grade A		
	-- Mil. lbs --		Pct	-- Mil. lbs --		Pct	Mil. lbs	Pct
Northeast	31,854	30,421	96	29,141	28,478	98	-1,943	+2
Corn Belt	21,991	12,987	59	17,739	13,035	73	+48	+14
Lake States	28,045	9,511	34	27,063	15,122	56	+5,611	+22
South Atlantic	4,010	3,887	97	5,033	5,005	99	+1,118	+2
South Central	9,121	7,749	85	9,081	8,421	93	+672	+8
Plains	4,271	1,906	45	4,738	2,292	48	+386	+3
Mountain	2,204	1,936	88	2,588	2,320	90	+384	+2
Southwest	8,823	7,884	89	11,588	10,860	94	+2,976	+5
Northwest	4,061	2,758	67	4,706	3,634	77	+876	+10
Continental United States	114,380	79,039	69	111,677	89,167	80	+10,128	+11

Appendix table 15--Elasticity of supply and demand used in study

Region	Demand 1/	Supply						
	Fluid milk 2/	In year of policy alternative	Permanent shift in all future years	Distributed lag: 3/ First year	Second year	Third year	Fourth year	Fifth year
	Elasticity							
Northeast	-0.168	0.06	0.14	0.22	0.085	0.033	0.013	0.005
Corn Belt	-.168	.06	.14	.08	.037	.017	.008	.004
Lake States	-.123	.06	.14	.08	.037	.017	.008	.004
Southeast	-.244	.12	.28	.14	.054	.200	.007	.003
South Central	-.216	.09	.21	.15	.072	.037	.019	.010
Plains	-.197	.06	.14	.03	.021	.015	.010	.007
Mountain	-.173	.06	.14	.18	.044	.012	.003	.001
Southwest	-.158	.075	.175	.37	.240	.153	.098	.063
Northwest	-.173	.075	.175	.37	.240	.153	.098	.063

1/ U.S. manufacturing demand is -0.45.
2/ Source (1).
3/ Source (4).

Appendix table 16--Estimated changes in milk price, consumption, and production under eliminated minimum Class I differentials, with two supply lag assumptions

Item	Continued policy			Change from continued policy				
				Permanent lag		Five year lag		
	1977	1980	1985	1980	1985	1977	1980	1985
M-W mfg. milk price	8.45	9.83	11.91	-0.57	-0.65	-0.35	-0.51	-0.55
All-wholesale price:								
Northeast	9.94	11.32	13.40	-.30	-.21	-.52	.36	-.32
Corn Belt	9.13	10.51	12.59	.17	.21	-.01	.12	.12
Lake States	8.69	10.07	12.15	.42	.50	.18	.36	.40
Southeast	11.19	12.57	14.65	-.57	-.58	-.83	-.63	-.68
South Central	10.16	11.54	13.62	-.28	-.27	-.50	-.35	-.36
Plains	8.94	10.32	12.40	.16	.22	-.05	.11	.13
Mountain	9.74	11.12	13.20	-.12	.04	-.37	-.18	-.07
Southwest	9.49	10.87	12.95	-.13	-.10	-.37	-.18	-.20
Northwest	9.30	10.68	12.76	-.01	.07	-.26	-.06	-.03
United States (wtd. avg.)	9.46	10.85	12.93	-.01	.04	-.23	-.07	-.05
Class I price:								
Northeast	11.40	12.78	14.86	-1.18	-1.10	-1.40	-1.24	-1.20
Corn Belt	10.55	12.12	14.50	-.62	-.84	-.65	-.68	-.94
Lake States	10.05	11.43	13.51	-.38	-.30	-.70	-.44	-.40
Southeast	12.01	13.55	15.91	-.95	-1.15	-1.11	-1.01	-1.25
South Central	11.24	12.86	15.34	-.96	-1.18	-1.04	-1.02	-1.28
Plains	10.52	12.08	14.46	-.73	-.85	-.87	-.79	-.95
Mountain	10.98	12.36	14.44	-.81	-.58	-1.08	-.87	-.68
Southwest	10.20	11.80	14.26	-.75	-1.05	-.85	-.81	-1.15
Northwest	10.62	12.00	14.08	-.95	-.87	-1.27	-1.01	-.97
United States (wtd. avg.)	11.02	12.51	14.77	-.91	-.99	-1.07	-.97	-1.08
Fluid consumption:								
Northeast	19,467	19,738	20,322	306	252	402	321	275
Corn Belt	10,144	10,348	10,638	89	103	105	97	115
Lake States	2,747	2,797	2,904	12	8	24	13	10
Southeast	4,870	5,011	5,423	86	96	110	91	104
South Central	7,397	7,350	7,634	118	127	148	125	137
Plains	1,260	1,226	1,222	15	14	20	16	16
Mountain	1,909	2,024	2,200	23	15	32	24	18
Southwest	6,079	6,183	6,617	62	77	80	67	84
Northwest	1,806	1,812	1,874	25	20	37	26	22
United States	55,679	56,489	58,834	736	712	958	780	781
Milk Production:								
Northeast	31,292	31,186	31,789	-582	-1,022	-95	-437	-338
Corn Belt	19,223	18,302	16,805	84	298	2	41	35
Lake States	29,728	29,802	31,294	458	1,372	42	200	217
Southeast	5,502	5,736	6,285	-381	-739	-90	-108	-100
South Central	9,940	9,787	9,608	-269	-485	-43	-121	-101
Plains	5,174	4,766	4,227	12	66	-1	5	6
Mountain	2,824	2,865	2,986	-33	-40	-6	-17	-7
Southwest	12,852	13,936	16,256	-159	-278	-35	-211	-243
Northwest	5,105	5,244	5,605	-46	-29	-10	-59	-18
United States	121,640	121,624	124,855	-916	-857	-236	-707	-549

Appendix table 17--Estimated milk prices under alternative of 40-cent decreased Class I differentials, with comparative differences from continued policy

Item	40-cent decreased differentials			Change from continued programs					
	1977	1980	1985	1977	1980	1985	1977	1980	1985
	Dollars per cwt						Percent		
Prevailing Class I price:									
Northeast	11.10	12.53	14.62	-0.30	-0.25	-0.24	-2.63	-1.96	-1.62
Corn Belt	10.25	11.87	14.26	-.30	-.25	-.24	-2.84	-2.06	-1.66
Lake States	9.75	11.18	13.27	-.30	-.25	-.24	-2.99	-2.19	-1.78
Southeast	11.71	13.30	15.67	-.30	-.25	-.24	-2.50	-1.85	-1.51
South Central	10.94	12.61	15.10	-.30	-.25	-.24	-2.67	-1.94	-1.56
Plains	10.22	11.83	14.22	-.30	-.25	-.24	-2.85	-2.07	-1.66
Mountain	10.68	12.11	14.20	-.30	-.25	-.24	-2.73	-2.02	-1.66
Southwest	9.90	11.55	14.02	-.30	-.25	-.24	-2.94	-2.12	-1.68
Northwest	10.32	11.75	13.84	-.30	-.25	-.24	-2.82	-2.08	-1.70
United States (wtd. avg.)	10.72	12.26	14.53	-.30	-.25	-.24	-2.72	-2.00	-1.62
All-wholesale milk price:									
Northeast	9.86	11.28	13.37	-.08	-.04	-.03	-.80	-.35	-.22
Corn Belt	9.09	10.54	12.63	-.04	.03	.04	-.44	.29	.32
Lake States	8.74	10.16	12.26	.05	.09	.11	.58	.89	.91
Southeast	10.94	12.42	14.54	-.25	-.15	-.11	-2.23	-1.19	-.75
South Central	10.02	11.48	13.60	-.14	-.06	-.02	-1.38	-.52	-.15
Plains	8.91	10.35	12.45	-.03	.03	.05	-.34	.29	.40
Mountain	9.64	11.08	13.16	-.10	-.04	-.04	-1.03	-.36	-.30
Southwest	9.36	10.82	12.94	-.13	-.05	-.01	-1.37	-.46	.08
Northwest	9.25	10.69	12.78	-.05	.01	.02	-.54	.09	.16
United States (wtd. avg.)	9.40	10.84	12.95	-.06	-.01	.02	-.63	-.09	.15
M-W mfg. milk price	8.55	9.98	12.07	.10	.15	.16	1.18	1.53	1.34

Appendix table 18--Estimated milk production and consumption under alternative policy of 40-cent decreased Class I differentials

Item	40-cent decreased differentials			Change from continued policy					
	1977	1980	1985	1977	1980	1985	1977	1980	1985
	Million pounds						Percent		
Milk consumption:									
Northeast	19,553	19,801	20,376	86	63	54	0.44	0.32	0.27
Corn Belt	10,192	10,383	10,667	48	35	29	.47	.34	.27
Lake States	2,757	2,804	2,910	10	7	6	.36	.25	.21
Southeast	4,899	5,033	5,443	29	22	20	.60	.44	.37
South Central	7,440	7,380	7,660	43	30	26	.58	.41	.34
Plains	1,267	1,231	1,226	7	5	4	.56	.41	.33
Mountain	1,918	2,031	2,206	9	7	6	.47	.25	.27
Southwest	6,107	6,203	6,635	28	20	18	.46	.32	.27
Northwest	1,815	1,818	1,879	9	6	5	.50	.33	.27
United States	55,948	56,684	59,002	269	195	168	.48	.35	.29
Milk production:									
Northeast	31,275	31,092	31,635	-17	-94	-154	-.05	-.30	-.48
Corn Belt	19,219	18,296	16,840	-4	-6	35	-.02	-.03	.21
Lake States	29,738	29,905	31,589	10	103	295	.04	.35	.94
Southeast	5,466	5,617	6,083	-36	-119	-202	-.65	-2.07	-3.21
South Central	9,928	9,720	9,510	-12	-67	-98	-.12	-.68	-1.02
Plains	5,173	4,767	4,239	-1	1	12	-.02	.02	.28
Mountain	2,822	2,856	2,971	-2	-9	-15	-.07	-.31	-.50
Southwest	12,839	13,875	16,163	-13	-61	-93	-.10	-.44	-.57
Northwest	5,103	5,238	5,604	-2	-6	-1	-.04	-.11	-.02
United States	121,563	121,366	124,634	-77	-258	-221	-.06	-.21	-.18

Appendix table 19--Measures of the levels of Class I differentials on a proportional basis

Year	Percentage Class I differential is of Class I price			Percentage basic formula price is of Class I price			Percentage Class I price is of basic formula price		
	All markets	Chicago	Southeastern Florida	All markets	Chicago	Southeastern Florida	All markets	Chicago	Southeastern Florida
					Percent				
1966	30.5	--	46.2	69.5	--	55.7	143.9	--	179.5
1967	31.6	--	44.7	68.4	--	55.9	146.2	--	178.9
1968	33.4	22.7	43.2	67.6	79.2	57.4	148.0	126.3	174.2
1969	32.5	21.4	41.3	67.8	78.6	58.7	147.4	127.2	170.3
1970	31.0	20.8	39.1	69.0	79.2	60.9	144.9	126.3	164.2
1971	30.4	20.8	39.6	69.6	79.2	60.3	143.7	126.3	165.8
1972	29.6	20.1	38.6	70.4	79.9	61.3	142.0	125.2	163.1
1973	26.2	17.5	34.8	73.8	82.5	65.5	135.5	121.2	152.7
1974	22.4	14.8	30.2	77.6	85.2	69.7	128.9	117.4	143.5
1975	22.4	14.8	30.3	77.6	85.1	69.7	128.9	117.5	143.5
1976	19.6	12.8	26.8	80.4	87.2	73.2	124.4	114.7	136.6
1977	19.8	12.9	27.1	80.2	87.1	72.9	124.8	114.9	137.1

-- = not applicable.

Appendix table 20--Weighted average Class I over order charges in Federal order markets 1/

Month	Year			
	1973	1974	1975	1976
	Cents per 100 pounds			
January	10	32	100	22
February	17	30	89	10
March	17	37	77	19
April	15	36	73	43
May	17	35	67	24
June	15	51	55	31
July	18	64	48	39
August	51	100	49	33
September	51	106	57	
October	88	105	46	
November	54	97	35	
December	27	97	27	

1/ Calculated from selected periods	Average	Standard deviation
January 1973 to July 1974	35.0	20.0
August 1974 to January 1975	101.0	3.5
February 1975 to August 1976	44.4	20.7

Source: (12).

APPENDIX B

Description of Core Model Used

A nine-region model of the Continental United States was developed to analyze the impact of alternative classified pricing policies on regional and aggregate milk production, consumption, and prices. This is important in understanding the broader implications of Federal milk marketing orders.

For simplicity, a three-region model is illustrated in figure 1. The regional demand for fluid milk, which depends on the prevailing Class I price in that region, is represented by F_1, F_2, and F_3. The regional milk supply, which depends on the all-wholesale milk price in each region, is represented by S_1, S_2, and S_3. Within each region, the demand for manufacturing milk is assumed to be infinitely elastic at the U.S. manufacturing milk price (P^m). The U.S. manufacturing milk price is determined by the intersection of the aggregate U.S. demand for manufacturing milk (M^d) and the total supply of milk available for manufacturing after the higher priced fluid demand is met (M^s).

Under Federal milk marketing orders, minimum Class I prices are set above the U.S. manufacturing price. The differential between these prices varies from one region to another. This is illustrated by different values of the Class I differential (Θ_1, Θ_2, and Θ_3) in figure 1. Without a change in Class I pricing policy, these differentials would be expected to remain fairly constant over time.

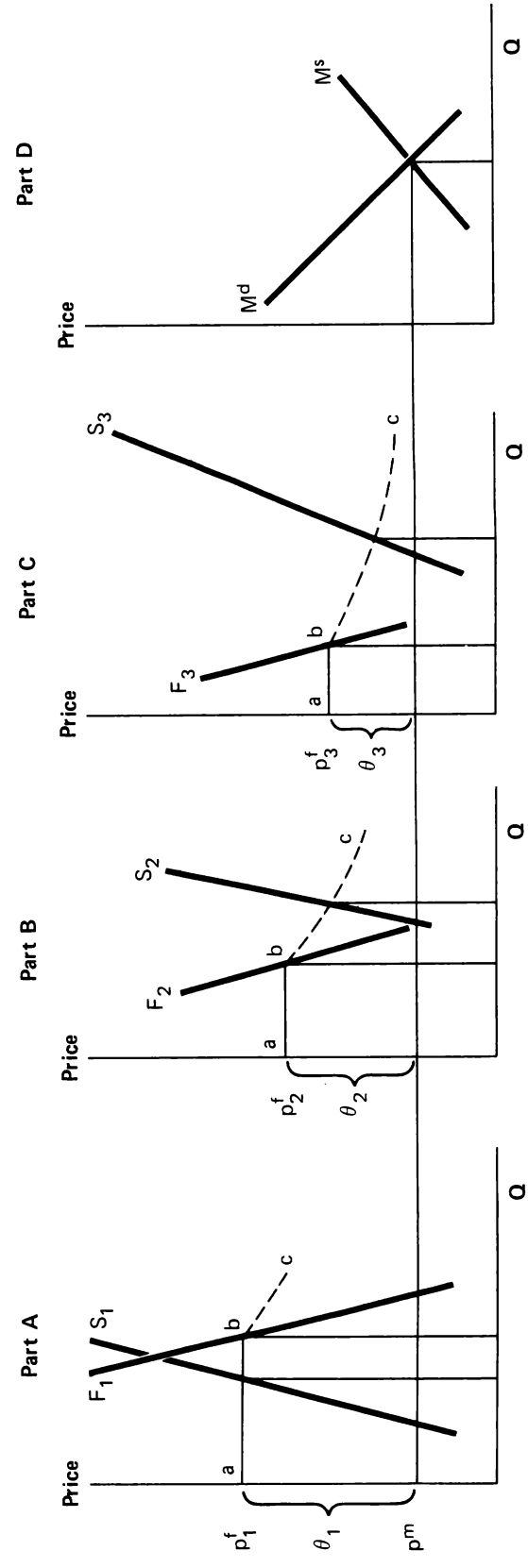
The average revenue to farmers per 100 pounds of milk (the all-wholesale milk price) reflects both Class I and manufacturing milk sales, and is illustrated with lines labeled abc in figure 1. This average revenue can be written as:

$$(1) \qquad P_i^w = \frac{P_i^f F_i + P^m (S_i - F_i)}{S_i}$$

where:

- i = 1 to 9 regions
- P_i^f = regional Class I milk price
- P_m = U. S. manufacturing milk price
- F_i = regional milk used as Class I (including Class I milk shipped to other regions)
- S_i = regional milk production.

If the quantity of milk produced in a region increased relative to the quantity used as fluid, a larger proportion of the milk must be sold at the lower manufacturing price (P^m).



Appendix figure 1
Partial equilibrium model of the U.S. classified pricing program

Therefore, the average revenue would decline as illustrated by the bc segment of the abc curve in figure 1. The average revenue curve (abc) becomes the effective demand curve facing producers in a given region. It is the intersection of this curve with the regional supply (S) that would determine the quantity of milk produced in each region.

The region illustrated in part A of figure 1 is deficit in fluid milk; therefore, the all-wholesale milk price would be equal to the Class I price.[1] The quantity produced within that region would be determined by the intersection of the ab segment of the abc curve and S_1. The horizontal distance between that intersection and the fluid demand curve is the quantity of fluid milk that would be shipped into that region from a surplus region(s). The regions illustrated in parts B and C of figure 1 produce more milk than is used as fluid.

The M^s curve in part D of figure 1 shows the quantity of milk available for manufacturing for all regions (after the fluid demand has been met) at all possible manufacturing milk prices. The higher the manufacturing milk price, the greater will be the quantity of milk available for manufacturing. This is because the resulting higher Class I prices would tend to decrease fluid consumption, and the higher all-wholesale milk prices would encourage production leaving more milk available for manufacturing.

This annual partial equilibrium model exists over time. Changes in population, tastes and preferences, price of substitutes, and other factors affecting demand would be shifting the demand curves over time. On the supply side, changes in feed and other input prices, returns from competing farm enterprises, and other factors affecting supply would be shifting the supply curves over time. These shifts along with specific Class I differentials established under Federal milk marketing orders would generate a series of annual equilibrium quantities and prices over time.

Assuming a continued Federal order Class I pricing policy through 1985, forecasts of supply and demand shifts were made and expected regional equilibrium production, fluid consumption, Class I prices, and U.S. manufacturing milk prices were determined. These forecasts were based upon expected inflation, feed costs, input prices, and other factors affecting the dairy industry.

The forecasting procedure employed trend analysis, available supply and demand models, and subjective judgment. These forecasted prices and quantities allowed the supply and demand curves discussed above and illustrated in figure 1 to be positioned for each year over the 1975 to 1985 period. The slopes of the demand and supply curves were calculated assuming what appeared to be reasonable supply and demand elasticity estimates. This procedure is discussed in more detail in the next section.

A Mathematical Representation of the Model

The more general regional model, of which the three-region model shown in figure 1 is a special case, can be written in the following equations:

$$(2) \quad F_i(t) = a_i(t) + b_i(t)P_i^f(t)$$

$$(3) \quad S_i(t) = c_i(t) + d_i(t)P_i^w(t)$$

$$(4) \quad M^d(t) = e(t) + f(t)P^m(t)$$

and identities:

$$(5) \quad P_i^f(t) = P^m(t) + \Theta_i(t)$$

$$(6) \quad P_i^w(t) = P^m(t) + \gamma_i(t)\Theta_i(t)$$

$$(7) \quad M^s(t) = \sum_{i=1}^{9} (S_i(t) - F_i(t))$$

where:

i	=	1 to 9 regions
t	=	year
$F_i(t)$	=	fluid milk consumption
$S_i(t)$	=	total milk production
$M^d(t)$	=	total U.S. manufacturing milk consumption
$P^m(t)$	=	U.S. average manufacturing milk price
$P_i^f(t)$	=	Class I milk price
$P_i^w(t)$	=	all-wholesale milk price
$M^s(t)$	=	total milk available in the U.S.
$\Theta_i(t)$	=	Class I milk price differential
$\gamma_i(t)$	=	percentage of milk used as Class I

and $a_i(t)$, $b_i(t)$, $c_i(t)$, $d_i(t)$, $e(t)$, and $f(t)$ are intercept and slope coefficients for supply and demand equations.

Equation (6) is equivalent to equation (1) when γ_i is equal to the actual percentage of total milk used for fluid consumption.

Because less information is available on interregional milk shipments than on all-wholesale milk prices, the percentage of Class I utilization is estimated from the all-wholesale milk

[1] Because of seasonal variation in production, a region probably would have to import 20 percent or more of its fluid milk before it could utilize most of its own production as fluid Class I sales. Some of its milk production would be diverted to manufacturing during part of the year, causing the all-wholesale milk price to be below the Class I price.

price, manufacturing milk price, and the Class I differential as:

$$\mathcal{J}_i(t) = \frac{P_i^w(t) - P^m(t)}{\Theta_i(t)}$$

The equilibrium condition for each year is:

$$(8) \quad M^d(t) = M^s(t).$$

The intercept and slope parameters of the model for the 1975 to 1985 period were calculated using the forecasted equilibrium prices and quantities and the estimates of demand and supply elasticity. The parameters of the supply and demand equations were calculated for each year. The slopes and intercepts of the fluid demand equations were estimated as:

$$b_i(t) = \frac{P_i^t(t)^\circ}{F_i(t)^\circ \eta_i^f(t)} = \text{slope}$$

and:

$$a_i(t) = b_i(t)F_i(t)^\circ + P_i^f(t)^\circ$$

$$= \text{intercept},$$

where o refers to forecasted equilibrium quantity and price and $\eta_i^f(t)$ = elasticity of fluid demand in the ith region and tth year. The slopes and intercepts of the supply equations were estimated as:

$$d_i(t) = \frac{P_i^w(t)^d}{S_i(t)^d E_i^s(t)} = \text{slope}$$

and:

$$C_i(t) = d_i(t)\, S_i(t)^\circ + P_i^w(t)^\circ$$

$$= \text{intercept},$$

where o refers to forecasted equilibrium quantity and price and:

$E_i^s(t)$ = elasticity of milk production response in year t to a change in the all-wholesale milk price in year t.

The slope and intercept of the aggregate U.S. demand for manufacturing milk were estimated as:

$$f(t) = \frac{P^m(t)^\circ}{M^d(t)^\circ \eta^m(t)} = \text{slope}$$

and:

$$e(t) = -f(t)M^d(t)^\circ + P^m(t)^\circ$$

$$= \text{intercept},$$

where o refers to forecasted equilibrium quantity and price and:

$\eta_i^f(t)$ = elasticity of demand for manufacturing milk.

All the parameters of the model that are consistent with the forecasted equilibrium prices and quantities have now been calculated. The model can be solved for the equilibrium U.S. manufacturing milk price in any year. From the equilibrium condition (equation 8), the manufacturing price would be:

$$P^m(t) = \frac{e(t) + \sum_{i=1}^{9}\left[a_i(t) - c_i(t) - d_i(t)\,\mathcal{J}_i(t)\Theta_i(t) + b_i(t)\Theta_i(t)\right]}{\sum_{i=1}^{9}\left[d_i(t) - b_i(t)\right] - f(t)}$$

All other prices and quantities can then be calculated from this equilibrium manufacturing milk price.

Changing any one of the parameters will change the equilibrium prices and quantities from those forecasted.

Analyzing Policy Alternatives

The policy variable of interest in this paper is the Class I differential ($\Theta_i(t)$). Reducing the Class I differential in all regions would lower Class I prices in all regions and encourage more fluid milk consumption. All-wholesale milk prices in most regions would be expected to fall which would reduce total U.S. milk production. Higher fluid consumption and lower milk production in the aggregate would reduce the quantity of milk available for manufacturing at the original manufacturing milk price and, thereby, the manufacturing milk price would be expected to rise to a new equilibrium level.

Two assumptions on the lagged milk production response to a price change were built into the model. Results shown in tables 5 to 10 assume the following lag assumptions:

When the all-wholesale milk price in any year deviated from that forecasted, because of a policy or other change, it is assumed that the supply curve for the next and all subsequent years would shift.[2] The new intercept for the supply curve in t+1 would then be:

$$C_i(t+1)' = C_i(t+1) + \frac{E_i^L(t)\left[P_i^w(t) - P_i^w(t)^\circ\right] S_i(t+1)}{P_i^w(t)^\circ}$$

[2] This shift is only due to the change in policy variable, and is in addition to the effect of exogenous supply shifters that are already reflected in the forecasted supply equations.

where: $C_i(t+1)$ = the supply intercept calculated from the forecasted price and quantity and supply elasticity for year t+1,

$E_i^L(t)$ = supply elasticity of a one-year lagged response to a deviation of the all-wholesale milk price from the forecasted equilibrium all-wholesale milk price in t.

If no policy change is introduced, the solution to the model will be the forecasted equilibrium quantity since $P_i^w(t) - P_i^w(t)^o$ would be zero.

The supply curve intercept 10 years after a policy change was instituted would reflect the original intercept calculated from the forecasted price and quantity plus the 10 shifts calculated from the deviation of the all-wholesale milk price from the forecasted all-wholesale milk price for each of the prior 10 years.

Results were also obtained for a second lagged assumption and are shown in appendix table 15. This lagged supply response to a deviation in milk prices from the baseline is a form of distributed lag. Results from the Nerlove distributed lag, polynomial lag, or other lag structure of up to 5 years from the price change are reflected in the model. When the all-wholesale milk price in any year deviated from that forecasted, because of a policy change, it is assumed that the supply curve for the next and all subsequent years would shift in the following 5 years. The new intercept for the supply curve in the year after a policy change would be:

$$C_i(t+1)' = C_i(t+1) + \frac{E_i^{L1}(t)\left[P_i^w(t) - P_i^w(t)^o\right] S_i(t+1)}{P_i^w(t)^o}$$

where: $E_i^{L1}(t)$ is the first year lag response.

The new intercept for the supply curve 5 years after a policy change would reflect the deviations in price from the baseline price for the previous 5 years as follows:

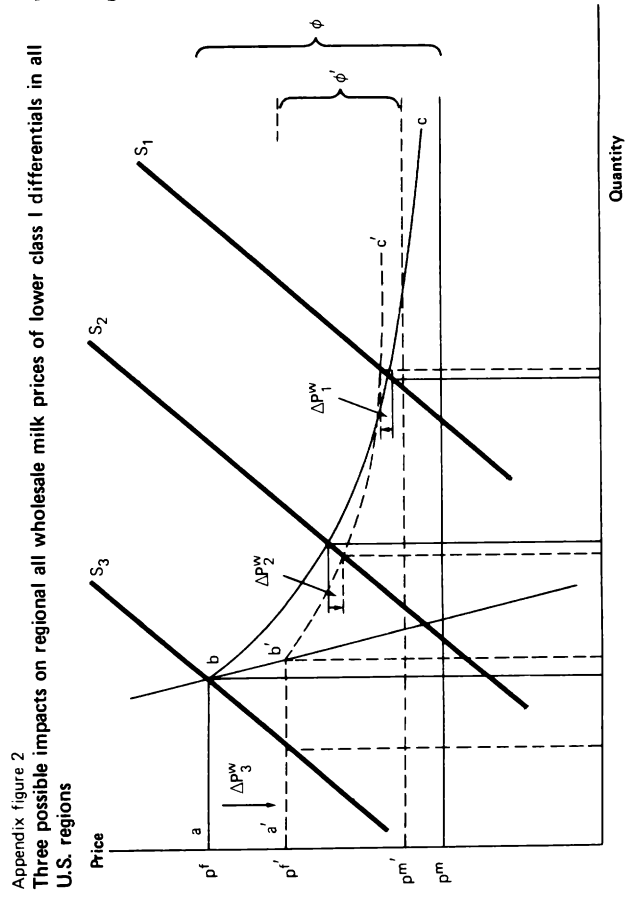
$$C_i(t+5)' = C_i(t+5) + \frac{E_i^{L1}\left[P_i^w(t+4) - P_i^w(t+4)^o\right] S_i(t+4)}{P_i^w(t+4)^o} + \ldots\ldots\ldots + \ldots\ldots\ldots + \ldots\ldots\ldots + \frac{E_i^{L5}\left[P_i^w(t) - P_i^w(t)^o\right] S_i(t)}{P_i^w(t)^o}$$

where: E_i^{L1}, E_i^{L2}, E_i^{L3}, E_i^{L4}, E_i^{L5} are the assumed response elasticities.

The elasticity of supply and demand used under both lag assumptions are shown in appendix table 14.

Regional Impact on Producer Prices

Reducing the Class I differential (from Θ to Θ' in figure 2) would result in a higher U.S. manufacturing milk price and a lower Class I price. The demand curve facing the producers would shift from abc to a'b'c' in figure 2. The impact on specific regions depends upon the region's Class I utilization percentage. For example, in figure 2 a region with a very high utilization (supply S_3) would be expected to become more deficit with lower Class I differentials. On the other extreme, lower Class I differentials may result in a higher all-wholesale milk price for some regions with a very low utilization of total milk as fluid (supply S_1 in figure 2).



APPENDIX C

Glossary of Terms

All-wholesale milk price—The weighted average price received by all dairy farmers in a specified geographic area. It is the total revenue received by Grade A dairy farmers in the geographic area plus the total revenue received by Grade B dairy farmers divided by the total pounds of milk (Grade A plus Grade B) sold to plants and dealers in the specified area. Individual farmers do not receive the all-wholesale milk price. It is merely an arithmetic calculation of the weighted average price received by all dairy farmers in a specified area. Fluid-grade (Grade A) dairy farmers in an area generally receive a higher price than Grade B dairy farmers.

Blend price—The weighted average price received by Grade A dairy farmers supplying a milk order market. It is the Class I price times the proportion of the market's milk used to produce Class I products plus the Class II price times the proportion of the Market's milk used to produce Class II products. (If more than two classes of milk are specified in a milk order, the above procedure is used, but it applies to more categories of prices and classes of milk.)

Class I differential—The difference or price spread between the Class I price and the Class II (M-W) price.

Class I milk—Milk used for fluid consumption. It generally includes milk used for packaged milk products—whole milk, skim and lowfat milk, milk drinks, flavored milk, and buttermilk.

Class II milk—In this study, any fluid-grade milk that is used to produce manufactured dairy products such as butter, nonfat dry milk, and cheese. (Some milk order markets differentiate products into more than two classes, but the difference between the lowest price class and Class II is small.)

Class II price—The minimum price stipulated by milk orders that handlers must pay for fluid-grade milk used to produce manufactured dairy products. In most milk orders this is the Minnesota-Wisconsin (M-W) price.

Fluid-grade milk (Grade A)—Milk approved by designated health authorities (Federal, State, or municipal) for bottled fluid milk products.

Manufacturing-grade milk (Grade B)—Milk that is not approved by designated health authorities (Federal, State, or municipal) for bottled fluid milk products. This milk can only be used to produce manufactured dairy products such as butter, nonfat dry milk, and cheese, because it does not meet the sanitary standards for bottled fluid milk products.

Minimum Class I price—The minimum price stipulated by milk orders that fluid milk product bottling handlers must pay for fluid-grade milk used for bottled fluid milk products (Class I products).

Minnesota-Wisconsin price (M-W)—A price announced monthly by the U.S. Department of Agriculture which is an estimate of the average price paid by unregulated handlers for manufacturing grade milk (Grade B) in the two States.

Pooling—The procedure of aggregating the returns from fluid-grade milk used in Class I and Class II products to arrive at a weighted average (blend) price paid all fluid-grade dairy farmers associated with a milk order market.

Prevailing Class I price—The minimum Class I price stipulated by milk orders plus over order premiums charged by producer cooperatives for fluid-grade milk used for bottled fluid milk products.

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