

Dairy

Background for 1995 Farm Legislation

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Introduction

A complex set of social, economic, and political relationships affects the dairy industry in the United States. Certain beliefs about milk and its production have been fostered by the European heritage underlying the development of the country. The industry is diverse, partly in response to development patterns and resource availability over a large land mass. The ability of the U.S. farm sector to provide ample supplies of low-cost inputs to dairying (feed grains and forages, for example) and the availability of competing products (such as margarine) have played major roles in industry developments. Lastly, the industry operates under a wide range of public policies and regulations--Federal, State, and local--which create a complex regulatory system.

The U.S. Dairy Industry

The dairy industry includes milk producers, dairy cooperatives, processors and manufacturers, and the firms that market milk and dairy products. Dairying is an important part of the agricultural economy of the United States. In 1993, cash receipts from milk marketings totaled \$19.3 billion. This was 10.3 percent of the total cash receipts (including government payments) from farming. Only meat animals (\$51.4 billion) and feed crops (\$19.4 billion) had greater cash receipts for the year. Milk products are also an important part of food industry receipts. Consumers spend about 13 percent of their food budget on milk and dairy products. Food expenditures comprise about 12 percent of disposable personal income (Putnam and Allshouse, 1993).

The dairy industry is shaped by the production and market characteristics of milk. Raw milk is a bulky (about 87 percent water), extremely perishable product with a high potential for disease transmittal. Sanitary production and handling conditions, rapid movement, refrigeration, and heat treatment are a must. Efficient assembly and hauling require a number of dairy farmers in most cases. Production (supply) and demand are seasonally unsynchronized and supply and demand responses to price changes are highly inelastic--small changes in supply and/or demand will cause large price changes.

Milk production, assembly, processing and manufacturing, and distribution (marketing) are coordinated by prices. During much of the history of the United States, fluid milk markets were local and largely isolated, with supplies and prices varying dramatically across markets and seasons. The production of storable manufactured dairy products (primarily cheese, butter, and nonfat dry milk) has linked most milk markets. As the needs of fresh milk markets change, milk is diverted from manufacturing and supplies of manufactured products are drawn into markets from other areas or from storage. Almost all milk and milk product prices are thereby linked to the prices of the storable products.

In theory, the prices for manufactured products and milk for manufacturing can be said to be in equilibrium when: (1) the value of milk is the same in all manufactured products, (2) geographic price differences are defined by costs of transporting products from surplus to deficit areas, and (3) seasonal price differences are defined by costs of storing products for the deficit season. Milk and

dairy product markets can be said to be in overall equilibrium when: (1) manufacturing markets are in equilibrium, (2) the farm value of milk used in fluid is the same as the manufacturing value in areas where there is manufacturing, and (3) milk prices in other areas are defined by milk transportation costs from surplus areas.

It is unlikely that the theoretical equilibriums have or will be achieved. Some of the problems that interfere with achievement of the theoretical overall milk and dairy product market equilibrium in the United States can be identified: geographic mismatches between milk supplies and the available product manufacturing capacity, and an inability to efficiently coordinate the fluid market and to price market balancing services accurately. Government programs can mitigate market deficiencies (and have done so) but can also create distortions of their own.

Milk Production

Key features of milk production are: location, quantities (both aggregate and per cow), herd size and distribution, farm numbers and ownership, producers' financial conditions, and the ability of producers to respond to changing economic conditions. Divergent beliefs as to what are sound farming practices and differing viewpoints about the changes taking place in farming and rural areas underlie these issues in the dairy industry. The major factors affecting milk supply are shown in app. table 1.

Location and Quantities

Regional issues quickly surface in discussions of milk production and dairy programs. These issues relate to the geographic location of milk production and the character of dairy farms in different parts of the country. Milk production has grown in areas outside the heavy producing tier of States stretching from New England to Minnesota (table 1). Wisconsin is still considered to be "America's Dairyland," but California surpassed it in milk production in August 1993 and has maintained this monthly production advantage. In 1993, Wisconsin produced just over 23 billion pounds of milk, 15.3 percent of total U.S. production, while California's production totaled about 22.9 billion pounds or 15.2 percent of the U.S. total. In 1960, Wisconsin

outproduced California by more than two to one (14.4 percent versus 6.6 percent).

Past regional population shifts in part help to explain the current location of milk production in States such as Arizona, California, Texas, and Florida. The current growth of production in those States, and others, is likely related more to factors such as land and facilities costs, climate, the supply and quality of hay and forage, the availability of a labor supply compatible with dairy operations, and opportunities to strictly specialize in managing and milking cows. Large drylot facilities of 1,000 cows or more, which are common in Western States, apparently show economies of both specialization and scale, which lead to reduced production costs.

Over half of 1993's total milk production (51.2 percent) came from five States--Wisconsin, California, New York, Pennsylvania, and Minnesota--and more than two-thirds was produced in 10 States. Production per cow varied widely among States, ranging from 19,425 pounds in California (24.9 percent above the U.S. average of 15,423 pounds) to 11,492 pounds (26.1 percent below the U.S. average) in Tennessee.

One recent attempt to develop an aggregate measure of the changes in location of milk production in the United States is the "propensity to produce milk" index (PTPM) as shown in app. table 2. The PTPM in a particular State reflects the State's change in share of U.S. production adjusted by the change in its relative milk price.

The top 10 States based on PTPM indices in 1992 were New Mexico, Arizona, Nevada, California, Florida, Washington, Texas, Colorado, Utah, and Idaho. The PTPM index in each of these States was much greater in 1992 when compared with both 1985 and 1975. The 10 States with the lowest PTPM's--ranked in reverse order--were Rhode Island, New Jersey, West Virginia, Illinois, North Dakota, Wyoming, Mississippi, Kansas, Iowa, and Alabama. In contrast to the top 10 States, these PTPM's were much lower in 1992 when compared with both 1985 and 1975.

A careful evaluation of the PTPM indices and a look at the underlying forces of change indicate that the growth of milk production in the West and

Table 1--Regional shares of U.S. milk production

Region	1965	1975	1985	1990	1991	1992	1993
<i>Percent of U.S. total</i>							
Northeast	20.7	20.4	20.0	18.3	18.5	18.7	18.6
Lake States	28.3	28.0	28.7	26.7	26.3	26.0	25.3
Corn Belt	17.1	13.6	11.8	11.5	11.3	11.1	10.9
Northern Plains	5.3	4.6	3.9	3.6	3.5	3.4	3.2
Appalachia	6.9	6.9	6.1	5.6	5.5	5.4	5.3
Southeast	3.0	3.8	3.1	3.3	3.3	3.3	3.3
Delta	2.3	2.3	1.8	1.7	1.7	1.7	1.6
Southern Plains	3.5	3.7	3.6	4.6	4.5	4.5	4.7
Mountain	3.7	4.4	5.5	6.4	6.7	7.0	7.5
Pacific	9.2	12.3	15.5	18.3	18.7	19.0	19.7

Southwest will likely continue. Some location-related factors, such as climate, are essentially fixed. However, many of the other forces affecting the location and structure of the dairy industry--size and enterprise specialization, good management practices, business and sociological philosophies, dairy and business support systems and economic development strategies--are open to change (Fallert, Weimar, and Crawford).

Farm Numbers

The number of operations in 1993 with at least one milk cow was estimated to be 162,450, down from almost 2.8 million in 1955. Included in this number are operations that do not sell milk. Milk cow numbers (excluding heifers not yet fresh--cows that have not yet had a calf) have also declined--from 21 million head in 1955 to 9.7 million in 1993. The changing average herd size on all farms with milk cows--from 8 in 1955 to 52 in 1990 and to 60 in 1993--is one indicator of the structural changes taking place in milk production (table 2).

Herd Size and Distribution

The National Agricultural Statistics Service (NASS) of the U.S. Department of Agriculture reported that operations with 1-49 head accounted for just under 60 percent of all operations in 1993. About 20 percent of the cow inventory was in the 1-49 head category. Farms with 100 or more cows represented almost 14 percent of the operations in

1993 and accounted for just over 50 percent of the cows.

Dairy Farm Ownership

Since 1969, individual or family ownership organizations have accounted for 80 percent or more of the reporting farms with milk cows, reaching almost 89 percent in 1974. Corporate organizations ranged from 0.5 to 4 percent of farms over the 1969-1992 period. Most corporate organizations are family-held with small numbers (10 or fewer) of stockholders. Ownership and operational decisionmaking in milk production are firmly in the hands of individuals and families, even for very large farms.

Financial Conditions of Milk Producers

The financial position of milk producers is a key element in understanding structural changes in the dairy industry. A perspective on current conditions can be gained by reviewing the financial problems faced by dairy farmers in the 1980's, a decade marked by periods of severe financial stress in U.S. agriculture.

Dairy farmers' financial problems in the 1980's were a result of industry forces at work in the previous decade. Periods of relatively strong market prices in the 1970's, with support prices tied to inflation, led to expectations that at least nominal prices would not fall. The early 1980's saw an increase in investments in productive

Table 2--Changes in the dairy industry, selected years

Item	1955	1975	1990	1993
<i>Thousands</i>				
Cows	21,044	11,139	10,127	9,705
Farms with milk cows	2,763	444	194	162
<i>Number</i>				
Average cows per farm	8	25	52	60
<i>Pounds</i>				
Milk per cow (annual)	5,842	10,360	14,646	15,554
<i>Billion pounds</i>				
Total milk production	122.95	115.4	148.31	150.95

capacity financed by debt, with productivity gains permitting debt repayment despite falling real milk prices. In the mid-1980's, dairy farmers were faced with the prospects of continued real milk price declines. The 1985 Food Security Act contained provisions that would trigger a lower support price for milk under certain conditions. Surviving producers were forced to reduce production costs and debt.

USDA's 1984 Farm Costs and Returns Survey (FCRS) data confirm the effects of the forces at work in the 1970's--17.8 percent of dairy farms were highly leveraged (40-70 percent debt/asset ratio) and 8.7 percent were very highly leveraged (greater than 70 percent debt/asset ratio). While the percentages themselves are of interest, more important is the change in these numbers since 1980. The percentage of highly leveraged dairy farms in 1984 was 60 percent greater than in 1980 while the very highly leveraged group nearly quadrupled. Since 1987, the overall financial position of dairy farmers has improved. Greater proportions of dairy farms have been classified in a favorable financial position and the percentages of marginally solvent and vulnerable farms have fallen.

1992 Conditions. The average net cash farm income of dairy farms in the 1992 FCRS (app. table 3) was \$38,674, well above that reported in 1991 but slightly lower than in 1990. The farm milk price in 1992 averaged \$13.15 per cwt. Regional average net cash incomes ranged from \$21,798 per farm in the Northern Plains to \$131,075 in the Pacific region.

From a balance sheet perspective, the financial position of dairy farms changed from 1991 to 1992. Debts in 1991 were 18 percent of assets compared with 14 percent in 1992. Liabilities, particularly noncurrent liabilities, fell in 1992, which combined with modest rises in assets led to the low debt/asset ratio. Regional debt/asset ratios varied from 0.07 in Appalachia to 0.21 in the Mountain States in 1992 (app. table 4).

Revenues. Dairy farm cash receipts come from three sources: (1) milk sales, (2) sales of replacement cows, calves, and cull cows, and (3) other sources (including leasing cattle, sale of manure, and dairy cooperative patronage dividends). Milk sales accounted for just over 91 percent, on average, of U.S. dairy enterprise revenues during the 1982-1992 period. Steady gains in production per cow and more volatile milk

prices during the late 1980's and early 1990's led to a cyclic pattern of total cash receipts from 1988 to 1992 (app. table 5).

Costs. Variable and fixed cash production expenses are influenced by several factors, including government policies and programs. Feed and forage costs can be affected by feed grain programs, conservation policies, disaster relief programs and, in some regions, policies related to irrigation water. Environmental, wage, and budget policies directly affect other variable expenses such as energy costs, labor costs, and assessments. Fixed cash expenses such as taxes, insurance, and interest payments are affected by Federal, State, and local actions. Tax policies and agricultural and nonagricultural credit and interest rate policies play roles in the entry, exit, and expansion decisions of dairy farmers and in the well-being of the entire industry.

The quantity data for calculating the cost of production (COP) of milk are not collected every year. Estimates for the years between surveys are based on price indices. From 1982 to 1992, variable cash expenses nationwide ranged from \$7.39 to \$9.00 per cwt, averaging just under 80 percent of total cash expenses. Feed and forage costs, the largest component of cash expenses, averaged almost 64 percent of total variable cash expenses. Fixed cash expenses, from a low of \$1.60 to a high of \$2.57 per cwt, accounted for the remaining 20 percent of total cash expenses.

The effect of recombinant bovine somatotropin (rbST) technology on the milk supply will depend on the extent to which it lowers milk production costs. Studies show that rbST will lower the cost of producing milk by increasing milk per cow and allowing costs other than feed costs to be distributed over greater output.

In a recent study (Executive Office of the President, 1994) based on 1989 FCRS dairy COP data and assuming an increase of 1,800 pounds of milk and additional costs of using rbST, cost changes were estimated by regions and by size (table 3). The 1,800-pound increase in milk per cow per year is the level that would be expected, based on reported test-herd results of using rbST.

There appears to be little difference in the actual levels of increased revenues between herd sizes; however, there is some variation if the increases are expressed as percentage changes. The regional impacts of rbST show a little more variation. The rbST technology appears to be size neutral, which is contrary to many people's beliefs. Good management skills are required in the use of rbST; therefore, rbST technology is not management neutral.

Returns. Cash returns (gross value of production less cash expenses) for dairy enterprises ranged from \$2.78 to \$4.76 per cwt during the 1982-92 period (app. table 5). Milk prices ranged from \$12.20 to \$13.70 per cwt over the same period. We observe both increases and decreases in year-to-year returns during the period. Cash returns peaked in 1982 at \$4.76 and generally declined until 1986. Since 1987 there have been more numerous ups and downs with greater magnitudes of change. Average cash returns in the 1980's (1982-89) were \$3.85 per cwt compared with \$4.13 per cwt in the 1990's (1990-92).

Supply Adjustments

The U.S. dairy industry has frequently faced milk surpluses--the result of prices high enough to generate production greater than commercial needs. Major expansions or contractions of the total milk supply are commonly viewed as long-term processes. The milk supply can be thought of as a flow process, a flow that involves the cow herd and the physical plant (capacity) of the industry. Unlike other livestock producers, dairy farmers can influence aggregate milk supply from either end of the "life" of the herd or physical plant production assets. For a given price structure, the dairy farmer may retain more heifer calves for the herd and lower culling rates to alter supplies of milk. Physical capacity changes are the result of long-term investment (or disinvestment) decisions. Entry, expansion, or exit decisions are not rapidly made.

Changes in culling and feeding can quickly generate either higher or lower production in the short term--but the aggregate magnitudes of such changes are likely to be small. A product like rbST could also accelerate increases in output per cow, but the aggregate effect of its use will depend on the adoption rate of producers.

Table 3--Net cash balance comparison with and without use of rbST

Classification	Without rbST, 1989 FCRS Survey				With rbST, 1989 FCRS Survey			Percentage change in net cash balance with rbST
	Percentage of farms	Cows per farms	Milk per cow	Net cash balance per cow 1/	Milk per cow	Net cash balance per cow 1/	Net cash advantage with rbST, per cow 2/	
	Percent	Number	Pounds	Dollars	Pounds	--- Dollars ---		Percent
Fewer than 75 cows	77.4	41	13,988	689	15,788	794	105	15.2
75-149 cows	16.6	98	14,886	707	16,686	810	103	14.6
150-299 cows	4.1	195	15,028	638	16,828	753	115	18.0
300-599 cows	1.0	396	16,467	560	18,267	667	107	19.1
More than 599 cows	0.8	1,044	16,966	475	18,766	552	77	16.2
Southeast	1.0	244	13,129	391	14,929	478	87	22.2
Appalachia	7.9	65	13,732	623	15,532	733	110	17.7
Corn Belt	13.7	51	13,930	620	15,730	713	93	15.0
Southern Plains	1.7	181	14,064	517	15,864	624	107	20.7
Northeast	26.3	63	14,574	727	16,374	833	106	14.6
Upper Midwest	45.9	50	14,655	747	16,455	860	113	15.1
Pacific	3.6	330	17,132	484	18,932	563	79	16.3
United States	100.0	69	14,841	653	16,641	755	102	15.6

1/ Net cash balance is milk and dairy cattle sales less cash costs (variable and fixed).

2/ Net cash balance with rbST less net cash balance without rbST.

Source: USDA, 1989 Farm Costs and Returns Survey (FCRS).

Marketing Milk and Dairy Products

Raw milk from the farm is usually jointly assembled and transported to firms where it is either processed into fluid (beverage) or perishable products or manufactured into storable products such as butter, hard cheeses, or dry milk products. The dairy cooperative is an important link in the movement of milk from the farm to dairy product markets. In 1992, about 82 percent of the milk sold to plants and dealers in the United States was marketed through 265 dairy cooperatives.

Agricultural cooperatives have been important in the United States since the late 19th century. Dairy cooperatives' involvement in marketing and pricing fluid milk coincided with the growth of Eastern and Midwestern cities and the rise of milk dealers. Dealers were concerned with meeting their supply and demand needs in an environment of seasonal production and fluctuating prices. One method used was refusal of milk during low-demand periods. This type of action led dairy farmers to successfully form bargaining organizations which gave them greater control of milk prices.

Effective member representation and business operations required that agricultural cooperatives be recognized as legal entities. Specific statutes related to agricultural cooperatives or cooperative marketing adopted in all States have eliminated reliance on general incorporation rules. Federal laws and regulations, particularly the Capper-Volstead Act, have greatly facilitated dairy cooperative organization and operation.

The Fluid Processing Industry

The U.S. commercial fluid milk processing industry is over a century old (Lough, August 1991). In its early stages, the industry produced a highly perishable, relatively homogeneous product at low cost. Such factors generally promote a competitive industry structure, and fluid milk processing was no exception. The number of processors increased steadily to 1940, when there were almost 10,000 plants in the industry.

Technological advances, stricter health and sanitary regulations, and changes in milk pricing contributed to the development of the commercial fluid milk processing industry. The glass milk bottle, mechanical refrigeration, power fillers and

cappers, improved transportation, and homogenization are examples of technological innovations that underlie the factory structure of fluid milk processing.

The linkage of bacteria to disease emphasized the importance of sanitation and sterile conditions in processing fluid milk. Pasteurization came into use in 1893, but there was public resistance. Recognizing the potential for milk-borne diseases, public health officials had implemented sanitary and health regulations for milk in most cities by 1920. There is little doubt that public health concerns were behind the regulations, but they also had economic effects (Manchester, 1983).

As producers and dealers adapted to the commercial fluid processing and distribution industry, there was experimentation with various pricing plans. Both the large processors and the producer cooperatives eventually adopted classified pricing as a solution to pricing problems. Classified pricing was introduced in the Boston market about 1886, with other markets following suit.

By 1962, the fluid milk processing industry had changed as a result of population shifts, ongoing technological innovation, reduced institutional barriers to milk movement, classified pricing plans, a changing marketing channel, and the mergers and acquisitions among dairy companies. Another factor was the role of Federal and State programs in marketing and pricing milk and milk products.

Two general forces have affected the fluid processing industry: a declining number of processors serving geographically larger markets, and the changing ownership of leading fluid milk

firms. Many of the trends leading toward fewer plants serving larger geographical markets existed prior to 1940. The number of plants processing fluid products declined steadily, from 9,950 in 1940 to 558 in 1992.

Vertical integration by food chains and some dairy cooperatives is another feature of today's fluid processing industry. A few food chains operated fluid plants as early as the 1930's, but the major structural change occurred in the 1960's. Integration by cooperatives followed the formation in the 1960's of a few regional dairy cooperatives. The integrated food chain and dairy cooperative (both regional and local) shares of estimated fluid product sales have increased over time, but cooperatives have not played the major role that they have in the manufactured products industry.

The Manufactured Dairy Products Industry

Like fluid milk processing, the manufactured dairy products industry had its beginnings on the farm (Lough, July 1991). Farm-separated cream was churned into butter for home use and for sale to neighbors. Some types of cheese were also produced, although probably not to the same extent as butter. Creameries, canning plants, and cheese factories, the pioneers of a commercial manufactured dairy products industry, developed in the middle to late 1800's, slightly predating commercial fluid processing. The manufacturing industry--firms producing butter, cheeses, dry milk powders, and canned milk--faced the same forces as the fluid processing industry. Technological advances on the farm, in transportation, and in product manufacturing processes combined to create an industry tending toward fewer and larger manufacturing plants (table 4).

Table 4--Number of dairy product manufacturing plants, selected years

Product	1950	1970	1980	1990	1993
	<i>Number</i>				
American cheese	1,620	669	483	298	252
All cheese	2,158	963	737	516	464
Butter	3,060	622	258	152	123
Nonfat dry milk (human food)	459	219	113	76	62

Source: *Dairy Products, Annual Summary*, U.S. Dept. Agr., Natl. Agr. Stat. Serv., various years.

Prior to World War II, manufacturing was characterized by highly specialized plants. The advantages of flexible, diversified operations were recognized in the late 1930's and early 1940's. As product prices and profitability measures changed, milk could be shifted among the products produced in the plants. The height of flexible plants was probably in the 1970's. Flexibility today is more likely to mean the operation of several specialized plants by a single firm or cooperative.

The technology of manufacturing products has changed from the batch process to the continuous process. Butter production is generally a continuous process of churning, printing, and molding (packaging) taking place under one roof. Adoption of similar innovations in cheese-making and other manufactured products production has led to an industry with fewer numbers of plants with expanding production per plant.

Manufactured dairy product markets are regional or national in the United States. Improved manufacturing processes and storage technologies have contributed to this development. Transportation advances have made it feasible to move products long distances at little cost. International trade opportunities take the markets (and marketing) one more step--to a global scope.

There are markets for manufactured dairy products that contribute to price discovery; central markets have been particularly important in pricing cheese and butter at various points in time. In 1993, futures for nonfat dry milk and Cheddar cheese were introduced on the New York Coffee, Sugar, and Cocoa Exchange. It remains to be seen if these markets develop into viable pricing mechanisms; trading has not been active as of this writing.

Dairy cooperatives have played a major role in the manufactured dairy products industry since the 1850's. By 1992, the number of cooperatively owned and operated plants producing manufactured products had decreased, mirroring the overall industry trend. In 1992, cooperatives handled about 65 percent of the butter produced, 81 percent of the dry milk products, and 43 percent of the cheese (Ling and Liebrand).

Demand for Milk and Dairy Products: Consumers and International Trade

There are active wholesale and retail markets for milk and dairy products in the United States. The U.S. Government participates as both a buyer and, in some cases, a seller of manufactured dairy products. International markets offer another outlet for both commercial and government dairy product sales.

Commercial Disappearance

Commercial disappearance measures the quantity of a particular product or all dairy products as a group demanded by all commercial buyers. It includes the generally small export quantities that are made without subsidy. Changes in commercial use reflect consumer responses to price changes and underlying demand shifts.

During the 1970's, commercial use of all dairy products grew about 1 percent annually on a milkfat basis. Retail dairy prices rose at about the same rate as general inflation. Since 1980, eroding real retail dairy prices have boosted growth in commercial disappearance to about 1.5 percent per year.

Sales of milkfat and of skim solids have risen at similar rates in the long run but often are not synchronized in the short run. Adjustment to changes in relative prices, including limited substitution of fat and skim solids in some products, and changes in demand trends account for most of the differences. During 1970-87, milkfat sales rose slightly more than did skim solids sales. Sharp shifts during 1987-91 resulted in more than a 2-percent yearly increase in skim solids sales, while commercial use of milkfat grew less than 1 percent per year. The difference was almost erased by 1994 as consumers responded to changes in relative prices (app. table 6).

Trends in the commercial use of individual dairy products vary greatly. In general, products with rising or declining use patterns are not identified by any common characteristics (app. tables 6 and 7).

Fluid Milk and Cream Products. Per capita consumption of fluid milk and cream has declined at a fairly steady rate since World War II. However, major consumption shifts among the fluid milk and cream products were steady until the late 1980's. Whole milk sales dropped steadily, lowfat milk use grew steadily, and skim milk sales were fairly stable. These trends appear to be changing. Skim milk sales have risen sharply since the late 1980's. Since 1991, growth in lowfat milk sales and declines in whole milk use have slowed and become more irregular. Fluid cream use rose steadily, in part because of better shelf life and lower prices.

Perishable Manufactured Products. Use of perishable manufactured products such as cottage cheese, ice cream, and yogurt has been variable. In general, the importance of these products in aggregate measures of milk and dairy product consumption has declined. Ice cream use was steady during the late 1970's and early 1980's, grew in the mid-1980's, dropped by 1990, and has recovered partially since then. Sales of other frozen desserts were steady until significant growth started in the mid-1980's. Cottage cheese use dropped steadily. Yogurt sales grew steadily into the 1980's but have been relatively stable since 1986.

Storable Manufactured Products. Strong, steady growth in cheese sales has been the dominant factor in demand for storable manufactured dairy products and the overall aggregate demand for milk. Per capita sales of Mozzarella more than tripled between 1975 and 1992, mostly because of the growing pizza market. Sales of other varieties of cheese also have risen, including Cheddar and the other American varieties.

Butter sales were generally flat between the early 1970's and 1991. Low prices have triggered large increases since then. Commercial consumption of nonfat dry milk declined until the late 1980's, in part because of substitution of whey products. Sales have been higher in recent years, but some of the increase has been to produce other manufactured products. Canned milk use generally decreased.

Demand Responses to Changing Prices and Incomes

Aggregate milk demand is relatively unresponsive to both price and income changes (inelastic demand). Consumer responses to individual product prices and the effects of income changes on individual product demands have been widely studied. While product demand elasticities do vary, they are still generally in the inelastic range. Income effects on dairy product demands are also small.

Commercial International Trade

There is a tendency to envision international trade of dairy products as a large market, similar to some of the grains. In fact, international dairy product trade, primarily of butter, butteroil, nonfat dry milk, dry whole milk, cheeses, and casein, is a relatively small proportion of total milk production (approximately 7 percent of the 1988-1992 annual average world cows' milk production of 430 million tons). The European Union (EU), New Zealand, and Australia together account for about three-quarters of the exports (table 5). Major net importers of dairy products include Mexico, Russia, and Japan.

The equilibrium pricing conditions described previously apply also to the international dairy markets. Butter and nonfat dry milk play the key roles in international trade and their prices would, if allowed, bring the world's dairy markets into alignment (table 6). However, export subsidies and import restrictions reflecting the domestic policies of the major dairy trading countries have distorted the international dairy product markets.

The United States was the largest milk producing country in the world in 1992 but traditionally has not played a major role in international dairy trade. Average imports from 1988 to 1992 were 2.5 billion pounds, milk equivalent, milkfat basis, about 1.8 percent of domestic disappearance. Cheeses accounted for nearly 90 percent of the dairy products imported. Exports during the same period averaged 3.0 billion pounds, milk equivalent, about 2 percent of U.S. milk production.

Table 5--Average exports and market shares for selected countries of butter, cheese, and nonfat dry milk, 1990-93

Item	Butter				Cheese				Nonfat dry milk			
	1990	1991	1992	1993 1/	1990	1991	1992	1993 1/	1990	1991	1992	1993 1/
<i>Thousand metric tons</i>												
Annual exports 2/	740	794	719	698	755	769	783	873	817	787	982	799
<i>Percent</i>												
Shares 2/												
EU 3/ United States	36	51	32	27	58	59	58	58	42	32	39	31
Canada	4	8	22	23	2	1	2	2	1	9	13	18
New Zealand	1	2	2	1	1	1	2	1	5	5	3	2
Australia	31	22	31	33	12	13	14	14	22	22	17	14
Total	7	7	8	10	7	8	9	10	12	16	12	16
	79	90	95	94	80	82	85	85	82	84	84	81

1/ Preliminary.

2/ Excludes intra-EU trade.

3/ Formerly the European Community (EC).

Source: Dairy: World Markets and Trade Circular, U.S. Dept. Agr., Foreign Agr. Serv.

Table 6--International and U.S. market prices for selected traded products, 1990-93

Product	1990	1991	1992	1993
<i>Dollars per metric ton</i>				
Butter	1,363	1,410	1,498	1,343
Butter-U.S. 1/	2,251	2,189	1,819	1,640
Butter-GATT minimum	1,350	1,350	1,350	1,350
Nonfat dry milk	1,431	1,350	1,685	1,545
Nonfat dry milk-U.S. 1/	2,218	2,072	2,361	2,469
Nonfat dry milk-GATT minimum	1,200	1,200	1,200	1,200

1/ U.S. butter price is Chicago wholesale price for Grade A. U.S. nonfat dry milk price is for Extra Grade and Grade A, all heat treatments, in the Central production area.

Sources: Dairy: World Markets and Trade Circular, U.S. Dept. Agr., Foreign Agr. Serv., various issues, and Dairy: Situation and Outlook Yearbook, DS-411, U.S. Dept. Agr., Econ. Res. Serv.

As the world moves toward more open agricultural trade, embodied in the Uruguay Round of the General Agreement on Tariffs and Trade (GATT), it is simultaneously embracing regional trading blocs such as the North American Free Trade Agreement (NAFTA). The GATT Uruguay Round, concluded on December 15, 1993, is to be implemented over the 1995-2000 period and addresses four agricultural areas: export subsidies, market access, internal support measures, and sanitary and phytosanitary rules. The GATT agreement is potentially significant for the U.S. dairy industry in two of the areas--export subsidy programs and market access. The Dairy Export Incentive Program (DEIP) is in fact an export subsidy, and U.S. market access has long been curtailed by Section 22 quota rules. Long-term effects on the industry are expected to be minor (USDA, March 1994).

NAFTA, which was effective as of January 1, 1994, sets out separate bilateral agreements on cross-border agricultural trade between the United States and Mexico and Mexico and Canada. U.S.-Canada trade is still covered by the U.S.-Canada Free Trade Agreement. The major agricultural issues addressed by NAFTA are: nontariff barriers, tariffs, producer safeguards, rules of origin, and sanitary and phytosanitary rules. Market access under NAFTA is a primary concern for the U.S. dairy industry, as are rules of origin. The U.S. dairy industry is expected to benefit from NAFTA in that Mexican demand for milk and dairy products will likely continue to outpace Mexico's domestic production (USDA, 1993).

History of U.S. Dairy Programs

The U.S. dairy industry is affected by a set of regulations including Federal dairy price supports and milk marketing orders, import restrictions, export subsidies, domestic and international food aid programs, and State milk market regulations. The major Federal dairy programs (and some State regulations) date from the 1930's and 1940's. The current dairy price support program was established by the Agricultural Act of 1949, Federal milk marketing orders date to the Agricultural Marketing Agreement Act of 1937, and Section 22 dairy import quotas derive from the Agricultural Adjustment Acts of 1933 and 1935, as amended.

Federal dairy programs have often been modified to meet changing industry and economic conditions.

State regulations operate separately or are superseded by Federal statutes. There are some shared State/Federal regulatory activities--milk safety, sanitary conditions, and environmental regulations, for example. State regulations are less prevalent today than previously, but State lawmakers have recently shown they are ready and willing to try to establish rules to aid their dairy farmers. Dairy farmers, analysts, policymakers, and other interested parties need to appreciate the multijurisdictional nature of dairy industry regulation.

Price Support Activities

The Agricultural Act of 1949 established the dairy price support program. USDA, through the Commodity Credit Corporation (CCC), supports the price dairy farmers receive for their milk by offering to purchase any butter, nonfat dry milk, and Cheddar cheese (meeting announced specifications) at announced purchase prices (app. table 8). Purchase prices are calculated using a formula that combines the support price for milk, quoted for manufacturing grade (Grade B) milk, with "make allowances," which enable plants to process and market products to the CCC and pay, on average, the announced support price to milk producers (table 7; Appendix A).

Farmers can and have received more or less than the support price, depending on supply and demand conditions and market competitiveness (app. table 9). Plant location, the type of product manufactured, the quantity of milk delivered, milk composition, local competition between processors for milk supplies, and plant operating efficiency all play a role in determining the price individual dairy farmers receive for their milk.

Prices to farmers for manufacturing grade milk moved above the support level in the tight portion of the marketing season of most years (usually in the fall when production reaches a seasonal low, and seasonal milk demand is high) until 1980, and at times even during the flush season (when production reaches its spring peak). During 1980 to 1986, manufacturing grade milk prices were

Table 7--USDA purchase prices under dairy price support program, 1977-93 1/

Effective date of change	Butter at Chicago, Grade A or higher	Nonfat dry milk, extra grade, spray or higher	Natural Cheddar cheese, Grade A
<i>Cents per pound</i>			
10/01/77	100.71	68.00	98.00
4/01/78	106.71	71.00	103.25
10/01/78	111.30	73.75	106.00
4/01/79	121.80	79.00	116.00
10/01/79	131.33	84.00	124.00
4/01/80	140.58	89.50	132.50
10/01/80	149.00	94.00	139.50
4/01/81	153.00	96.50	143.25
10/21/81	149.00	94.00	139.50
10/01/82	149.00	94.00	139.50
10/01/83	149.00	94.00	139.50
12/01/83	143.25	91.00	134.75
10/01/84	143.25	91.00	134.75
4/01/85	143.25	84.75	128.75
7/01/85	139.75	80.75	125.00
1/01/87	137.75	78.75	122.50
10/01/87	135.75	76.75	120.00
1/01/88	132.00	72.75	115.25
4/01/89	132.00	79.00	120.25
7/01/89	120.50	79.00	115.50
1/01/90	109.25	79.00	111.00
4/21/90	98.25	85.00	111.00
1/17/92	87.25	91.20	111.38
5/13/92	76.25	97.30	111.75
7/07/93	65.00	103.40	112.00

1/ Prices for bulk containers--butter, 64- and 68-pound packages; nonfat dry milk, nonfortified in 50-pounds bags; and cheese, 40- or 60-pound blocks. See DS-387, December 1981, table 3 for earlier data.

below the support level. In 1989 and so far in the 1990's, manufacturing grade milk prices have been above the support level.

The basic structure of the price support program remained essentially unchanged from 1949 to 1981. In the 1980's, four major departures from traditional dairy price support policy occurred:

- (1) Price supports were separated from parity or any other index.
- (2) Voluntary supply management provisions were used on a temporary basis to hasten industry adjustment (1984 Milk Diversion Program; 1986 Dairy Termination Program).
- (3) Changes in dairy price supports were linked directly to projected annual government purchases, limiting the Secretary of

Agriculture's discretion in setting the support price.

- (4) Through assessments, dairy farmers assumed some responsibility for the program.

Appendix B contains a list of major price support actions for the 1970-93 period. Readers seeking more detail on changes made prior to the 1990 farm legislation are referred to the previous dairy background publication (Fallert, Blayney, and Miller).

On January 1, 1990, the support price for manufacturing grade milk was lowered 50 cents to \$10.10 per cwt. The cut was made because CCC purchases during calendar 1990 were projected to exceed 5 billion pounds milk equivalent. The authorizing legislation, as amended by the Budget

Reconciliation Act of 1989, permitted the support price to remain unchanged or to be lowered by up to 50 cents under these conditions.

Butter and nonfat dry milk purchase prices continue to be adjusted to reflect changes in the relative market values of cream and skim milk. In 1980, butter carried 46 percent of the combined value of butter and nonfat dry milk in CCC support price calculations. Brisk sales of cream-based products in the mid-1980's led to butter's share being raised to 50 percent by 1988. The emergence of a commercial export market for nonfat dry milk in 1988 and domestic market adjustments to earlier changes in relative prices reversed the imbalance in butter and nonfat dry milk prices and resulted in the shifts in relative support price. By 1994, butter's share of the combined value was 26 percent.

The dairy provisions of Title I of the Food, Agriculture, Conservation, and Trade Act of 1990 (1990 Act) made minor adjustments to previous policy. Although price support adjustments are still triggered by CCC purchase levels, combined purchases of cheese, butter, and nonfat dry milk are measured on a milk equivalent, total milk solids basis, instead of a milkfat basis. The 1990 Act also provides that the price of milk be supported at not less than \$10.10 per cwt through 1995. The 1990 Act continued the search for new methods of supporting and stabilizing milk prices without increasing government expenditures. The budget pressures that shaped the 1990 Act have not lessened as the 1995 farm legislation debate approaches.

The 1990 Act authorizes the Secretary of Agriculture, for calendar years 1991-95, to:

- (1) Increase the support price at least 25 cents if USDA's estimate of purchases in the coming year does not exceed 3.5 billion pounds milk equivalent, total milk solids basis.
- (2) Not decrease the support price if USDA's estimate of purchases in each of calendar years 1991-95 exceeds 3.5 billion pounds but not 5 billion pounds milk equivalent, total milk solids basis.
- (3) Decrease the support price by 25 to 50 cents if USDA's estimate of purchases in the

coming year exceeds 5 billion pounds milk equivalent, total milk solids basis.

In estimating the level of CCC purchases, the Secretary is instructed to deduct from this figure any increase in the most recent calendar year's dairy product imports from the average imports during 1986-90.

The 1990 Act contained provisions requiring producers to help finance CCC program purchases during calendar years 1991-95 under certain conditions. Any expected purchases above 7 billion pounds, total solids basis, would be financed through a producer assessment on milk marketings. Excess production assessments have not yet been triggered. The Secretary was given discretionary authority to adjust support purchase prices for butter and nonfat dry milk in a way that would result in the lowest cost to the CCC or would achieve other objectives considered appropriate.

The Agricultural Reconciliation Act of 1990 implemented the 1990 deficit reduction agreement, which prescribed spending cuts of more than \$13 billion for agriculture over fiscal years 1991-95. This act modified the 1990 Act in order to reduce outlays as required by the deficit reduction agreement. For the dairy industry, this meant a producer assessment of 5 cents per cwt of milk marketed during calendar 1991. For calendar years 1992-95, the assessment increased to 11.25 cents per cwt.

Producers who do not increase marketings from the previous year are eligible for an annual refund of the budget reduction assessment. The assessments in a specific year must be raised to recapture refunds made on the previous year's marketings. Eligible producers claimed refunds totaling \$23.2 million in calendar year 1991, \$50.7 million in 1992, and \$80.3 million in 1993. The assessment rate was set at 19.28 cents per cwt beginning in May 1994 for the remainder of the year to cover the refunds.

The Omnibus Budget Reconciliation Act of 1993 contained several provisions related to the dairy price support program. Most of the 1990 Act's dairy price support provisions were extended to 1996. The butter purchase price was restricted to

no more than \$0.65 per pound while nonfat dry milk's purchase price could be no less than \$1.034 per pound. Instead of 11.25 cents, the reconciliation assessment was set at 10 cents per cwt for 1996 and 1997. Finally, a 90-day moratorium on the sale of rbST for commercial milk production from the date of FDA approval was written into the legislation. During the moratorium, which has run its course, the deficit reduction assessments were to be lowered by 10 percent.

Priorities for Purchases under Price Support Programs

Products acquired under the price support program are committed to specific uses or are put into storage for future dispositions. Uses can be categorized as: (1) domestic donations (food aid) such as The Emergency Food Assistance Program (TEFAP) which donates surplus stocks directly to needy persons; and child feeding programs, including the School Lunch Program and the Child Care Food Program; (2) international food aid through Section 416(b) of the Agricultural Act of 1949, as amended, and the Food for Peace Program (P.L. 480) of 1954; (3) direct export sales; and (4) sales back to the domestic industry for unrestricted use. Priorities are based on perceived social value by use and increasingly on budgetary impacts.

In the 1970's, CCC supplies generally were relatively small. Domestic donations, primarily to the school feeding programs, had top priority for butter and cheese. For nonfat dry milk, international food aid, primarily donations under P.L. 480, were the first choice. Export sales were not heavily used, even though they generate revenues partially offsetting program costs, because it was felt they conflicted with overall trade policy by involving an export subsidy. Most sales were directly to other governments and had significant food aid aspects.

The extreme surpluses of the early 1980's made disposing of dairy products the prime priority. Large export sales of butter and nonfat dry milk were made. Direct distribution of dairy products to the needy and the elderly was resumed on a large scale for the first time since the widespread adoption of food stamps.

In the late 1980's and early 1990's, CCC supplies of butter stayed large, but cheese and nonfat dry milk supplies shrank dramatically. Butter has gone into all possible outlets. The very small amounts of cheese stocks have been committed to selected domestic donation programs. The biggest change since the 1970's has been the priority shift for nonfat dry milk to export sales (either direct CCC sales or through DEIP) from humanitarian exports.

Unrestricted sales back to the domestic dairy industry have occurred occasionally. Normally, the CCC offers products not committed to programs at a price above the support purchase price (110 percent of the support purchase price most of the time). Conceptually, this provides market incentives for normal storage and transportation, but helps to stabilize prices in a tight market. Storage of products specifically to stabilize prices has not been deemed a high priority.

Trade and Other Programs

In addition to direct sales from CCC supplies, the Government assists exports through the Dairy Export Incentive Program (DEIP) and export credits. Imports of dairy products into the United States have been subject to quotas since the 1950's. Recently completed trade negotiations will require conversion of the quotas to tariff-rate quotas, with reduction in those tariffs to follow. The demand for dairy products is affected by several domestic food assistance programs, which are either targeted at the products specifically or designed to raise consumption of all foods.

DEIP and CCC Export Credits. The Dairy Export Incentive Program (DEIP) is an export subsidy program similar to the Export Enhancement Program (EEP) for other U.S. agricultural commodities. The program is used to assist U.S. dairy products to meet competition from subsidizing countries, especially the European Union, in targeted markets. Products currently eligible for the DEIP are milk powders, butterfat, and several cheese varieties. USDA, members of the agricultural community, foreign government officials and others may recommend countries for targeting. The DEIP is currently authorized through December 31, 2000.

DEIP sales are made by private firms. Upon contacting a potential buyer, the prospective exporter submits a bid to USDA requesting a cash DEIP bonus that would allow the sale to take place. The bonus (if accepted by USDA) is paid after the exporter furnishes evidence that the specified commodity has been exported to the target country under the terms of the sales agreement. The DEIP was relatively dormant until 1991, the first year bonuses exceeded \$10 million. The highest level of DEIP activity to date is \$143 million (FY 1993).

In addition to promoting U.S. trade policy and market expansion, an active DEIP program can also enhance domestic U.S. milk prices under many market conditions. The exception would be when the surplus is heavy enough that DEIP export quantities cannot move prices above support. It is widely accepted that the DEIP enhanced 1992 milk prices, with estimates of the effect ranging from 30 cents to 50 cents per cwt. It is also the case that price variability is affected by DEIP sales.

Export credit programs to assist commercial exports of U.S. dairy products can also be used. Only GSM-102 is used for dairy product exports (only 5 percent of the total commodities exported under the program). Export credits and the DEIP can be used in combination if the destination country is eligible for both programs.

Import Controls. Section 22 dairy product import quotas were designed to prevent imports from undermining the dairy price support program. U.S. purchases of dairy products would support international product prices if there were no binding import quotas. Imports of ingredient products are severely restricted under the quota authority while more liberal treatment is given to products that are noncompetitive or partially so--some specialty cheeses, for example.

Implementation of the GATT and the NAFTA trade agreements will have important ramifications for the dairy industry. When the agreements are implemented, all quotas will be converted to tariff-rate quotas, which will be reduced over time. Also included in the GATT and NAFTA agreements are minimum access requirements, which will allow

more dairy products to enter the United States than currently. The yearly minimum access increases are clearly defined in the agreements.

Other Domestic Programs. Domestic food assistance programs have operated in the United States since the 1930's. Program goals in the early years were to help feed the poor and the unemployed and to help stabilize farm prices by disposing of growing stocks of surplus commodities. Over time, another goal has been added and emphasized--improving the nutritional well-being of low-income persons and other target groups, such as children and the elderly.

Food assistance programs take a variety of forms and have varying effects on dairy markets and the dairy price support program. Market purchases of all foods are subsidized by the Food Stamp and school feeding programs. Some programs specifically target the purchase or consumption of milk and dairy products--the Women, Infants, and Children (WIC) program and the Special Milk Program.

Federal Milk Marketing Orders

Federal milk marketing orders are authorized by the Agricultural Marketing Agreement Act of 1937. One of the original intents of the 1937 Act was to secure fair exchange value for farm products by establishing orderly marketing conditions for farmers. These goals were to be met while accounting for consumer interests. The general administration and oversight of the Federal milk marketing orders are the responsibilities of the Dairy Division of USDA's Agricultural Marketing Service (AMS).

Only Grade A milk is regulated under Federal milk marketing orders. In 1993, some 93,000 producers delivered just under 104 billion pounds of milk to handlers regulated under Federal orders. There were 38 orders in effect as of January 1, 1994 (fig. 1). Federal order deliveries represented 70 percent of total U.S. milk marketings during 1993 (74 percent of the Grade A milk marketed). California, which is not part of the Federal order system, had milk marketings in 1993 representing about 16 percent of the U.S. total Grade A milk.

Whenever the Secretary of Agriculture has reason to believe that the issuance of an order is necessary to achieve the declared policy of the 1937 Act, a notice of a public hearing on the proposed order is issued. All interested parties--including producers, cooperatives, processors, handlers, consumer groups, and the general public--may present evidence at the hearing. If the hearing record supports it, the Secretary issues an order. Milk producers delivering to handlers with sales in the geographical area to be covered must approve the order before it becomes effective. Procedures for amending orders are essentially the same as for establishing a new order.

Procedures for terminating orders if producers indicate a desire to do so are specified. The Secretary can also terminate or suspend, without notice or a hearing, orders or most particular order provisions if it is determined that they "obstruct or do not tend to effectuate the purpose of the Act." The Secretary may not terminate or suspend pricing provisions.

The legal scope of milk marketing orders is defined by the provisions of the 1937 Act. Each order includes provisions for:

- (1) Classifying milk according to use.
- (2) Establishing the minimum class prices that handlers must pay for milk used in each class.
- (3) Pooling (averaging proceeds of sales by class and apportioning the payments to producers).
- (4) Verifying weights and tests of milk shipped by producers.
- (5) Auditing handler reports to verify milk utilization and payments to producers.
- (6) Providing market information.

Federal milk marketing orders do not contain provisions that:

- (1) Control production or restrict individual producers' marketings.
- (2) Guarantee producers a market with any buyer.
- (3) Regulate handlers' decisions--from whom to buy, to whom to sell, quantity purchased, or what selling price is charged.

- (4) Set maximum prices handlers may pay for milk.
- (5) Guarantee a fixed price to producers.
- (6) Establish sanitary or quality standards for Grade A milk.
- (7) Set wholesale or retail milk and dairy product prices.

Classified pricing, pooling, uniform payments to producers, and no restrictions on marketing are key elements of milk marketing orders. Classified pricing is a pricing system based on the use (utilization) of milk purchased by regulated handlers. All Federal milk marketing orders now provide for at least three classes of milk. Twenty-seven (27) orders, of the 38 in effect at the beginning of 1994, have been granted the authority for an additional class called III-A. When this fourth class is permitted, the order classifications are:

- o Class I - milk used for fluid milk products.
- o Class II - milk used for fluid cream or in perishable manufactured products such as ice cream, cottage cheese, and yogurt.
- o Class III - milk used in hard cheeses, butter, and some dried milk products.
- o Class III-A - milk used in nonfat dry milk.

When there are only three classes in an order, Classes I and II are as above with Class III and III-A combined as the single Class III.

Each order specifies the minimum price that must be paid by handlers for milk used in each class, which is to be uniform to all handlers, with enumerated provisos. Class I milk receives the highest price, Class III (or Class III-A) milk the lowest. Class II prices are currently determined by formula and on average are somewhat higher than Class III prices. Producers and/or their cooperatives are free to negotiate for prices above the minimums with the handlers buying their milk. In many marketing orders, effective class prices (at least for Class I) are above the established minimums--the result of these "over-order" payment negotiations.

The basis of the class prices in the Federal milk marketing orders currently is the Minnesota-Wisconsin (M-W) price, the average price paid for

manufacturing grade milk in the two-State area. The minimum Class III price is set equal to the M-W price and is generally the same in all orders. The minimum Class I price in each order is the M-W price for the second previous month plus a fixed Class I differential, which is different in each order and generally increases with distance from the Minnesota-Wisconsin production area. Class I differentials are meant to reflect the additional costs associated with producing and marketing milk for the fluid markets, such as increased sanitary requirements, balancing, and transportation costs.

Pooling provisions provide the mechanism for payment of uniform or "blend" prices to the producers whose milk is purchased by regulated handlers under the orders. Two types of pools are permitted, marketwide and individual handler. The marketwide pool is currently in use in all but one order. Under a marketwide pool, the dollar value of all milk delivered by producers to regulated handlers is calculated by summing the minimum class price multiplied by the quantity of milk from producers used in each class. The total value is divided by the total producer milk delivered to arrive at the minimum blend or uniform price to be paid to pooled producers, subject to some adjustments if authorized (Appendix C).

Milk Marketing Orders Under Pressure

Federal milk marketing orders have been much debated and analyzed. We focus here on the period beginning in 1985 but refer to order changes or actions prior to that date where necessary. More detailed studies of Federal milk marketing orders can be found in the list of readings at the end of this report.

The geographic structure of minimum Class I prices that exists in Federal milk orders evolved naturally over a period of 20 years or more (Novakovic and Pratt). The minimum Class I differentials in markets east of the Rocky Mountains generally increased with the distance from the single basing point located in the surplus area of the Upper Midwest (Minnesota and Wisconsin). This "price surface" implied that any changes in the minimum Class I differential for a particular order would or could result in a series of minimum Class I differential changes to maintain price alignment in the order markets.

Until 1985, the geographic structure of minimum Class I price differentials remained essentially unchanged. The 1985 Food Security Act mandated higher Class I differentials in 35 of the 44 orders in place at the time, with the largest increases in southern deficit orders. The higher Class I differentials became effective in 1986.

A peripheral but not unimportant hearing for Federal milk marketing orders was mandated by the 1990 Act to examine replacements for the M-W price. The M-W was first used in the Federal milk marketing orders in 1961 and since 1975 has been the basis for establishing minimum class prices in all orders. In May 1990, NASS notified AMS that it would not be able to report an accurate M-W price beyond the middle of 1992 but would continue to do so until a replacement was selected. AMS issued a final decision that adopted a base month M-W price updated by a butter/cheese/powder formula as a temporary replacement. The decision recognizes that adoption of the base month M-W price will allow the Department and the industry with additional time to develop a long-term solution.

A hearing to consider a separate Class III-A price for milk used to make nonfat dry milk under about three-fourths of the orders was held in mid-1991. Proponents of the new class and price argued that milk used for nonfat dry milk should be based on wholesale prices of nonfat powder, rather than the cheese-driven M-W price. In November 1992, Class III-A pricing and a product price formula for milk used for nonfat dry milk was adopted in three orders--New England, the Middle Atlantic, and the Pacific Northwest. At the request of the industry, the hearing was later reopened to receive evidence regarding the 24 markets where pricing changes were not initially recommended. Based on the new evidence, Class III-A pricing was adopted in those 24 orders effective December 1, 1993.

Milk has traditionally been priced on volume and milkfat content. Multiple component pricing results in a farmer's milk price being adjusted for the content and value of the other components, such as protein or solids-not-fat (SNF), in milk as well as for milkfat. California, which is outside the Federal milk marketing order system, has had multiple component pricing since 1962. Multiple component pricing of milk was first implemented

under Federal milk market orders in the Great Basin order in 1988.

Multiple component pricing (MCP) has been adopted in seven orders--the Great Basin, Middle Atlantic, Eastern Ohio-Western Pennsylvania, Ohio Valley, Indiana, Pacific Northwest, and Southwestern Idaho-Eastern Oregon. USDA has recommended MCP for six more orders--Chicago Regional, Upper Midwest, Iowa, Nebraska-Western Iowa, Eastern South Dakota, and Southern Michigan. Of the thirteen orders, eleven have or are recommending adoption of pricing based on the protein of milk and two on the SNF content. The recommendation for the five Midwest orders will include pricing on other nonfat solids in addition to protein pricing. For Southern Michigan, pricing is recommended on a fluid carrier component in addition to protein. Nine of the orders are or are recommending that adjustments to producer payments based on the producers' milk somatic cell count be made.

USDA recently changed Class II pricing in all orders. The formula-based Class II price is to be replaced by a fixed differential approach like the Class I price. In all orders the Class II price would be equal to the basic formula (M-W) price of the second preceding month plus a differential of 30 cents. This pricing change will be effective on April 1, 1995.

Federal Program Linkages

The price support and Federal milk marketing order programs are connected, which implies that changes in one will affect both. The link between the two programs is a price--currently the M-W price. Class prices under Federal milk marketing orders are directly tied to the value of milk for manufacturing, which is a market price influenced by the support price for milk (fig. 2). As the mover of class prices in all Federal milk marketing orders, the M-W price coordinates price signals to producers under the orders. For example, a lower M-W (due to a support price reduction) assures that minimum class prices would not continue rising (providing a production incentive) when the support price reduction signals the desire for lower production.

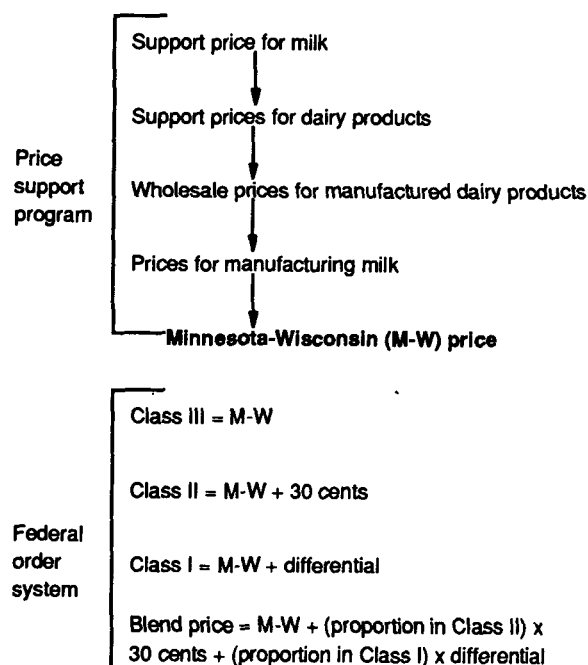
The Federal order system similarly affects manufacturing milk markets and the price support program. Production responses to order-induced price adjustments or to any stability benefits of the orders will alter the overall market balance, all milk prices, the size of the surplus, and (ultimately) the milk support price.

State Regulations

Several States enforced their own milk pricing and marketing regulations prior to implementation of Federal laws, particularly the marketing orders, and some still do (app. table 10). Many States have laws still in place that are not being used. Regulation of milk markets by States and how that regulation affects Federal policies has been the subject of many debates.

Prices paid to producers for fluid-grade milk are regulated by Federal orders and by 10 States. The share regulated by the States has declined from nearly 25 percent at one time. California is the largest producing State with only State pricing regulations. In a number of cases, Federal orders were introduced after State legislation had been repealed or declared unconstitutional.

Figure 2
Price linkage between the price support program and Federal orders



Improvements in transporting milk have diminished the ability of States to effectively regulate markets. Less than 1 percent of the fluid-grade milk sold in the United States is unregulated.

Many States have enacted legislation to raise milk producers' prices in recent years. New legislation in Maine has reinstated the vendor's fee on fluid milk sales in the State. The new law eliminates the tie between the fees and payouts to dairy farmers with funds from the new tax going directly into the State's general fund. The Maine legislature currently is considering legislation that will provide payouts to dairy farmers in the State. The Maine policymakers believe this approach will not be declared unconstitutional by the courts, as was their previous vendor's fee program. Several States have enacted producer security trust funds that provide farmers with compensation should a handler go bankrupt and be unable to pay producers. While most recent plans have not survived the courts, there appears to be renewed willingness by States to consider ways to assist their milk producers.

Six States regulate wholesale or retail prices, or both, of fluid milk products. States differ in resale price regulations--some set minimum prices, some set maximum prices, and some set both. Other States set prices that must be paid by the retailer but do not restrict the price the retailer charges consumers. Most States with resale price-fixing authority--as well as a number of others--have authority to regulate trade practices. Several States require a minimum markup, particularly by retailers, while others require that prices be filed with the State agency (Manchester, Weimar, and Fallert).

Effects of Dairy Programs

Dairy programs are meant to influence prices so that policy objectives are reached. The effects of each Federal program are, in general terms, well defined in the economics literature. National policies, as we have noted, can and do have varying effects at the local, State, or regional level.

In the 1990's, dairy issues receiving the most attention are milk price volatility, the relative prices of fat and skim solids, and the capacity of

manufacturing plants (both regionally and nationally) to produce the products demanded by consumers.

The Dairy Price Support Program

Generating adequate supplies of high-quality milk and price stabilization are dairy price support program objectives. The program has enhanced producer incomes at times. This was particularly evident during the early 1980's when support price rigidities enacted by Congress prevented prices from adjusting to rapid supply shifts. Net removals of dairy products from the commercial market by CCC accounted for 14 percent of milk marketings in 1983, compared with less than 2 percent in 1979 and 3 percent recently.

Program effects on consumers are measured by the changes in prices paid and quantities consumed. Since the 1970's, the net effect of the dairy price support program is that consumer prices probably averaged higher than they would have without the program. Price support reductions since 1983 have brought prices more in line with supply and demand conditions and reduced consumer prices from levels at which they would have been without the price support reductions.

The direct cost of the price support program to taxpayers ranged from \$69 million to \$612 million between FY 1953 and FY 1973, averaging \$325 million for the period. Over the 1970's, outlays fluctuated with the variability in milk surplus. Program costs exceeded \$1 billion per year from FY 1980 through FY 1989, reaching a maximum of \$2.6 billion in FY 1983. Program costs for recent years are similar to those from FY 1953 to FY 1973: \$232 million in FY 1992, \$253 million in FY 1993, and \$158 million in FY 1994 (USDA, June 1994).

Federal Milk Marketing Orders

The minimum classified prices and the pooling provisions of Federal milk marketing orders have effects for both producers and handlers related to equity. The minimum prices assure that handlers who are similarly located pay at least the same minimum prices for their milk. Producers on the market all receive the same blend price.