

Table 8--Federal order Class I differential as percentage of  
Federal order Class I price

Year	All markets	Chicago regional	Southeastern Florida
<u>Percent</u>			
1966	30.5	---	46.2
1967	31.6	---	44.7
1968	33.4	22.7	43.2
1969	32.5	21.4	41.3
1970	31.0	21.5	41.2
1971	30.4	20.8	39.6
1972	29.6	20.1	38.6
1973	26.2	17.5	34.8
1974	22.4	14.8	30.2
1975	22.4	14.8	30.3
1976	19.6	12.8	26.8
1977	19.8	12.9	27.1
1978	18.4	11.9	25.3
1979	16.3	10.5	22.6
1980	15.3	9.7	21.3
1981	14.4	9.1	20.0
1982	14.7	9.2	20.2
1983	14.6	9.1	20.1
1984	15.1	9.3	20.4
1985	15.6	9.7	21.2
1986	17.8	10.8	25.6
1987	18.4	11.0	27.0
1988	19.1	11.4	27.7
1989 <u>1/</u>	17.7	10.5	25.9

--- = No Federal order.

1/ Preliminary.

### Consumers

When the manufacturing grade milk price is above the support level, increasing Class I differentials beyond the cost-justified level increases fluid milk product prices and decreases fluid use. The drop in fluid milk sales, combined with increased Grade A milk production because of the higher price received by farmers, increases supplies of milk for manufacturing, lowering the manufacturing grade milk price. This lowers prices of manufactured dairy products and increases both manufactured dairy product and total milk sales. However, when the manufacturing milk price is at or below the support level, increasing Class I differentials increases fluid milk product prices and decreases consumption. The manufacturing milk price and manufactured product consumption remain unchanged, and total milk consumption

decreases. The opposite would be true in the above examples for decreased Class I differentials.

Selected groups of U.S. households which are large (small) consumers of fluid milk relative to the U.S. average tend to be large (small) consumers of manufactured dairy products. Thus, a decrease in fluid milk prices relative to manufactured dairy product prices would not give a greater advantage to one group relative to another group within the U.S. population.

Milk order pricing and allocation provisions reduce or eliminate the economic incentives for reconstituting nonfat dry milk and butterfat into fluid milk or blended fluid milk products. There is little evidence to show how closely reconstituted milk products from traditional forms of concentration would substitute for fresh fluid milk products. However, studies do indicate that substantial savings in fluid milk costs could be achieved in some markets, especially in high-cost areas. Some say that changes in market order pricing and allocation provisions could be made to better accommodate adoption of available and emerging technologies conducive to lower fluid milk product ingredient, transportation, and market-balancing costs.

Emerging technology includes membrane filtration (reverse osmosis and ultrafiltration) which can reduce the water content of milk and produce a 50-percent concentrate. Since fluid milk is approximately 87 percent water, concentrating milk can reduce transportation, storage, and handling costs. Historically, the dairy industry has had to rely on the more traditional forms of concentration such as nonfat dry milk, evaporated milk, and butter. These high-heat concentrating processes tend to yield a reconstituted fluid milk product with a "cooked" flavor. Membrane technology does not subject milk to high-heat treatment and should significantly improve consumer acceptance of reconstituted milk. Reverse osmosis is the most likely membrane technology to be used because it reduces only the water content and does not remove other milk components as is the case with ultrafiltration.

### Taxpayers

Direct Government (taxpayer) costs of the Federal milk order program are small compared with those of the price support program. Expenses of market administrators totaled \$34.4 million in 1988 and are estimated at \$35.9 million for 1989. These expenses are recovered by assessments on processors regulated by the orders and are only indirectly reflected in retail prices of fluid milk products. Headquarters expenses (about \$2.8 million in FY 1988) in operating the program are paid from Section 32 funds which are receipts from duties collected under the customs laws. Section 32 was established in 1935 by amending the Agricultural Adjustment Act of 1933. It set aside 30 percent of the customs receipts for promoting exportation and domestic consumption, encouraging the use of surplus commodities by diverting them to industrial or other use, and financing adjustments in the production of agricultural commodities.

Excess milk supplies under market orders increase supplies available for manufactured dairy products. If the manufacturing grade milk price is at or below the price support level, excess milk supplies under the market order program result in increased dairy product purchases by the CCC and therefore costs under the price support program increase.

### Indirect

Federal milk marketing orders generally provide a favorable environment for cooperative marketing and bargaining. Cooperatives, assuming more of the fluid milk market balancing functions, fine-tune Federal order minimum Class I prices through negotiations with fluid milk processors for over-order charges. The participation of cooperatives reduces the need for even further Government involvement in pricing. Several studies indicate that, except for a few markets, over-order charges are primarily cost-related and generally do not represent pure price premiums extracted through exertion of market power.

The major effects of changes in the level and structure of Class I differentials and pooling provisions to more closely reflect competitive market conditions would be on changes in regional farm income, the location of milk production, and the location of manufactured dairy product processing plants. Producer revenue and overall milk production would likely fall the most in the Northeast and Mid-Atlantic regions. The manufactured dairy products industry in the Northeast would face the most severe structural adjustment with the decline of milk available for manufacturing.

Reducing Class I differentials when market prices are above support levels would tend to increase the manufacturing grade milk price, and increase the price of manufactured dairy products relative to fluid milk product prices.

### **Overview of Price Support Program and Federal Milk Marketing Order Effects**

A recent analysis attempted to quantify the social welfare gains and losses from deregulating the dairy industry (McDowell and Fallert). The analysis assumes the elimination of the price support program and Federal and State marketing orders, while holding constant import and commercial stock levels for the calendar years 1984 through 1987.

The total welfare gains from deregulation increase from \$1.9 billion in 1984, to a maximum of \$3.0 billion in 1985, and decline to \$1.3 billion in 1987 (table 9). Consistent with the overall welfare changes, deregulation causes the maximum change in all prices and quantities in 1985. This is because 1985 production levels were the least affected by the dairy diversion and dairy termination programs. Thus, 1985 price levels required the greatest reductions to achieve market clearance.

Table 9--Welfare changes resulting from dairy deregulation 1/

Year	<u>Consumption</u>		<u>Production</u>		CCC saving	Total
	Fluid	Manufacturing	Grade A	Grade B		
<u>Million dollars</u>						
1984	1,511.0	332.9	-1,271.1	-55.7	1,391.0	1,908.1
1985	1,901.8	645.0	-1,755.4	-98.4	2,293.0	2,986.0
1986	1,701.4	382.4	-1,444.4	-62.9	2,107.0	2,683.5
1987	1,586.8	-90.9	-1,090.6	14.4	888.5	1,319.8
Avg.	1,675.3	317.4	-1,390.4	-50.7	1,669.9	2,224.4

1/ Welfare measures are consumer and producer surplus, and net CCC expenditures. Net annual CCC expenditures are adjusted from fiscal year expenditures.

Source: McDowell and Fallert.

The major beneficiaries of deregulation are fluid milk consumers with an average gain of \$1.675 billion, and taxpayers with a saving of \$1.670 billion in CCC net expenditures. Grade A milk producers' losses average \$1.390 billion under deregulation. Manufacturing milk consumer gains averaged just over \$315 million, less than 20 percent of fluid consumer gains, but applicable to about 60 percent of total consumption. Grade B milk producer losses averaged \$50 million. The magnitudes of change associated with consumers of manufacturing milk and Grade B producers relative to those for Grade A producers and fluid milk consumers provide some insight into the magnitudes of distortion associated with the price support program as compared with Federal orders. Results of the analysis clearly indicate the effects of programs in transferring income from consumers to producers.

Consumers of fluid milk subsidize Grade A dairy farmers if the regulated prices under Federal and State milk marketing orders are higher than cost-generated levels. The resulting greater Grade A milk production levels place downward pressure on commercial manufacturing milk prices, benefiting manufacturing milk consumers at the expense of Grade B milk producers and the Treasury. It also provides incentives for Grade B producers to convert to Grade A even though there may already be sufficient Grade A milk in the system to adequately supply fluid milk markets plus an adequate Grade A milk reserve.

One qualification of the above results is that under deregulation the CCC would make no purchases of dairy products. Therefore, there would be no surplus dairy commodities to distribute in domestic and foreign food aid programs. In the above welfare calculations, the value of dairy products distributed in food aid programs is not considered. These expenditures on donations averaged \$1,750.6 million per year over 1984 through 1987. If the donations were valued to society at their cost, then there

would be a like reduction in the overall costs of dairy programs. If donations are valued to society at 50 percent of CCC expenditures on these commodities, the donation welfare loss would average \$875 million. This would be an offset to the \$2,224 million average welfare gain from dairy industry regulation shown in table 9.

Another complicating factor is that the structure of the dairy industry would probably change under deregulation. For example, the costs faced by dairy farmers might change under deregulation because of greater milk price variability and increased risk. If this is true, dairy farmers would require a somewhat higher price to produce a given quantity of milk under deregulation than under more stable regulated markets. Thraen and Hammond found that from 1950 through 1978 the price support program resulted in increased production and blend prices 4-8 percent lower than would have been generated without price support. The Federal milk marketing order system also reduces producers' risk. Risks are also reduced for dairy processors, manufacturers, and marketing firms. Thus, it may be possible that the deregulated prices simulated in the McDowell and Fallert study are lower than would be the case under a deregulated and more market-oriented system. This also implies that benefits to consumers, losses to producers, and gains for taxpayers might be less from deregulation than shown by simulated results.

#### **Effects of Voluntary Supply Management Programs**

The Dairy and Tobacco Adjustment Act of 1983 was a major departure from traditional dairy policy in that it authorized substantial direct payments to producers who would voluntarily reduce marketings from a historical base. This payment program and the refundable second 50-cent per cwt deduction of the preceding 1982 legislation represented the first attempts to add voluntary supply management provisions to the dairy price support program.

One of the objectives of the milk diversion program which was included in 1983 legislation was to encourage adjusting milk production to levels consistent with the demand for dairy products. Under the terms of the program, milk producers could enter into contracts with the CCC to reduce milk marketings during a 15-month period beginning January 1, 1984, and ending March 31, 1985. The reduction could have been from 5 to 30 percent of milk marketings during a base period selected by the producer. Contracting producers received a fixed payment of \$10.00 per cwt of reduction in their milk marketings.

Approximately 38,000 producers signed contracts to reduce marketings under the terms of the milk diversion program. The participation rate was less than expected, possibly due to the short time given farmers to study the program regulations and make their decision. The contracting producers represented about 12 percent of all operations with milk cows or about 20 percent of commercial dairy farmers with typical herds and output levels. The contracted reduction in milk marketings for the 15 months of

the program was about 9.4 billion pounds (from a base of 41 billion pounds).

It was expected that reductions in milk marketings would translate into decreased milk production. As a group, those participants in the milk diversion program had begun reducing marketings on their own prior to contracting reductions under the program. The program may also have accelerated exits from dairying by providing monetary incentives large enough to convince some producers to retire from farming.

Data suggest that there was no long-term effect on cow numbers or milk production. In December 1983, the U.S. dairy herd numbered 11.1 million head. In March 1985, the herd numbered just over 10.8 million and by the end of 1985 had increased to 11.1 million. Total milk production on farms in 1983 was approximately 139.6 billion pounds. In the first quarter of 1985, production was reported as 33.6 billion pounds, about 2 percent below the first quarter production in 1983. Second, third, and fourth quarter production levels in 1985 were all above 1983 levels, by 2, 5, and 5 percent, respectively. The recovery of production in the second half of 1985 resulted in total milk production for the year being more than 2 percent above 1983 production.

Milk production decisions of producers not participating in the milk diversion program heavily influenced overall milk supply adjustments. These adjustments of the nonparticipants were probably influenced more by lower milk prices, changes in feed and other input costs, and other farm and off-farm opportunities than by the diversion program.

The Food Security Act of 1985 included legislation enacting a voluntary dairy termination program, also known as the whole-herd buyout, as a method to slow the expansion of U.S. milk production. Milk producers could submit competitive bids to remove production, based on 1985 marketings, for at least 5 years. Participating farmers had to sell all of their cattle for slaughter or export, not to other milk producers. In addition, a participant's physical plant could not be used for milk production or dairy cattle. A long-term objective of the program was reduction of U.S. milk production capacity by removal of resources from the dairy industry.

Bids ranging from \$3.40 to over \$1,000 per cwt of base production were submitted by about 39,500 producers. All bids up to \$22.50 per cwt (averaging \$14.88 per cwt) were accepted, a total of 13,988. Total cost of the program was \$1.8 billion of which 38 percent was paid by the industry. Participants had marketed just over 12 billion pounds of milk in 1985 and held, at the time of bidding, slightly more than 1.55 million head of dairy animals. Herds removed under the program were generally average or above in terms of size and output per cow.

Three herd liquidation periods were established: April-August 1986, September 1986-February 1987, and March-August 1987. About

two-thirds of the participants in the program chose the first period. Concerns raised by beef industry interests regarding the effects on the beef market of slaughtering a large number of dairy cattle led the U.S. Department of Agriculture (USDA) to permit shifts by first-period participants to later periods.

The dairy termination program likely accelerated the normal exit patterns from dairying. There can be little doubt that there was removal of resources from the dairy industry; the removal of over 1.55 million dairy animals and about 14,000 farmers with their accumulated human capital are visible examples. The longer term effect of the program on the physical plant is less certain. Some of these resources are likely to come back into the industry at the end of the 5-year legislated period. <sup>2/</sup> The compression of exit decisions into a nearer term resulted in rather large initial program effects on production; these effects diminished over time. The overall production effects were conditioned by the extent to which tighter milk supplies generated a price that induced expansion of output by nonparticipants.

Prior to the initiation of the dairy termination program in 1986, milk production had been rising, on average, about 2 percent per year from 1980 to 1985. The expansion from 1984 to 1985 was almost 6 percent. The average increase in production from 1985 to 1988 was just less than six-tenths of 1 percent. However, the annual increase from 1987 to 1988 was just over 2 percent, comparable to the pre-program average rate. Not all of the credit for the lower cow numbers and slower average growth of milk production can be given to the program; reductions in the dairy support price from \$13.10 per cwt in November 1983 to \$10.60 on January 1, 1988, also played an important role.

There were pronounced regional differences in participation in the milk diversion program. Contract diversions ranged from 2 percent of 1983 production in Pennsylvania to 15 percent in Florida. Diversions were heaviest in most of the South, the Plains States, the western Corn Belt, and some of the Mountain States. Participation was relatively limited in the Northeast and low in the Lake States and Pacific regions, the major milk producing regions. The diversion rate in the five major dairy States--Wisconsin, California, New York, Minnesota, and Pennsylvania--was 3.8 percent of production, little more than half the rate of the other 43 States. The program excluded Alaska and Hawaii.

As in the milk diversion program, State and regional participation and effects on processors varied widely. The share of 1985 marketings covered by accepted contracts under the dairy termination program ranged from 4.7 percent in the Northeast to 17.2 percent in the Southeast. Participation was generally low

---

<sup>2/</sup> The ending dates of the 5-year period legislated under the program in which participating producers can reenter the dairy industry are Sept. 1, 1991, Mar. 1, 1992, and Sept. 1, 1992, depending upon their termination period.

in northern regions and relatively high in southern and western regions. The Lake States, Corn Belt, and Northeast had relatively low levels of accepted contracts.

### **Import Restrictions**

The international dairy market is generally restricted to manufactured products since fresh fluid milk products are highly perishable, and transportation costs are high relative to the value of the final product. International trade in dairy products is also constrained by extensive import restrictions by most developed countries.

Only New Zealand and Australia would probably have a clear absolute advantage over U.S. producers for providing manufactured dairy products to the U.S. market. Import restrictions are imposed by the United States to avoid supporting world prices through the U.S. price support program. On balance, U.S. imports have averaged less than 2 percent of U.S. milk marketings or about 3 percent of U.S. manufactured dairy products consumption (app. table 11). The effectiveness of domestic dairy programs, as currently structured, depends critically upon foreign trade policies and programs. Without the import controls provided by Section 22 of the Agricultural Adjustment Act of 1937, as amended, price supports through a purchase program would be unworkable because the United States would be supporting world dairy product prices.

International dairy markets--especially for nonfat dry milk--changed dramatically in 1988. The primary reasons for this change in which prices of skim milk powder, casein, and cheese rose substantially were EC and U.S. efforts to reduce dairy surpluses and stocks.

### **International Competitive Position**

The U.S. competitive position in international dairy markets is a dynamic and dramatically changing milk marketing phenomenon. For years, world dairy markets were heavily influenced by the subsidized exports of many countries, especially the European Community. But since the quota system was established in the EC in 1984 to reduce dairy surpluses and stocks, and the United States reduced price supports and initiated the milk diversion and dairy termination programs in 1984 through 1987, the "butter and milk powder mountains" have declined dramatically and nonfat dry milk prices have risen sharply. Even so, conditions in international markets remain dominated by large, subsidized EC exports.

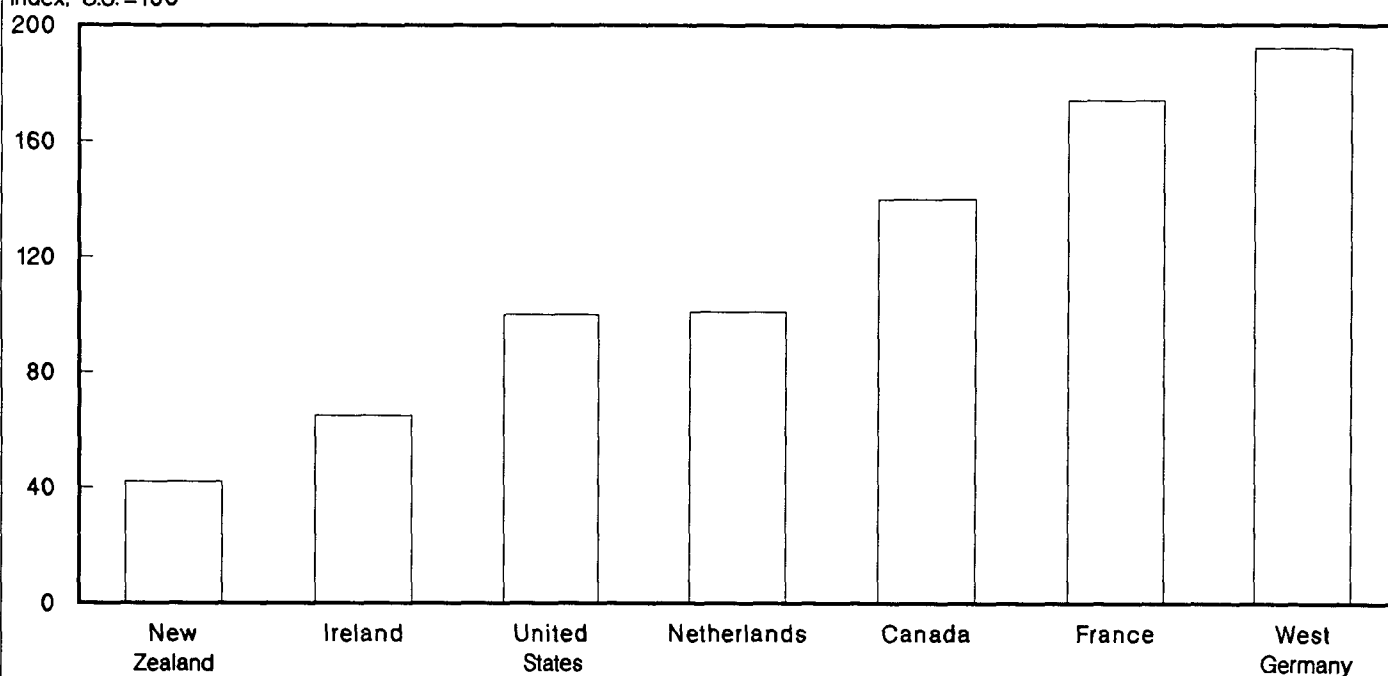
Under liberalized agricultural trade, the relative costs of milk production and the principles of comparative advantage should influence world dairy product prices and trade flows. Research indicates that in the absence of subsidized milk production and exports, the United States can compete in world dairy markets (fig. 8).



Figure 8

**Indexes of cost estimates for milk production, seven major milk producing countries, 1986**

Index, U.S.=100



Source: Baker, Hallberg, Tanjuakio, Eiterich, Beck, and Liebrand. "Estimates of the Cost of Producing Milk in Seven Major Milk Producing Countries, 1986," U.S. Dept. Agr., forthcoming.

Among the major milk producing countries in the world, milk production costs--disregarding subsidies less taxes--appear to be lowest in New Zealand and Ireland. They are highest in France and West Germany. Milk production costs in Canada are substantially higher than in the United States while costs in the Netherlands are about the same as in the United States. Overall, milk production costs in the United States appear to be in the middle-range of cost estimates in major milk producing countries.

The lowest cost milk producing countries are pasture-based systems like New Zealand's. However, New Zealand's total milk production about equals the amount produced in California and additional pasture resources for dairying are limited. Furthermore, countries like New Zealand with low-cost pasture-based systems and relatively low milk prices are not likely to benefit as much from emerging bovine somatotropin (bST) technology as could the United States or the European Community where farmers receive higher prices and supplement forage rations with grain and concentrates. Use of bST as a management tool will also be substantially different--and probably less advantageous--for the EC and Canada, if adopted there, than in the United States because of the quota restrictions on individual farm output.

Costs of EC milk production have risen relative to U.S. costs since initiation of the EC quota in 1984, for several reasons. First, when a milk production quota system is locked into place, the industry is not permitted to shift production to areas of

competitive advantage. Second, individual farm output was cut back about 15 percent from 1983 levels and fixed overhead is spread over fewer units of milk production. Finally, the relatively high milk prices are being capitalized into quota values. The Canadian experience with the effects of milk quotas on costs of milk production would also indicate that the United States can be competitive in world dairy markets.

### Issues

Provisions of the Food Security Act of 1985 expire on December 31, 1990. Dairy policy issues likely to be of concern and debated during deliberations on the 1990 farm bill will likely concentrate most heavily on the dairy price support program. The dairy price support adjustment mechanism and the need to prevent the recurrence of heavy dairy product surpluses and high government costs will likely be under scrutiny. The flexible price support program, the trigger mechanism, the trigger level, and the method of calculating dairy removals will also likely be considered. An issue with dairy policy is the amount of discretion given the Secretary of Agriculture in setting the level of price supports. Other topics may include whether there will be a continuation of authority to establish another milk diversion or dairy termination program.

Due to actual or perceived regional distortions in prices under Federal milk marketing orders, an issue might arise as to whether Federal milk marketing order provisions should be addressed by the Congress or through the normal USDA hearing process. In the 1985 farm act, the Congress set a precedent by legislating higher minimum Class I differentials (prices) in 35 of 44 Federal milk orders that were operating in May 1986. Most of these increases were in milk-deficit southern markets. Some dairy interest groups feel these legislated price changes further distorted regional prices while other groups contend the price changes were needed to assure better industry performance. Emerging processing technology such as reverse osmosis, which removes water from milk and lowers transportation, storage, and handling costs for servicing the fluid milk and soft dairy products markets, may also raise interest in changes in Federal order provisions to accommodate this technology. Historically, most Federal order issues have been addressed by USDA through the Federal order hearing process.

Proposals for reducing trade-distorting agricultural policies are a focus of current GATT multilateral trade negotiations, which include 105 participating nations. Liberalization of agricultural trade has been discussed extensively by both policymakers and policy analysts in recent years. Thus, the level of dairy import restrictions under Section 22 of the Agricultural Adjustment Act of 1937, as amended, may come under scrutiny. Section 22 authorizes the President to restrict imports by imposing quotas or fees if the imports interfere with Federal price support programs or substantially reduce U.S. production of products processed from farm commodities.

The dairy export incentive program, due to be terminated September 30, 1990, may surface as an issue. Discussion of direct sales of surplus dairy products as well as donations of dairy products through food assistance programs to the needy overseas under PL 480 and Section 416 might also arise.

The high concentration of dairy cattle in some areas of the country gives rise to groundwater pollution through dairy manure. Thus, environmental considerations could directly affect the dairy industry in the 1990's.

#### Additional Readings

Babb, Emerson M. Case Studies of Over-Order Payments in Federal Milk Marketing Orders. Staff Paper 557. Univ. of Florida, May 1989.

\_\_\_\_\_. Future of Dairy Marketing Orders. Staff Paper 363. Univ. of Florida, July 1989.

Baker, Derek, M.C. Hallberg, Rodolfo Tanjuakio, Joachim Elterich, Robert L. Beck, and Carolyn Betts Liebrand. "Estimates of the Cost of Producing Milk in Seven Major Milk Producing Countries, 1986." U.S. Dept. Agr., Econ. Res. Serv. (forthcoming).

Blayney, Don, and Richard Fallert. "Biotechnology and Agriculture: The Emergence of Bovine Somatotropin (bST)." U.S. Dept. Agr., Econ. Res. Serv. (forthcoming).

Buxton, B. M. "Elasticities of Milk Production in the United States." U.S. Dept. Agr., Econ. Res. Serv., working paper, 1984.

Capponi, S. "Milk Marketing Price Premiums Reflect Added Services, Costs," Farmer Cooperatives, Vol. 49, No. 9, Dec. 1982.

Chaves, J. P., and Richard M. Klemme. "Aggregate Milk Supply Response and Investment Behavior on U.S. Dairy Farms," American Journal of Agricultural Economics, Vol. 68, No. 1, Feb. 1986.

Christ, Paul G. "An Appraisal of the U.S. Government's Role in Milk Pricing," American Journal of Agricultural Economics, Vol. 62, No. 2, May 1980, pp. 279-87.

Dahlgran, Roger A. "Welfare Costs and Interregional Income Transfers Due to Regulation of Dairy Markets," American Journal of Agricultural Economics, Vol. 62, No. 2, May 1980, pp. 288-96.

Dash, Suzanne L., and Judith Sommer. Recent Dairy Policy Publications with Selected Annotations. Staff Rpt. AGES840417. U.S. Dept. Agr., Econ. Res. Serv., May 1984.

Dobson, William D., and Boyd M. Buxton. Analysis of the Effects of Federal Milk Orders on the Economic Performance of U.S. Milk Markets. Res. Bull. R2897. Univ. of Wisconsin, Oct. 1977.

Dobson, William D., and Larry E. Salathe. "The Effects of Federal Marketing Orders on the Economic Performance of U.S. Milk Markets," American Journal of Agricultural Economics, Vol. 61, No. 2, May 1979, pp. 213-17.

Fallert, Richard F. "Federal Milk Marketing Order Issues and Research Needs." in Dairy Models and Models for Policy Analysis: Concepts and Issues. ESO-1304. Proceedings of a Seminar Sponsored by the NC-176, NE-153, and S-166 Dairy Research Committees, Ohio State Univ., Oct. 1985.

Fallert, Richard F., and Don Blayney. "U.S. Dairy Programs," National Food Review. U.S. Dept. Agr., Econ. Res. Serv., Jan.-Mar. 1990.

Fallert, Richard F., James J. Miller, and Lynn G. Sleight. Dairy: Background for 1985 Farm Legislation. AIB-474. U.S. Dept. Agr., Econ. Res. Serv., Sept. 1984.

Fallert, R.F., and B.M. Buxton. Alternative Pricing Policies for Class I Milk Under Federal Marketing Orders--Their Economic Impact. AER-401. U.S. Dept. Agr., Econ. Res. Serv., 1978.

Fallert, Richard, Tom McGuckin, Carolyn Betts, and Gary Bruner. bST and the Dairy Industry: A National, Regional, and Farm-level Analysis. AER-579, U.S. Dept. Agr., Econ. Res. Serv., Oct. 1987.

Fleming, Ann, and Jeannine Kenney. "Will Consumers Benefit from New Dairy Technologies?," National Food Review. U.S. Dept. Agr., Econ. Res. Serv., Jan.-Mar. 1989.

Gardner, Bruce, et al. Federal Milk Marketing Orders: A Review of Research on Their Economic Consequences. Occasional Paper No. 3 by the Amer. Agr. Econ. Assn. Task Force on Dairy Marketing Orders. June 1986.

Glaser, Lewrene K. Provisions of Food and Security Act of 1985. AIB-498. U.S. Dept. Agr., Econ. Res. Serv., Apr. 1986.

Gruebele, James W. "Effects of Removing the Dairy Price-support Program," Illinois Agricultural Economics, Vol. 18, No. 2, July 1978, pp. 30-38.

Haidacher, Richard C., James R. Blaylock, and Lester H. Myers. Consumer Demand for Dairy Products. AER-586. U.S. Dept. Agr., Econ. Res. Serv., Mar. 1988.

Hallberg, M.C. "Cyclical Instability in the U.S. Dairy Industry Without Government Regulations," Agricultural Economics Research, Vol. 34, No. 1, Jan. 1982, pp. 1-11.

Hallberg, M.C. Stability in the U.S. Dairy Industry Without Government Regulations? Staff Paper No. 37. Pennsylvania State Univ., Dept. Agr. Econ. and Rural Soc., 1980.

Hathaway, Dale E. Agriculture and the GATT: Rewriting the Rules. Inst. Int'l. Econ., Sept. 1987.

Heien, Dale. "The Cost of the U.S. Dairy Price Support Program: 1949-74," The Review of Economics and Statistics, Vol. 59, No. 1, Feb. 1977, pp. 1-8.

Ippolito, R.A. and R.T. Masson. "The Social Cost of Government Regulations of Milk," Journal of Law and Economics, Vol. 21, No. 1, 1978, pp. 33-65.

Jesse, Edward V., and Aaron C. Johnson, Jr. An Analysis of Cooperative Over-Order Pricing of Fluid Milk. TB-1708, U.S. Dept. Agr., Econ. Res. Serv., Aug. 1985.

Kenney, Jeannine, and Richard Fallert. "Livestock Hormones in the United States," National Food Review. U.S. Dept. Agr., Econ. Res. Serv., July-Sept. 1989.

Ling, K. Charles, and James B. Roof. Marketing Operations of Dairy Cooperatives. ACS Res. Rpt. No. 88. U.S. Dept. Agr., Agr. Coop. Serv., Nov. 1989.

Lipton, Kathryn L., and Susan L. Pollack. A Glossary of Food and Agricultural Policy Terms, 1989. AIB-573. U.S. Dept. Agr., Econ. Res. Serv., Nov. 1989.

Manchester, A.C. Dairy Price Policy: Setting, Problems, Alternatives. AER-402. U.S. Dept. Agr., Econ. Stat. Coop. Serv., Apr. 1978.

Manchester, A.C. The Public Role in the Dairy Economy--Why and How Governments Intervene in the Milk Business. Boulder, CO: Westview Press, 1983.

Masson, Robert, and Philip Eisenstat. "Welfare Impacts of Milk Orders and the Anti-Trust Immunities for Cooperatives," American Journal of Agricultural Economics, Vol. 62, No. 2, May 1980, pp. 170-78.

McDowell, Howard, Ann M. Fleming, and Richard F. Fallert. Federal Milk Marketing Orders: An Analysis of Alternative Policies. AIB-598. U.S. Dept. Agr., Econ. Res. Serv., Sept. 1988.

McDowell, Howard, and Richard F. Fallert. "Gains and Losses in U.S. Dairy Programs," in "Economic Gains and Losses From Farm Commodity Programs." U.S. Dept. Agr., Econ. Res. Serv., (forthcoming).

Miller, James J., and Clifford M. Carman. "Participation in the Milk Diversion Program," Dairy Outlook and Situation. DS-396. U.S. Dept. Agr., Econ. Res. Serv., Mar. 1984.

National Commission on Dairy Policy. Report and Recommendations. U.S. Government Printing Office, Mar. 1988.

Novakovic, Andrew, and Robert L. Thompson. "The Impact of Imports of Manufactured Milk Products on the U.S. Dairy Industry," American Journal of Agricultural Economics, Vol. 59, No. 3, Aug. 1977, pp. 507-19.

Organization for Economic Cooperation and Development. National Policies and Agricultural Trade. Oct. 1987.

Shaw, C.N., and S.G. Levine. Government's Role in Pricing Fluid Milk in the United States. AER-397. U.S. Dept. Agr., Econ. Stat. Serv., Mar. 1978.

Short, Sara D. "U.S. Dairy Markets Since 1970," National Food Review. U.S. Dept. Agr., Econ. Res. Serv., Jan.-Mar. 1989.

Thraen, Cameron S., and Jerome W. Hammond. Price Supports, Risk Aversion, and U.S. Dairy Policy: An Alternative Perspective of the Long-Term Impacts. Econ. Rpt. ER83-9. Univ. of Minnesota, Dept. Agr. Econ. and Appl. Econ., June 1983.

U.S. Department of Agriculture. Compilation of Agricultural Marketing Agreement Act of 1937. AH-421. Oct. 1971.

\_\_\_\_\_. The Impact of Dairy Imports on the U.S. Dairy Industry. AER-278. Econ. Res. Serv., Jan. 1975.

\_\_\_\_\_. "Staff Report on Casein." Econ. Res. Serv., Apr. 1977.

\_\_\_\_\_. U.S. Casein and Lactalbumin Imports: An Economic and Policy Perspective. Staff Rpt. AGES810521. Econ. Stat. Serv., June 1981.

\_\_\_\_\_. Review of Existing and Alternative Federal Dairy Programs. Staff Rpt. AGES840121. Econ. Res. Serv., Jan. 1984.

\_\_\_\_\_. State Milk Regulation: Extent, Economic Effects, and Legal Status. Staff Rpt. No. AGES860404. Econ. Res. Serv., Apr. 1986.

\_\_\_\_\_. Government Intervention in Agriculture. FAER-229. Econ. Res. Serv., Apr. 1987.

\_\_\_\_\_. Dairy Situation and Outlook Report. Econ. Res. Serv., selected issues, but especially DS-414, Apr. 1988.

\_\_\_\_\_. The Federal Milk Marketing Order Program. Mktg. Bull. No. 27. Agr. Mktg. Serv., Jan. 1989.

\_\_\_\_\_. Economic Indicators of the Farm Sector, Costs of Production, 1987. ECIFS 7-3. Econ. Res. Serv., Feb. 1989.

\_\_\_\_\_. ASCS Commodity Fact Sheet - 1988-1989 Dairy Price Support Program. Agr. Stab. and Cons. Serv., Apr. 1989.

\_\_\_\_\_. Dairy Situation and Outlook Yearbook. Econ. Res. Serv., Aug. 1989 and selected prior issues.

\_\_\_\_\_. World Dairy Situation. Circ. Series FD 2-89. For. Agr. Serv., Nov. 1989.

\_\_\_\_\_. Economic Indicators of the Farm Sector: Costs of Production--Livestock and Dairy, 1988." ECIFS 8-3. Econ. Res. Serv., Mar. 1990.

U.S. General Accounting Office. Dairy Termination Program: An Estimate of Its Impact and Cost-Effectiveness. GAO/RCED-88-157. Resources, Comm., and Econ. Dev. Div., July 1989.

\_\_\_\_\_. Milk Marketing Orders: Options for Change. GAO/RCED-88-9. Resources, Comm., and Econ. Dev. Div., Mar. 1988.

Whipple, Glen D. "An Analysis of Reconstituted Fluid Milk Pricing Policy," American Journal of Agricultural Economics, Vol. 65, No. 2, May 1983, pp. 214-24.

## Glossary

**Agricultural Marketing Service (AMS)** -- A USDA agency responsible for administering the marketing of several agricultural products, including providing marketing news and stock reports. AMS oversees the operation of the Federal milk marketing order system.

**Agricultural Stabilization and Conservation Service (ASCS)** -- A USDA agency responsible for administering farm price support and income support programs and some conservation and forestry cost-sharing programs.

**Allocation procedure** -- The Federal order procedure in which imported milk, regardless of use, is allocated to a manufacturing class when local milk for fluid use is available. This procedure reserves as much of the Class I allocation as possible for producers within the order, increases the order blend price, and reduces unnecessary transportation.

**Balancing** -- The market service of moving milk between various uses and among processors to meet fluctuating needs from varying supplies.

**Blend price** -- A weighted average price based on the proportion of Grade A milk in a pool allocated to each of the use classes. Producers participating in a pool receive its blend price with adjustments for butterfat content and farm location.

**Census of Agriculture** -- A survey taken by the Bureau of the Census every 5 years to determine the number of farms, land in farms, crop acreage and production, farm spending, and so forth.

**Class I differential** -- The amount added to the M-W price to obtain a given order's Class I price. Two components make up the effective or total Class I differential: a minimum Federal order differential and an over-order payment.

**Class I use** -- Grade A milk used in Class I milk products as defined under a milk marketing order. Class I products generally include all beverage milks and may include other fluid products.

**Class II use** -- Grade A milk used in fluid cream products or perishable manufactured products (ice cream, cottage cheese, and yogurt) under Federal marketing orders with three classes. The designation also refers to Grade A milk used to produce any manufactured product under a Federal marketing order with only two classes.

**Class III use** -- Grade A milk used to produce storable manufactured products (cheese, butter, canned milk, and dry milk) under a Federal marketing order with three classes.

**Classified pricing** -- The Federal order pricing system under which regulated processors pay into the pool for Grade A milk according to the class in which it is used.



**Commodity Credit Corporation (CCC)** -- A federally owned and operated corporation within the U.S. Department of Agriculture created to stabilize, support, and protect farm income and prices through loans, purchases, payments, and other operations.

**Compensatory payment** -- An assessment paid on milk or components for reconstitution shipped into a Federal order from another order or market. The assessment is equal to the difference between the order's Class I price and its Class III price in some situations and between the order's Class I price and its blend price in other situations.

**Cooperative** -- A firm that is owned by its farmer-members, is operated for their benefit, and distributes earnings on the basis of patronage (volume of milk).

**Cost of production** -- An amount, measured in dollars, of all purchased inputs, allowances for management, and rent, that is necessary to produce farm products.

**Economies of size** -- Increasing returns as use of factors is expanded in least-cost combinations. Once the size of an operation reaches a certain size, the marginal cost of producing additional output begins to decline.

**European Community** -- Also known as the European Economic Community and the Common Market, an attempt originating under the Treaty of Rome in 1957 to unify and integrate member economies by establishing a customs union and common economic policies, including the Common Agricultural Policy. The EC currently has 12 members.

**Farm act** -- The omnibus agricultural legislation that expires every 4 or 5 years. The act's titles include program commodities, trade, conservation, credit, agricultural research, food stamps, and marketing.

**Federal milk marketing order** -- A regulation issued by the Secretary of Agriculture specifying minimum prices and conditions under which milk can be bought and sold within a specified area.

**Fluid utilization** -- The proportion of Grade A milk pooled in a market and used to produce fluid (Class I) products.

**Fluid product** -- Packaged dairy products traditionally including beverage milks, milk and cream mixtures, cream, eggnog, and yogurt.

**Food Security Act of 1985 (PL 99-198)** -- The omnibus food and agricultural legislation signed into law on December 23, 1985, that provides a 5-year framework for the Secretary of Agriculture to administer various agriculture and food programs.

**General Agreement on Tariffs and Trade (GATT)** -- An agreement originally negotiated in 1947 by 23 countries, including the United States, to increase international trade by reducing

tariffs and other trade barriers. The agreement provides a code of conduct and a framework for periodic multilateral trade negotiations on trade issues.

**Give-up charge** -- The price needed to attract milk away from profitable manufacturing operations because lower volume increases costs of manufacturing. This charge is included in over-order payments.

**Grade A milk** -- Milk produced under sanitary conditions that qualify it for fluid consumption. Only Grade A milk is regulated under Federal marketing orders.

**Grade B milk** -- Milk not meeting Grade A standards; less stringent standards generally apply.

**Handlers** -- Generally refers to fluid milk processors and includes manufacturing plants that also supply fluid markets.

**Interregional marketing costs** -- The average cost of marketing milk interregionally is equal to the actual average cost of transporting milk times the proportion of milk marketed that is actually transported.

**Make allowance** -- The margin between the Government support price and the CCC announced price for butter, nonfat dry milk, and cheese. This margin is administratively set to attain the desired level of prices for milk in manufacturing uses.

**Manufacturing milk** -- Grade B milk or Grade A milk assigned to Class II and Class III or otherwise used in the production of a manufactured product.

**Manufacturers** -- Generally refers to the manufacturers of cheese, butter, nonfat dry milk, or other storable dairy products.

**Minnesota-Wisconsin (M-W) price** -- The average price per cwt paid to farmers for Grade B milk in Minnesota and Wisconsin as estimated by USDA.

**Over-order payment** -- A payment negotiated between buyers and sellers to cover the cost of providing market services or attracting milk away from manufacturing plants. Over-order payments could also result from market power.

**Parity price** -- Originally defined as the price which gives a unit of a commodity the same purchasing power today as it had in a base period, traditionally 1910-14. In 1948, the base prices used for calculating parity were made dependent on the most recent 10-year average prices for commodities. Except for wool, mohair, and certain minor tobaccos, parity is not currently used to set price-support levels for dairy or any program commodities.

**Perishable manufactured dairy products** -- Manufactured dairy products with limited storage life, including ice cream, cottage cheese, yogurt, and sour cream.

**Processors** -- Generally refers to firms that process raw Grade A milk into fluid dairy products.

**Public Law 480 (PL 480)** -- Common name for the Agricultural Trade Development and Assistance Act of 1954 which seeks to expand foreign markets for U.S. agricultural products, combat hunger, and encourage economic development in developing countries.

**Reconstituted milk** -- Fluid milk recombined from ingredients (nonfat dry milk, condensed milk, and butterfat) or concentrated milk.

**Revenue pool** -- With a classified pricing system such as that used in Federal and State orders, processors pay for milk at different prices for each use category. Producers are paid a weighted average, or "blend," price for all uses of milk in a particular order or market. Processors pay into the pool on the basis of their uses of milk; these are the pool revenues. Producers participating in the pool receive identical uniform blend prices, with adjustments for butterfat content and location of the farm.

**Reverse osmosis filtration** -- A membrane separation technique used to remove water from fluid milk, yielding a concentrate for shipping and recombining at the final destination. The process can yield a concentrate of about 50 percent without altering the milk's key taste and nutrient characteristics.

**Section 22** -- A section of the Agricultural Adjustment Act of 1933 (PL 73-10) that authorizes the President to restrict imports by imposing quotas or fees if the imports interfere with Federal price support programs or substantially reduce U.S. production of products processed from farm commodities.

**Storable manufactured dairy products** -- Storable manufactured dairy products, including butter, nonfat dry milk, and cheese.

Appendix table 1--Dairy herd size distribution on farms with milk cows, by region, 1987

Region 1/	Herd size (number of cows)							Average herd size		
	1-4	5-19	20-49	50-99	100-199	200-499	500+	All sizes	All farms	Farms with 5 or more cows
	----- Number of farms -----							----- Number of cows -----		
New England	1,051	450	1,756	1,983	685	152	8	6,085	55	66
Middle Atlantic	7,148	5,158	15,754	12,888	3,796	679	51	45,474	48	56
Corn Belt	8,278	5,906	12,805	8,892	2,296	281	11	38,469	38	48
Lake States	1,556	5,724	28,780	15,977	2,466	267	9	54,779	45	46
Plains	3,862	1,853	4,156	2,625	634	77	4	13,211	33	46
Southeast	2,608	543	447	710	797	352	124	5,581	76	141
South Central	9,078	2,547	2,526	3,204	2,164	694	107	20,320	44	79
Mountain	4,565	431	435	603	466	237	66	6,803	39	115
Southwest	1,253	201	122	236	504	999	792	4,107	282	405
Northwest	2,912	554	841	1,192	1,025	504	88	7,116	67	112
United States 2/	42,311	23,367	67,622	48,310	14,833	4,542	1,260	201,945	50	63
	----- Percent of farms -----									
New England	17.3	7.4	28.9	32.6	11.3	2.5	.1	100	---	---
Middle Atlantic	15.7	11.3	34.6	28.3	8.3	1.5	.1	100	---	---
Corn Belt	21.5	15.4	33.3	23.1	6.0	.7	*	100	---	---
Lake States	2.8	10.4	52.5	29.2	4.5	.5	*	100	---	---
Plains	29.2	14.0	31.5	19.9	4.8	.6	*	100	---	---
Southeast	46.7	9.7	8.0	12.7	14.3	6.3	2.2	100	---	---
South Central	44.7	12.5	12.4	15.8	10.6	3.4	0.5	100	---	---
Mountain	67.1	6.3	6.4	8.9	6.8	3.5	1.0	100	---	---
Southwest	30.5	4.9	3.0	5.7	12.3	24.3	19.3	100	---	---
Northwest	40.9	7.8	11.8	16.8	14.4	7.1	1.2	100	---	---
United States 2/	21.0	11.6	33.5	23.9	7.3	2.1	.6	100	---	---
	----- Percent of milk cows -----									
New England	.6	1.5	18.7	39.7	26.0	12.1	1.7	100	---	---
Middle Atlantic	.6	2.9	25.2	39.2	22.4	8.1	1.7	100	---	---
Corn Belt	.9	4.8	29.1	40.1	19.6	4.9	.5	100	---	---
Lake States	.1	3.1	40.3	41.3	12.3	2.7	.2	100	---	---
Plains	1.5	5.0	31.2	39.4	17.9	4.5	.5	100	---	---
Southeast	1.0	1.2	3.5	12.1	25.3	23.0	33.9	100	---	---
South Central	1.7	2.8	9.2	24.8	31.4	20.5	9.7	100	---	---
Mountain	2.7	1.4	5.4	15.8	23.1	25.8	25.8	100	---	---
Southwest	.2	.2	.3	1.5	6.4	27.4	64.0	100	---	---
Northwest	1.0	1.2	6.0	17.7	28.9	30.2	15.2	100	---	---
United States 2/	.7	2.8	22.9	31.5	18.9	11.8	11.6	100	---	---
	----- Herd size (number of cows) -----									
	1-4	5-19	20-49	50-99	100-199	200-499	500+	Total		
New England	1,931	4,896	62,681	132,343	87,339	40,656	5,625	335,471		
Middle Atlantic	12,301	62,884	547,517	851,083	485,709	175,212	36,145	2,170,851		
Corn Belt	13,477	70,206	423,476	584,145	285,367	71,727	7,584	1,455,982		
Lake States	3,009	76,519	987,860	1,012,767	300,566	66,497	6,041	2,453,259		
Plains	6,339	21,678	135,704	171,520	78,028	19,610	2,350	435,229		
Southeast	4,395	5,094	14,870	51,311	107,604	97,554	144,168	424,996		
South Central	14,981	24,888	82,901	222,773	282,329	184,223	87,467	899,562		
Mountain	7,171	3,645	14,390	42,020	61,190	68,485	68,412	265,313		
Southwest	2,003	1,745	3,940	16,846	74,023	317,477	740,612	1,156,646		
Northwest	4,540	5,645	28,229	83,876	136,760	142,882	71,907	473,839		
United States 2/	70,147	277,200	2,301,568	3,168,684	1,898,915	1,184,323	1,170,311	10,071,148		

\* = Less than 0.05 percent.

--- = Not applicable.

1/ New England: CT, ME, MA, NH, RI, VT; Middle Atlantic: DE, MD, NJ, NY, OH, PA, VA, WV; Corn Belt: IL, IN, IA, KY, MI, MO; Lake States: MN, WI; Plains: KS, NE, ND, SD; Southeast: FL, GA, NC, SC; South Central: AL, AR, LA, MS, OK, TN, TX; Mountain: CO, MT, NV, NM, UT, WY; Southwest: AZ, CA; Northwest: ID, OR, WA.

2/ Excluding Alaska and Hawaii.

Source: 1987 Census of Agriculture, Vol. 1, Parts 1-51, Table 30.