

Milk Pricing in the United States. By Alden C. Manchester and Don P. Blayney. Market and Trade Economics Division, Economic Research Service, U.S. Department of Agriculture. Agriculture Information Bulletin No. 761.

Abstract

This report provides a primer on the complex pricing system that has evolved in the United States to deal with milk production, its assembly (collection), and its distribution to alternative users. All the various government and private institutions making up the system are expected to work together to ensure that the public gets the milk it wants, while dairy farmers get the economic returns needed to provide the milk. The major institutions are the Federal milk price support program and milk marketing orders, the Northeast Interstate Dairy Compact, State regulations, dairy cooperatives, and milk and dairy product futures and options markets. Our goal is to provide a primer on milk pricing that can serve as a steppingstone to other, more detailed works for those so inclined.

Keywords: Dairy, milk pricing.

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Summary

Over the past 125 years, a complex pricing system has evolved to deal with the problems of milk production, assembly, and distribution. The various government and private institutions making up the system are designed to work together to ensure that the public gets the milk it wants, while dairy farmers get the economic returns needed to provide the milk. The very complexity of the system, however, has baffled many and led to numerous misconceptions.

Economic theory posits that the milk pricing system must balance the supply of milk with the demand for milk. The physical uniqueness of milk complicates many of the pricing arrangements that are available for other products or commodities. The complex mix of public and private pricing institutions has arisen as producers, processors, milk marketers, and consumers have grappled with that uniqueness.

The pricing of milk in the United States involves a wide variety of pricing regulations based on public policy decisions. Some of these regulations include milk price supports, Federal milk marketing orders, import restrictions, export subsidies, domestic and international food aid programs, State-level milk marketing programs, and a multi-State milk pricing organization. Nongovernment pricing institutions are also important—the dairy cooperative being a major example. As the dairy industry has become less regulated in recent years, the use of futures markets has engendered considerable interest. In almost all cases, the major intent of public pricing policies is to somehow influence producer (farm) milk prices.

For some 50 years, price supports have been the backbone of the pricing system for milk and dairy products. The support price underpinned the entire price structure for bulk milk sold by farmers either directly to processors or through cooperatives. USDA's Commodity Credit Corporation (CCC) stood ready to buy as much butter, nonfat dry milk, and Cheddar cheese as manufacturers wanted to sell at specified support purchase prices. These prices were calculated to return at least the announced milk support price to the farmer. Until the 1996 Farm Act, interest in developing alternatives to the support purchase program was minimal or nonexistent.

Federal milk marketing orders are concerned primarily with the orderly marketing of raw fluid-grade milk from the producer to the processor. Legal and technical language makes them complex. Underlying the entire pricing system is the linkage between prices for various milk classes and the wholesale prices of manufactured dairy products. The 1996 Farm Act required that the Federal milk marketing order system be reformed.

The 1996 Farm Act offered a concept that had been under discussion in the Northeast for many years—an interstate compact for dairy market regulation. The proponents of the compact argued, successfully, that regulatory authority over the dairy marketplace in the New England States (Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, and Connecticut) needed to be restored to the six States, acting together. The compact has proven to be a lightning rod for regional conflict in the industry.

The authority to regulate intrastate milk markets was denied to the Federal Government in court decisions early in the New Deal period. These court decisions led the States to make efforts to assist dairy farmers suffering economic hardships at the time by implementing State milk controls. State regulations are important from a national perspective because the States that control milk prices tend to be major milk producers—California and Pennsylvania, for example. State milk pricing is much less prevalent today than in earlier years.

Not all of the pricing institutions for milk are based on public policy decisions. The roles of the dairy cooperatives in both regulated and unregulated milk markets have changed. Cooperatives still represent member interests in the rule-making processes of Federal- and State-regulated markets, which can include minimum price issues. But other roles have become more prominent and claimed more of the public's attention. In many cases, the cooperatives have assumed operation of a complete procurement and distribution system for milk. Assembling milk from the farm, routing raw milk where it is needed, managing or coordinating movements of processed or manufactured products, and managing surplus milk, defined for our purposes as supplies above fluid requirements, are all parts of the system. Taken together, these activities are called "balancing."

The advent of futures and options contracts for Cheddar cheese, butter, nonfat dry milk, and raw fluid milk was seen by some as the prelude to a new era in milk pricing. Were they to be widely used, futures and options contracts could manage price instability. As the role of the price support program has been reduced, milk price volatility has increased. As long as there is price volatility in cash markets for milk and dairy products, the dairy industry will continue to evaluate futures and options contracts for price risk management.

Milk Pricing in the United States

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Introduction

Over the past 125 years, a complex pricing system has evolved to deal with milk production, assembly (collection), and distribution (coordinating milk supplies with the demands of milk users, both intermediate and final). The various government and nongovernment institutions making up the system are designed to work together to ensure that the public gets the milk it wants, while dairy farmers get the economic returns needed to provide the milk. The very complexity of the system, however, has baffled many and led to numerous misconceptions.

This report aims to dispel misconceptions by explaining how the current milk pricing structure is set up and how it works. It is neither a history of milk pricing nor a catalog of all the technical or legal aspects of pricing regulations. But, some history is recounted and some details are included to give the reader a feel for the context in which actions occurred. Our goal is to provide a primer on milk pricing in the United States that can serve as a steppingstone to other more detailed works for those so inclined—a short list of information sources is included. There is also a glossary of terms for readers not familiar with some of the specialized terms that have grown up with milk pricing institutions.

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U.S. Dairy Industry in Brief

Milk production in 1999 was just over 162.7 billion pounds, almost twice the quantity produced in the early 20th century, when the first concerted efforts to develop alternative milk pricing institutions were being made. About 111,000 operations had milk cows in 1999. Milk is picked up at the farm, most often by tank truck, at least every other day and is moved to one or more of the 422 fluid bottling plants or 1,258 dairy product manufacturing plants for further processing and manufacturing. Every step of the way, the milk must be handled under sanitary conditions to guard against bacterial contamination and either marketed promptly as fluid milk or processed into storable manufactured products. Milk production fluctuates seasonally—generally expanding during the spring and early summer (the flush season) and contracting in the fall and winter (the short-supply season)—making it necessary to coordinate a supply that is rising when fluid milk demand is falling. In addition, while milk production shows little daily variation, fluid milk sales vary substantially from day to day. This daily variation in sales, primarily because of consumer buying patterns, becomes a significant problem when balancing fluctuating milk supplies with demand and pricing the various uses of milk. Manufactured dairy product demand also shows seasonal variation—cheese and butter demands are heavier in the fall and early winter.

Historically, two grades of milk have been identified: Grade A and Grade B. The grade depends on the milk meeting certain health (sanitary) standards. Sanitary standards, some of which might also be called “quality standards,” include the somatic cell count and bacterial count and the conditions of farm facilities, including the milking parlor, milk storage tank, and water well. Grade A milk meets the sanitary standards for use in fluid milk products and can be used for any dairy product. Grade B, or manufacturing grade, milk meets slightly lower standards and can be used only for manufactured dairy products. Grades are not the same as the classes of milk that are used in classified pricing systems. Prior to World War I, less than half of milk and cream marketings were Grade A. Only about 3 percent of all milk marketed did not meet Grade A standards in 1999, even though roughly 60-65 percent of all milk marketed ended up in manufactured dairy products.

For many years, cooperatives owned by dairy farmers have played a prominent role in the U.S. dairy industry. In the early 1900’s, they were organized to bargain for prices with dealers and handlers, a role they continue to perform today. The cooperatives have also had a hand in how public dairy pricing policies and programs have evolved. In the 1960’s and 1970’s, the scope of dairy cooperatives changed as they became regional rather than local organizations. The trend continues today with some cooperatives operating coast-to-coast, though not in all regions.

Milk possesses characteristics that individually describe other agricultural products, but taken together make marketing fluid milk different from marketing any other agricultural commodity. Milk is produced every day and must move to market at least every other day—thus it is a flow commodity. Eggs are also a flow commodity, but they can be and are stored. Eggs also do not have the numerous multiple uses at different values that milk does. Meat can be stored in carcasses or cuts, vegetables are storable for several days, and apples and pears can be stored for months.

In the short run (day to day), milk supply is not attuned to milk demand. The cows produce every day and the milk must go to market, even if the demand on a particular day is low. The demand for milk for bottling (packaging) is almost zero on Sundays and small on Saturdays and Wednesdays, since most plants close on those days in response to buyer demand schedules. The milk that is still produced could be discarded only at a high cost so it goes to manufactured product uses. Substantial economies of scale exist in managing milk supplies to deal with these day-to-day variations. A single manager, a role many dairy cooperatives have taken on, is more efficient than several individual firm managers are, which encourages centralization of the milk supply management functions.

Fluid grade milk can be used for milk and cream products or to manufacture cheese, butter, and other products. But its value in manufactured products is no greater than that of manufacturing grade milk. The costs of balancing a fluid milk market must be covered by some means—which is where classified pricing comes in.

How the Pricing System Evolved

There is a wide array of milk and dairy product prices in the United States: the all-milk price, the minimum Class prices defined under Federal and State milk marketing orders, the milk support price, wholesale prices of cheese and other manufactured dairy products, retail prices for fluid milk and manufactured dairy products, and others (fig. 1). These prices, and others not mentioned, are either market-determined or administered through some public dairy policy or program.

Included among the public policies and programs are Federal milk price support, Federal milk marketing orders, import restrictions, export subsidies, domestic and international food aid programs, State-level milk marketing programs, and a development of more recent (1996) origin, a multi-State milk pricing organization. Market pricing institutions include the dairy cooperative and the Chicago Mercantile Exchange where both wholesale dairy product prices are determined and futures and options contracts for milk and dairy products are traded. In almost all cases, the major intent of the public pricing policies and programs that have been implemented is to influence producer (farm) milk prices. The market pricing institutions influence both producer and buyer (consumer) prices.

Soon after the Civil War, milk production in the United States took on a much different character as dairy farmers began moving more of their milk to both fluid and manufactured dairy product processors supplying products in the rapidly growing urban areas of the country. Previously, the largest share of production was used on the farms—fed to animals, consumed by farm families as fluid milk, or made into butter and cheese for farm or very localized use. At the same time, shortrun price instability associated with seasonal fluctuations in supply and use led to longrun uncertainties for milk producers. The uncertainties and the price instability, taken together, drove substantial numbers of dairy farmers out of business—contributing to even greater production and price swings in the short run.

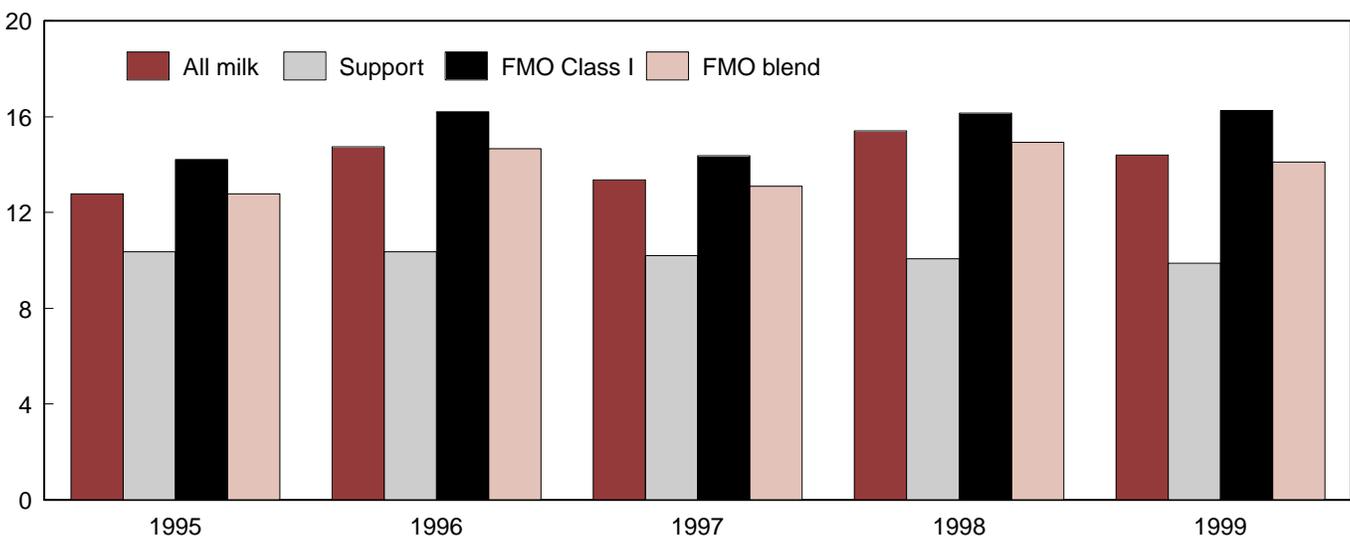
It was observed early on that flow commodities, such as milk, which were produced and marketed daily, could not be priced efficiently by the methods employed for most other commodities. Auctions or daily negotiations between buyers and sellers of milk would be costly to operate and result in dramatic daily price variations. So, farmers attempted to organize to bargain with processors over milk prices.

As early as 1900, producers in a number of markets had banded together into cooperative associations to bargain with fluid milk dealers or handlers for a flat

Figure 1

Selected milk price series, 1995-99

Dollars per cwt



Source: National Agricultural Statistics Service, Farm Service Agency, and Agricultural Marketing Service, USDA.

price, a uniform price for all milk. However, flat pricing would be sustainable only if all fluid milk sellers bore their proportional share of the costs of maintaining a reserve to cover unanticipated shortrun supply and demand requirements, something that occurred only rarely.

By the 1920's, a classified price system, where handlers paid for fluid grade milk according to its use, had been adopted in most of the major markets. The price paid for milk used in fluid products was higher than that paid for milk used for manufactured dairy products, reflecting the greater costs of handling and marketing perishable milk in fluid form (see box). Despite the seasonal variability of production, the price to producers was stabilized. Differential pricing (that is, pricing beverage milk higher than milk for manufactured products) reflected the greater cost of producing and marketing milk for fluid use.

During the Great Depression, the classified pricing systems broke down as the demand for milk dropped drastically, and cooperatives faced intensified pressures as more producers were cut off from the Class I (beverage milk) market and took any price to get back into it. Prices at all levels dropped sharply, and farmers were in great economic distress. The inherent instability of milk prices and the marketing problems that arose with the Great Depression prompted dairy cooperatives to ask for government intervention to stabilize milk marketing conditions. The Agricultural Adjustment Act of 1933 authorized the Secretary of Agriculture to enter into marketing agreements with handlers, processors, and others and issue licenses to handlers and processors to raise the prices of agricultural commodities, including milk. Some attempts were made to use marketing agreements to assist manufacturing milk producers, principally farmers selling milk to manufacturers of canned milk.

Congress revised the Agricultural Adjustment Act in 1935, authorizing Federal marketing orders for many agricultural products that replaced the earlier agreements and licenses. The 1935 Act contained more specific standards for milk than the 1933 Act. The Agricultural Marketing Agreement Act of 1937 re-enacted the 1935 Act and became the foundation for the modern Federal milk marketing order system.

During World War II, there was a great need for all kinds of food to feed the United States and its allies.

Demand for milk and dairy products was much greater due to higher incomes from wartime employment and military purchases of large volumes of products. Exports of cheese, butter, canned milk, and dried milk jumped manyfold in the war years. To meet this demand, producers of many products, including milk, were strongly encouraged to increase production through a number of devices. Milk production was encouraged through guaranteed higher prices to producers. Under wartime price controls, prices to consumers were kept down by paying subsidies to processors to offset the higher prices they had to pay for milk—a major shift from efforts to raise producer prices during the Depression.

The Agricultural Act of 1949 established a permanent milk price support program following a period of piecemeal extensions of wartime and earlier programs. Milk marketing orders, which applied only to fluid grade milk, were continued under the authority of the 1937 Act. Over the next 50 years, there were many changes in the way these marketing orders were applied as technical and economic developments greatly changed the way milk was produced, processed, and marketed.

The most recent Federal agricultural legislation (or Farm Act) in 1996 called for dramatic changes in Federal dairy policies and programs. The milk price support program as it had traditionally been operated was to be eliminated as of January 1, 2000, and the Federal milk marketing order system was to be “reformed.” Late in 1999, Congress passed legislation bearing on these two policy objectives that are noted in the appropriate sections.

While Federal policies and programs were changing over time, State-level public policies and market pricing institutions also evolved. Some of these changes have been the result of reduced Federal intervention in or regulation of the dairy industry.

Public Pricing Institutions

Federal and State milk marketing orders have influenced farm milk prices since the 1930's. Milk price support was a wartime program that became embodied in Federal legislation in 1949. The 1996 Act brought a new public pricing institution into being—a multi-State pricing organization, the Northeast Interstate Dairy Compact. The programs described in this section are separate—they have different primary objectives so that when we talk about price regulations or mecha-

Methods of Pricing Milk

Milk was priced, like most liquids, on the basis of simple volume until the very late 19th century. However, anyone making dairy products knew that milk was far from uniform. The composition of milk varied by producer, individual cow, stage of lactation, season, and other less explainable factors. Even today, some milk can easily contain twice as much fat as some other milk. The Babcock test, developed in 1890, was a simple, fast, and accurate way of measuring the milkfat content of milk. It fairly directly established the amount of cream or butter that could be produced from milk and also provided a fairly accurate means of predicting cheese yields. The Babcock test revolutionized milk pricing and was rapidly adopted by plants buying milk.

As the commercial dairy industry developed, measurement of the quantity of milk shifted from a volume basis to weight because accurate determination of weight was generally easier. The use of the Babcock test and the change to weighing milk led to the milk pricing method that would dominate throughout most of the 20th century: dollars per 100 pounds, adjusted for milkfat content with a butterfat differential. Another pricing method, dollars per pound of milkfat has been used for cream and was sometimes used for milk. It never was a satisfactory pricing method for many uses of milk and fell entirely out of favor as skim solids became more valuable.

The intent of the butterfat differential is to represent the difference in value between milkfat and an equal weight of skim milk. The differential results in prices that reflect the difference in value of milk with different milkfat contents, whether that milkfat content differs naturally or because cream has been added or removed. (The differential should always be positive as long as approximately 10 pounds of butter has greater value than a gallon of skim milk.) Milkfat pricing dramatically improved pricing efficiency and, as a side effect, reduced the incentive to adulterate milk by adding water.

Prices often are quoted at a standard of 3.5-percent milkfat. The standard is largely arbitrary but is approximately the seasonal low for the average fat test of all milk. If the 3.5-percent fat price is \$12.00 per hundred weight (cwt) and the butterfat differential is 13.5 cents, a producer delivering milk testing 3.70-percent fat would receive a price of \$12.00 plus 2 times \$0.135—or \$12.27 per cwt. Milkfat is not the only milk component that varies to an economically significant degree. For example, the amount of casein has a sizable effect on cheese yield.

In recent years, various pricing methods have emerged that recognize differences in value due to milk components other than just fat. Some have tried to determine a value for each component in 100 pounds of milk with the milk price being the sum of the values, or used differentials or bonuses for protein or total solids other than fat. Alternatively, some cheese plants have paid prices based on the predicted cheese yield from the milk, including quality factors other than milk composition, such as somatic cell count.

Reflecting differences in values of skim solids in milk prices is difficult because individual components can have much different values in different uses of milk. And, the level of skim solids components is difficult (and often illegal) to adjust for specific uses. It is therefore difficult to say which pricing method(s) will become the new norm. Pricing per pound of each component seems to be the most popular concept at this time. In any case, some form of multiple component pricing would seem inevitable.

Courtesy of Jim Miller, ERS economist.

nisms, they are not the same across programs. On the other hand, each program is not implemented or altered in a vacuum, and there have been and still are linkages between them.

Price Supports, 1949-Present

Although it was not the first Federal dairy policy to be enacted, milk price supports have been the backbone of the pricing system for milk and dairy products for some 50 years. The way that the support price level was determined has changed over the years and, since the early 1990's, support prices have been well below market prices so as to have little more than a psychological effect. The price support purchase program was to be terminated at the end of 1999, but Congress extended the program for 2 more years through December 31, 2001.

The support price underpinned the entire price structure for bulk milk sold by farmers either directly to processors or through cooperatives. The support price was determined annually under provisions of the Agricultural Act of 1949, as amended by succeeding farm acts. USDA's Commodity Credit Corporation (CCC) stood ready to buy as much butter, nonfat dry milk, and Cheddar cheese as manufacturers wanted to sell at specified support purchase prices. These prices were calculated to assure that farmers received at least the announced milk support price. The price support program thus directly provided a floor under wholesale milk product prices and the price of milk used to manufacture these products, and indirectly provided price support for all milk in all uses.

In the past, milk price support purchases made by the CCC removed significant milk surpluses from the market. However, since the 1990's, purchases have declined dramatically with only nonfat dry milk being acquired in significant amounts. Cheese prices have been near support levels in 2000 and, while no CCC purchases have been made, it is likely that the support price has been sustaining the market price. In lieu of the former open-ended offer to buy cheese, butter, and nonfat dry milk at stated prices and then donating the products to domestic and foreign food aid programs, the Dairy Export Incentive Program (DEIP) is now the major surplus-removal program. It uses CCC funds to subsidize exports of targeted dairy products to targeted overseas markets, up to a specified quantity. The United States has committed itself under multilateral

trade agreements to limiting and then reducing all subsidized exports.

Until the 1996 Act, interest in developing alternatives to the support purchase program was minimal or nonexistent. Making modifications to the existing program was a different story. Changing the relative prices of purchased products, the products to be purchased, and the pricing standard have all had proponents. So, too, has establishing some sort of production control program. A major change in the pricing standard was made in 1981 when parity (see Glossary) was replaced as the standard; a price related to milk surpluses and CCC costs was offered in its place.

The movement away from parity pricing removed the flexibility the Secretary of Agriculture had in setting the support price (it was possible to set the price in a range from 75 to 90 percent of parity). Since 1981, support prices have been written into legislation, making them somewhat harder to adjust in a timely manner. The 1996 Act established an incrementally downward movement in the support price from \$10.35 per hundredweight (cwt) in 1996 to \$9.90 per cwt in 1999. There is no particular economic foundation for this process—an initial price existed and a final price was desired at the end of a specific time period. The two extensions of the program were at the \$9.90 per cwt level.

Import Policies as Safeguards

The milk price support program maintained prices of dairy products above international market levels. The prices of manufactured dairy products in international trade—primarily butter, cheeses, and dry milk powders—have been low compared with the domestic prices in producing countries since World War II. European dairy industries made (and still make) extensive use of subsidies to export dairy products. In such circumstances, import controls were seen as a means of preventing the flooding of the U.S. market with foreign products.

Import quotas on dairy and other agricultural products were authorized by Section 22 of the Agricultural Adjustment Act of 1933, as amended. Quotas would be imposed when it was determined that the imports threatened the operation of the commodity price support programs. Such quotas were first imposed on dairy products in 1951 under emergency legislation. Higher supported milk prices in the United States

could induce some other countries where prices were lower to ship large quantities of dairy products to the United States. Were that to happen, the U.S. Government would be subsidizing milk production and processing (including manufacturing) abroad through the domestic price support program. The supplies of imported dairy products would drive the prices of those products in U.S. markets below the support purchase price levels. Each further shipload of imported product would replace U.S.-produced product in the market that would then be offered for sale to CCC. Potentially even greater imports could occur when the exporting countries also subsidized exports.

The United States has participated in multilateral trade negotiations over the years under the General Agreement on Tariffs and Trade (GATT). The GATT came into being in 1947 and continued in existence until it was superseded by the World Trade Organization (WTO) in 1994 during the Uruguay Round (the last round) of GATT. The agreement provided a code of conduct and a framework for periodic multilateral trade negotiations—a function no different for the WTO. But the WTO is different in at least two important ways. First, agricultural trade is now expressly subjected to specific rules. Second, greater powers for adjudicating trade disputes brought before it by member nations have been granted to the organization.

The Uruguay Round brought agricultural trade issues to the forefront, as had no previous round. Signatory nations embraced the conversion of non-tariff trade protections to tariff-based systems. To meet that obligation in the case of dairy, a tariff-rate quota (TRQ) system replaced the section 22 dairy import quotas on January 1, 1995. The TRQ system is a two-tier tariff system with a low-tier tariff rate applied to imports up to a specified quantity and a high-tier rate applying to any import quantity in excess of the specified level. The TRQ rates and quantities vary by product. Another objective of the Uruguay Round was increasing import access, which could be accomplished by reducing high-tier tariff rates, increasing the quantities subject to the low-tier rates, or a combination of the two during the implementation period (1995-2000) of the agreement, and beyond.

The United States also concluded the North American Free Trade Agreement (NAFTA) covering trade among Canada, Mexico, and the United States. The agreement was signed late in 1993 and its provisions went into

effect January 1, 1994. The NAFTA dairy provisions are laid out in a set of bilateral agreements. Inclusion of more countries in NAFTA and preparations for the next round of multilateral trade negotiations under WTO are current issues which are likely to have a bearing on future U.S. dairy trade. Changes of import policies to date have altered the method of establishing border protection, not the intent of shielding the U.S. dairy industry, to some degree, from international dairy market influences.

Federal Milk Marketing Orders, 1937-Present

Federal milk marketing orders are concerned primarily with orderly marketing of raw fluid-grade milk from the producer to the processor. Legal and technical language makes them complex. Classified pricing and pooling are the two key elements of the orders. As required by the Federal Agriculture Improvement and Reform Act of 1996, Federal milk marketing orders were changed in 1999 in some fundamental ways. Attempts to simplify order issues can always be criticized in some quarter or another but that does not imply that such attempts should be abandoned. One approach for addressing milk marketing orders is to lay out in general terms what they, as legal instruments, can (could) and cannot (could not) “do.”

What They Do Promoting orderly marketing is a fundamental objective of Federal milk marketing orders. To reach that goal, pricing rules that move milk smoothly from the farm to processors then on to consumers in desired quantities at the desired times are defined. A major function of Federal milk marketing orders is setting minimum prices for raw fluid-grade milk that regulated handlers, often processors, must pay to dairy farmers (usually through dairy cooperatives). Three key facets of orders are sometimes lost in discussions of them:

- 1) The prices set are minimums—market conditions can and often do lead to prices higher than the minimums;
- 2) Fluid grade (Grade A) milk is regulated; and
- 3) First handlers (processors or manufacturers) are regulated—the prices are set at the plant where milk is sold, not at the farm where it is produced.

A classified pricing system exists in the orders based on the end use of the milk sold under them. Over time, the number of classes has varied by order, from at least

2 to 7 or 8. Class I use has been defined as the milk going into beverage milk products. The other classes have represented aggregated or disaggregated uses for other products which have varied at times. The minimum prices to be paid for milk used in each class are specified in each order. Underlying the entire classified pricing system is the linkage between class prices and the wholesale prices of manufactured dairy products.

The minimum price received by the farmers or their cooperative from the regulated handler is not any one of the class prices; rather, it is what is called the uniform or “blend” price. The blend price is a weighted average of the class prices, with the weights being the utilization (percent) of milk in each class in the specific market. Marketing orders provide the legal authority for auditing regulated handlers to determine how their milk is used and to make sure that they are paying the appropriate minimum class price. The auditing authority also results in other valuable market information such as “test” weights and sales of the different types of beverage milks, e.g., whole and lowfat. Under this system, each milk producer supplying the regulated handlers in an order receives a price based on both the higher priced fluid market and the lower priced other product markets in that order.

The prices established by orders are computed on a pre-determined schedule designed to reflect the dynamic nature of milk supplies and demand. We will return to the question of setting prices in the section describing the reformed Federal milk marketing orders called for in the 1996 farm legislation. First, we consider the other half of order basics.

What They Don't Do Orders do not do anything that is not related to setting minimum prices at the handler level and determining that the regulated handlers pay at least the minimum blend prices to producers.

First, orders do not directly restrict the individual production or marketings of milk producers. The orders do not regulate producers at all. In a similar vein, the orders do not guarantee a market for an individual producer's milk with any regulated handler. These statements do not imply that the Federal milk marketing orders do not have some influence on these activities. Second, the regulated handlers are only regulated as to the minimum prices they pay—how they use the milk they receive is up to them. Handlers respond to known or anticipated purchases by their customers for fluid

milk, which generally has first call, and then use the remainder either for balancing or for storable manufactured products. Thus, Federal orders do not guarantee a fixed price to producers, not even a fixed minimum blend price. The fact that utilization can change for regulated handlers precludes such a guarantee.

In earlier times, numerous barriers to milk movement arose due to the actions of State and local health authorities that established sanitary regulations, product specifications, and other rules. Such regulations effectively protected local producers from competition. Legal and legislative actions have eliminated the ability of such regulations to restrict milk movements by establishing uniform regulations and specifications. Federal milk marketing orders do not restrict milk shipments from other Federal orders, although the order prices undoubtedly have some effects—handlers and cooperatives control milk movements, from producers to processors, among processors and manufacturers, and from one geographic area to another.

Finally, the Federal milk marketing orders do not set wholesale or retail milk and dairy product prices. Wholesalers and retailers react to the demands placed upon them by their customers and to internal business decisions with regard to pricing. However, some State-level laws regulate prices at the two levels.

Federal Order Reform

The 1996 Act required that the number of Federal milk marketing orders be reduced from the 33 then in existence to no less than 10 nor more than 14, including one for California if that State's producers decided to switch from their State pricing system to the Federal system. The act also gave the Secretary of Agriculture authority to examine pricing provisions. After reviewing proposals made by many groups and individuals, USDA published a proposed rule in winter 1998. The proposed final rule was published April 2, 1999, in the *Federal Register* with a target date of October 1, 1999, for implementation. Congress stepped in to modify the USDA plan, and that congressionally modified plan was implemented January 1, 2000.

All facets of the Federal milk marketing orders are covered by the modified USDA rules with emphasis on four components:

- 1) Consolidation—there are now 11 Federal milk marketing orders, reduced from 31 in 1999 (two orders

had been discontinued since 1996). California has maintained its State programs (fig. 2).

- 2) Classified Pricing—the number of classes and the manner in which class prices are determined is changed or, in the case of Class III and Class IV, to be reconsidered, as are the levels. The new orders have four classes and the Class I and Class II prices are determined by adding differentials to the “Class I price mover.”
- 3) Basic Formula Price (BFP)—the BFP is replaced by a “new” Class I price mover determined by multiple component pricing formulas which retain the link between milk used for fluid products and the milk used for manufactured dairy products. The new Class I price mover is the higher of the Class III or Class IV prices.
- 4) Classification and Identical Provisions—terms, definitions, and provisions applicable in all orders are streamlined and provisions related to the classification of products are made uniform.

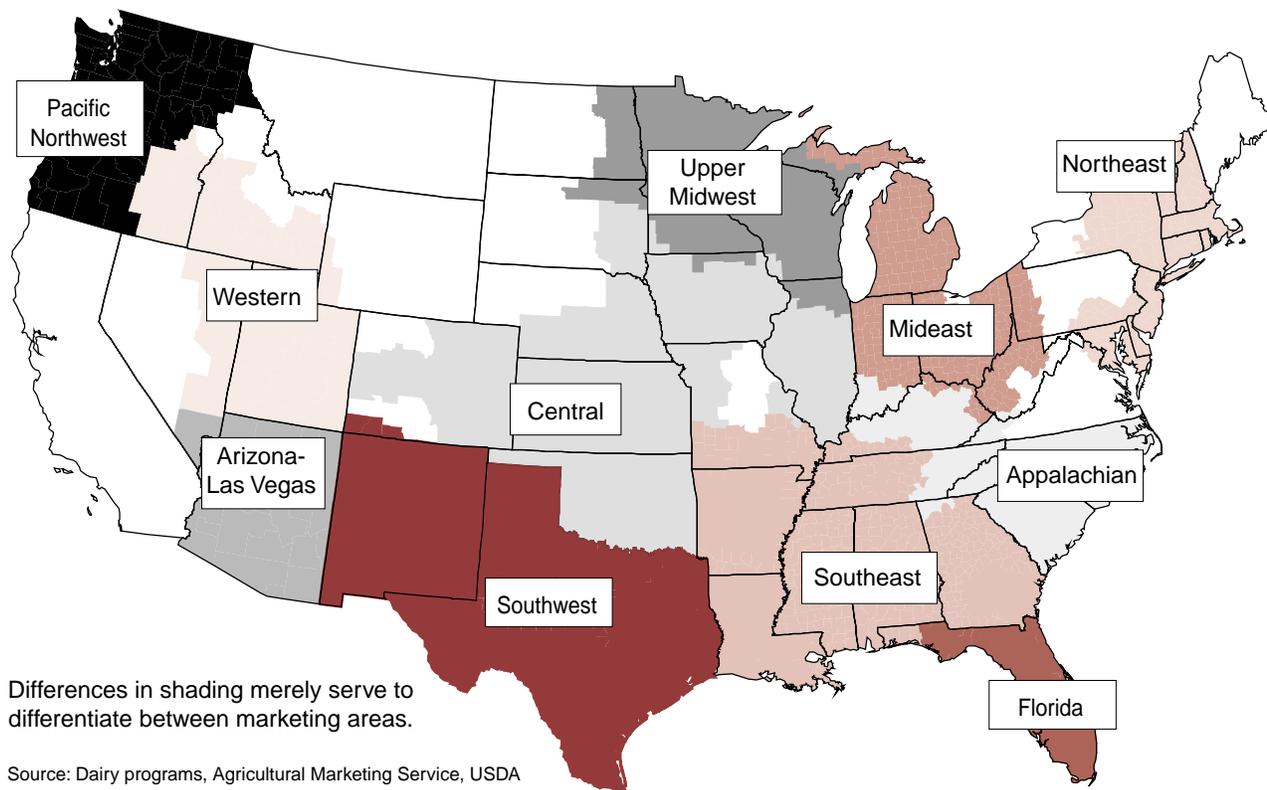
The concept of a price mover (noted above in 2 and 3) needs to be developed more fully. It is this price that

links the milk price support program to the Federal milk marketing orders so that changes in one program are reflected in the other. This price mover was chosen to reflect prices in unregulated milk markets and align the unregulated and the regulated markets. This link represents a fine point that is sometimes lost in the debates concerning public dairy policies and programs—the public programs were not intended to replace unregulated market price determinations but to work along with them.

From 1968 to about the middle of 1995, the mover was the M-W (or a modified version of it) price—the price of manufacturing grade milk in Minnesota and Wisconsin, where most of the manufacturing grade milk was produced. Early in the 1990’s, USDA decided that the M-W should be replaced. The most common argument put forward for replacing the M-W rested on the relatively small and declining volume of milk being used to compute the price (the thin market argument).

The Basic Formula Price (BFP) was introduced in 1995 as a temporary replacement for the M-W (which

Figure 2
Federal milk marketing order areas, January 1, 2000



was still being made available) to determine the minimum Class III price regulated handlers would be required to pay. It used the prices of butter, cheese, and nonfat dry milk in formulas to adjust the M-W price. Figure 3 shows the linkage between the milk price support program and the Federal milk marketing orders as they were defined on January 1, 2000. The formulas that are used to determine the class prices now incorporate component prices. The use of component pricing is not “new”—it had been used in some of the previously existing 31 orders. Under the new 11 orders, more milk came under such pricing. Under the old rules, Class I and Class II prices were determined by adding differentials to the BFP (which was the Class III price); the current method is much changed (Appendix A).

The reform of the Federal marketing order system has been characterized as a move toward a more market-oriented dairy industry. However, the basic purpose of the system is unchanged—to provide orderly market conditions so that producers are assured of stable markets and consumers have an adequate supply of milk and dairy products. To that end, the minimum prices that handlers must pay will continue to be established using a classified pricing system that incorporates national market prices for dairy products and recognizes the higher costs associated with supplying fluid milk markets.

Compacts

The 1996 Act brought to the national stage a concept that had been under discussion in the Northeast for many years—an interstate compact for dairy market regulation. Congress granted its consent to the formation of the Northeast Interstate Dairy Compact (the Compact) in the 1996 Act to include six States—Maine, New Hampshire, Vermont, Massachusetts, Connecticut, and Rhode Island, if certain conditions were met. The conditions included a finding of “compelling public interest” by the Secretary of Agriculture, which was issued in August 1996.

The proponents of the Compact argued that regulatory authority over the dairy marketplace in the New England States needed to be restored to the six States, acting together. This is a key fact—the compact gave the States powers to regulate a commodity that was moving in interstate commerce. States are not permitted this role unless granted the authority by Congress. The possibility that other States might join the

Compact existed, but has not yet happened. A Compact Commission established to implement the Compact pricing authority met for the first time in September 1996.

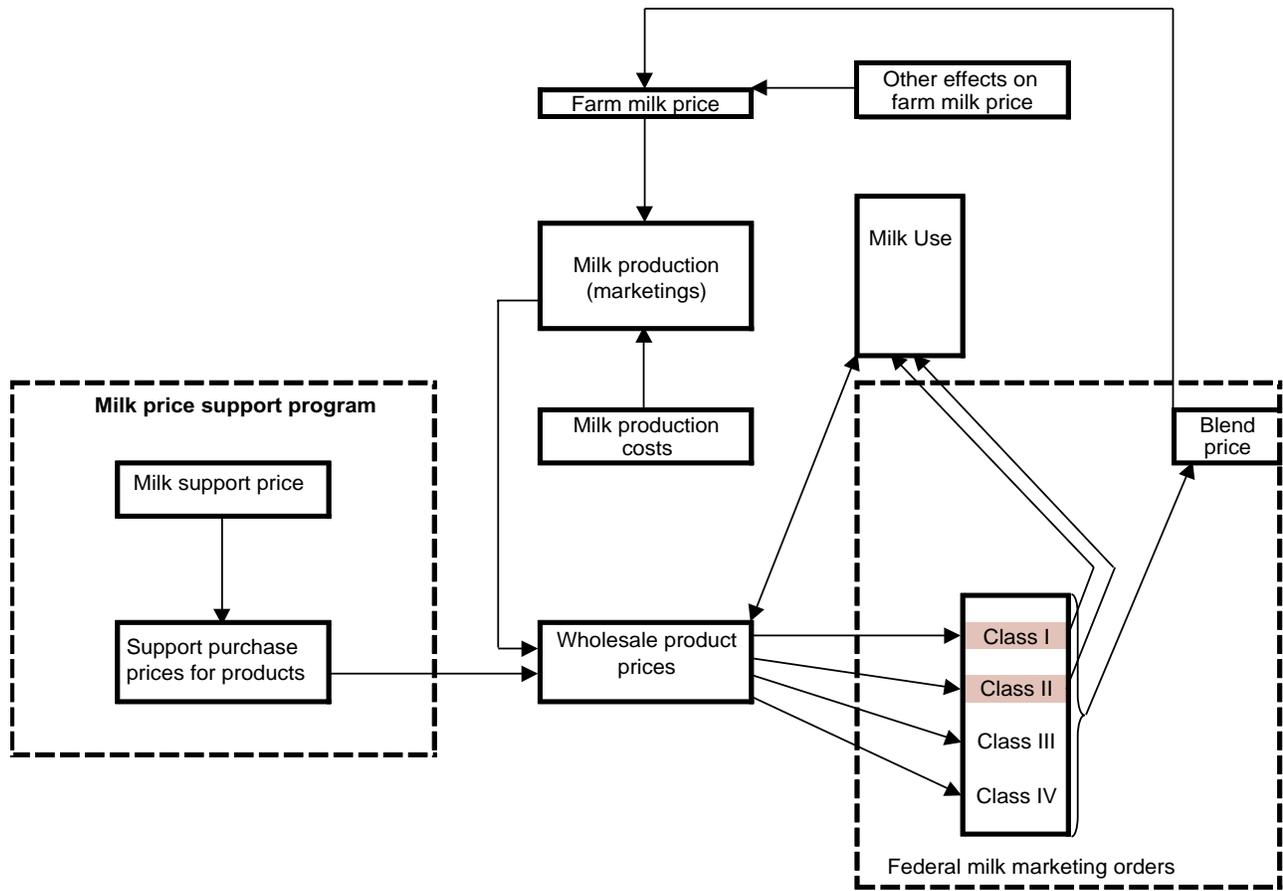
The Compact Commission regulates only the farm price of Class I milk. Through formal rule-making, the Commission arrived at a Compact over-order Class I price of \$16.94 per cwt that was set in July 1997 and has been unchanged since. Compact pricing was to work in conjunction with Federal milk pricing in the region. The 1996 Farm Act originally linked the duration of the Compact to the implementation of the Federal milk marketing reform.

Compact-regulated handlers are obligated to pay the \$16.94 per cwt minimum Class I price. If the Federal minimum Class I price in the Compact area is \$16.94 or above, the producer price is calculated using the Federal order procedures. When the minimum Class I price in the Compact area is below \$16.94, a two-step price calculation occurs. First, the Federal order price is calculated using the minimum Class I price. Second, an “over-order” obligation per cwt is defined as the difference between \$16.94 and the minimum Class I price. Each regulated handler pays an amount into a pool operated by the Compact Commission equal to the over-order obligation multiplied by Class I sales. Under the terms of the Compact, monies are set aside to meet certain requirements, for example, to reimburse CCC if there are increases in production in the Compact area that wind up as CCC product purchases. The balance of the pool proceeds (in dollars) is then divided by the total pounds of producer milk in the region to determine what is called the Compact producer price. All producers supplying the Compact area, including those outside it, receive the Compact producer price (per cwt) payment in addition to the price calculated on the basis of the Federal order pricing rules. To reiterate, the price received by the producer consists of two parts when the Compact over-order obligation is present. Detailed information on the Compact and how it operates may be found on its web site—the address is included in the list of information sources.

The Compact has proven to be a lightning rod for regional conflict in the industry. Over 20 legislatures in the South and elsewhere have passed enabling legislation to join future compacts, if the opportunity arises. Southern dairy farmers have been particularly vocifer-

Figure 3

Linkages between the milk price support program and the Federal milk marketing orders



Source: Economic Research Service, USDA.

ous in calling for approval of a compact in that region. Whether the political environment will ever allow consideration of dairy compacts again is questionable, especially since there is resistance to “reopening” farm legislation before 2002. Even so, the enthusiasm for establishing compacts has not weakened.

The Congress added to the debate by extending the life of the Northeast Compact by 2 years, but not authorizing any others. The extension of the Northeast Compact essentially broke the link between the life of the Compact and the implementation of Federal order reform that had been written in the 1996 Act. Debates about the Compact have tended to be waged outside the order reform question.

State Regulations

The authority to regulate intrastate milk markets was denied to the Federal government in court decisions early in the New Deal period. These court decisions

led the States to make efforts to assist dairy farmers suffering economic hardships at the time by implementing State milk controls, a power they clearly enjoyed. Some States went beyond producer price regulation to regulate wholesale and retail dairy prices as well. Both direct and indirect regulation was applied to wholesale and retail prices.

Many States fixed prices at the producer, wholesale, and retail levels during the Depression. State regulation has declined in recent years but many of the States retain the authority to control milk markets. State regulations are important from a national perspective because of which States do control milk prices. California (discussed in a following section) and Pennsylvania, two of the top five producing States in 1999, are the prime examples.

Producer Prices

About three-quarters of the 50 States have tried producer price regulation at some time since 1933. Various methods have been used to establish the price:

- Direct relationships to measures of cost of production or changes in those costs,
- Connections to prices in nearby Federal milk marketing orders,
- Economic formulas, and
- Hearing processes where all interested parties, producers, processors, and consumer groups, present their cases and some price is recommended and ultimately approved or not. When a recommendation is not approved, more hearings may be called.

Some recent State legislative attempts to regulate prices arose from dissatisfaction with the system in place. Many of those attempts were overturned in the courts. While not setting prices, several States have established producer security trust funds to provide compensation to farmers should their milk handlers go bankrupt without payment to them. California has gone further. Under an exception granted in the 1996 Act, that State has set composition standards for beverage milk at higher levels than Federal standards, an action that has been challenged.

Consumer Level

Several States regulate either the wholesale or the retail prices of fluid milk products, or both. States differ in the regulation of resale prices—some set minimum prices, some set maximum prices, and some set both minimums and maximums. For example, Pennsylvania essentially sets minimums at every market level for milk produced and marketed in the State. Minimum prices are set at a stop-loss level (conditions based on the estimated average cost of production), and market prices are generally above them. Other States, such as Nevada, set prices that retailers must pay for milk, but do not restrict the price the retailer charges consumers. State milk pricing regulations are much less prevalent than they used to be.

There are many reasons for maintaining resale price control of milk—not the least of which is the desire to retain the backing of handlers for control at the producer level by giving them guaranteed margins. From a public policy standpoint, however, the primary argument is that retail pricing is inherently unstable and

frequently leads to destructive price wars. The changing structure of the milk production and marketing sectors along with the accompanying change in the nature of the pricing process have substantially weakened this argument.

Under the typical milk marketing system of the 1950's, handlers provided full service to retail stores, including pricing milk and milk products, display case arrangement, and daily delivery. A typical store had two to six brands of milk, each serviced by a different handler. In practice, the handlers effectively determined prices, and the store received a fixed margin. While the handler did not have absolute control over prices, as did a gasoline company in its leased stations, the control was still strong. If one handler reduced retail prices, other handlers with milk in the same store were under strong pressure to follow.

In the present market, retailers generally exert a stronger control over pricing. Larger chain stores often have their own bottling and distribution plants. There is typically no more than one brand per store in addition to private label, and often there is only private label. Also, chain stores purchase for a large number of stores at the division level rather than at the local level. Under these circumstances, resale price control no longer serves the function it once did.

Most States with resale price-fixing authority, and many without, have authority to regulate trade practices. State trade practice laws usually prohibit all or most of the following: free merchandise, unreasonable extension of credit, secret rebates and discounts, free signs, unearned advertising allowances, loaning of money, free equipment, free repairs and services, sales below cost at the wholesale or retail level, price discrimination, and purchase price discrimination. Also, several States require a minimum markup, particularly by retailers, while others require that prices be filed with the State agency. By prohibiting many forms of nonprice competition, such as those listed above, there is some tendency to force competition more strongly into the price arena.

California Milk Pricing

Like milk markets everywhere, the markets in California were in disarray as the full weight of the Depression was felt. Californians first looked to the Federal Government for assistance. Based on the Agricultural Adjustment Act of 1933, the Federal

Government issued milk marketing agreements for Los Angeles, Alameda County, and San Diego in November and December of 1933, with expectations to do likewise in other markets. The courts declared Federal regulation of a local market illegal because no interstate commerce was involved and the Los Angeles and other agreements were terminated in 1934. In view of this problem with the Federal regulation, milk producers and distributors in California moved to draft and secure passage of State laws.

Producer price regulation was contained in the Young Act of 1935. The legislation designated a third party, the Director of Agriculture, to establish minimum prices to be paid for fluid milk and cream to producers by distributors. Three “standards” were to be considered in establishing the price:

- 1) A reasonable and sound economic relationship with the price of manufacturing grade milk,
- 2) Current and prospective supply and demand relationships for fluid milk, and
- 3) Assuring an adequate, continuous supply of pure, wholesome milk to consumers at fair and reasonable prices.

A classified pricing system with Class 1 milk for beverage use was the foundation of the minimum price. The 1935 law did not require pooling, so producers with contracts serving high Class 1 utilization distributors had a great advantage. It was not until the 1950’s and 1960’s that action was taken to address disparate prices paid to producers for milk that was essentially the same compositionally. The Gonsalves Milk Pooling Act of 1967 established the mechanisms for pooling and allocating revenues among California producers that are in effect today.

Unlike Federal milk marketing orders, which came to use component pricing recently, California regulations have recognized values for butterfat and solids-not-fat (SNF) for many years. Under today’s system of five classes, Classes 2, 3, 4a, and 4b are priced on the basis of fat and SNF through product price formulas. Class 1 milk has an added component, the fluid carrier (water) which is given a small value. California producers also have a system of quotas that are incorporated into their pricing plan, the quota being for “market” milk or fluid grade. Quota can be bought and sold, and it may be increased by the State if necessary.

Resale price regulation in California is authorized under a separate law, the Desmond Act, drafted in late 1936 and enacted in September 1937. The law gave the California Director of Agriculture the authority to establish minimum wholesale and retail prices for fluid milk and cream throughout the State for all wholesale sales to stores and restaurants, retail store prices, and home delivery prices. Price cutting and secret rebates between distributors and retail stores were the primary targets of the regulations. As the Desmond Act became operational, some sellers attempted to circumvent its rules. One approach was to discount other dairy products’ (other than fluid and cream products) prices. This practice led to further regulation of trade practices to eliminate such indirect price-cutting.

The California pricing system has been operating since the 1930’s on the set of rules that were written at the time, with alterations to adapt the laws to changing economic developments. In recent years, as Federal milk marketing orders have come under increasing pressures for change, so too has the California system. Even though two pricing systems are operating, there are attempts to reduce friction between them. For example, California law requires that the Class 1 price in the State be aligned with the Class I prices in adjacent Federal milk marketing orders.

Nongovernment (Market) Pricing Institutions

As noted earlier, not all of the pricing institutions for milk are based on public policy decisions. The long-standing cooperative presence in the dairy industry has played a major part in pricing. The development of milk and dairy product futures markets has provided milk producers another way to address their concerns about price movements and risk management issues.

The Role of Cooperatives

Dairy cooperatives broadened the scope of their operations in the 1970’s when they became regional rather than local organizations. Mergers, consolidations, and acquisitions are again altering the structure of dairy cooperatives today—some have “gone national.” Each cooperative has chosen its own particular approach to the question of how, if at all, to restructure.

Regardless of their size, the roles of the dairy cooperatives in both regulated and unregulated milk markets have changed. The cooperatives still represent member interests in the rulemaking processes of Federal- and

State-regulated markets, which can include minimum price issues. But other roles have become more prominent and claimed more of the public's attention. In 1997, dairy cooperatives sold 61 percent of the milk they handled as raw milk to buyers; the remainder was processed or manufactured in cooperative plants.

In many cases, the cooperatives have assumed operation of a complete milk procurement and distribution system. Assembling milk from the farm, routing raw milk where it is needed, managing or coordinating movements of processed or manufactured products, and managing surplus milk, defined for our purposes as supplies above fluid requirements, are all parts of the system. Taken together, these activities are called "balancing."

Procuring and coordinating a fluctuating supply to meet varying demands is costly to individual handlers. A full-supply arrangement with a cooperative can reduce the cost. Cooperatives supply the exact needs of the handler for fluid use and/or ice cream and cottage cheese production and manage the remaining milk for other uses. Full-supply arrangements do not eliminate fluctuations, but they do provide a relatively simple, routine way of balancing supply and demand with minimum effort or expense to the processor.

Cooperatives can achieve significant economies of scale by coordinating supplies with demands using full-supply arrangements and can reduce the uncertainties for handlers, fluid milk processors, and dairy product manufacturers. The reserve supplies that must be carried to meet the fluctuating demands of an entire market are smaller and less variable for a cooperative servicing the entire market than the sum of individual fluid handler reserves. A single agent moving milk between producers and users and among the users is more efficient also. Savings from a centralized supply and surplus management operation can be shared among the cooperatives providing the services and the fluid milk processors.

Full-supply agreements are not always a plus for the cooperatives. If members cannot produce enough milk to meet commitments that have been made, the cooperative may have to buy milk from sources in other Federal milk marketing orders, sometimes at a substantial premium, to make up the shortage. This ultimately is an added cost to the cooperative that its producer members absorb. The economies of scale that

cooperatives can achieve by adopting a full-supply arrangement can be large enough so that both cooperatives and handlers benefit, but there are instances where this is not the case. One example is the high utilization markets of the Southeast—the cooperative may have to purchase milk at unattractive prices to meet commitments under full-supply contracts.

Cooperatives have influenced price making in the regulated milk markets. Changes in the bargaining relationships in the procurement markets and centralized management of milk movements have meant lower operating costs for cooperatives. The resulting environment has fostered cooperatives' ability to bargain for and obtain payments above the minimum prices established in Federal milk marketing orders to help defray some of the costs of servicing those markets. These "over-order" payments were paid in nearly all Federal orders in recent years. The over-order payment is reflected in the price to members only of the cooperative that obtained it.

Futures and Options Contracts

Many commodities, including agricultural ones such as live cattle and hogs, are being priced at least partially on the basis of futures contracts. The advent of futures and options contracts for Cheddar cheese, butter, non-fat dry milk, and raw fluid milk was seen by some as the prelude to a new era in milk pricing. Were they to be widely used, futures and options contracts could be used to manage price instability.

In June 1993, Cheddar cheese and nonfat dry milk futures and options contracts were introduced on the Coffee, Sugar, and Cocoa Exchange (CSCE, now known as the New York Board of Trade). Previously, only butter futures had existed on the Chicago Mercantile Exchange (CME) since 1919, but they were used to a great degree only in the late 1940's and early 1950's. Interest in butter futures was low since the milk price support program, with its product purchases, greatly limited downside price risk for milk and its products. Why would anyone be interested in managing butter price risk when there was so little?

Times have clearly changed with respect to the price risk situation. As the role of the price support program as a floor under prices has been reduced, milk price volatility has increased. In the current price environment, one would expect a growing interest in risk management tools such as futures and options, but to

date one must conclude that the high hopes for dairy product futures and options contracts have been unmet. The manufactured product contracts never really took off, nor did the markets gain the broad liquidity that characterizes other successful futures and options markets. The BFP (Basic Formula Price) futures were more successful, and, if a futures market develops that represents the new Class I mover, either the Class III or Class IV price, it too could be viable.

The Commodity Futures Trading Commission approved a Grade A milk futures and options contract in October 1995 that proved difficult to understand. A BFP futures and options contract was begun on the CME in 1997 that reached a market milestone in March 1999 as open interest in it surpassed 5,000 contracts. The open interest indicates participation has grown to levels that are likely to make the contract a viable one. As long as there is price volatility in cash markets for milk and dairy products, the dairy industry will continue to evaluate futures and options contracts for price risk management. Both Class III and Class IV futures and options contracts began trading on the CME in the first half of 2000.

In January of 1999, USDA started the Dairy Option Pilot Program (DOPP) to introduce milk producers to the futures and options approach for managing risks. DOPP is a cost-sharing program that allows dairy farmers, meeting certain requirements, to gain hands-on experience with options trading for a period of 6 to 8 months. USDA pays 80 percent of the premium (or cost) of each option and broker fees up to \$30 per option—the farmer is responsible for the other 20 percent of the premium or cost. The first farmers in the DOPP program were located in designated counties in California, Minnesota, New York, Pennsylvania, Texas, Vermont, and Wisconsin.

In July 1999, the Secretary of Agriculture announced a “second round” of the DOPP that expanded the program in the original 7 States by adding 12 more counties and extending the program to an additional 49 counties in 25 other States. Almost 1,700 put options were purchased by the 425 producers who participated in the first round of the program. The put option gave the producers the right, but not the obligation, to sell a futures contract, thereby establishing a price floor for their milk. This hedging alternative can protect producer income in the event market prices fall below the put option price. If market prices exceed the put option price, the option can expire unused. Further program expansion to 300 counties was included in legislation signed by President Clinton in June 2000.

The development of the dairy futures and options contracts has given milk producers an opportunity to negotiate forward price contracts with the buyers of their milk. Congress directed the USDA to establish a pilot program to examine the issues related to forward contracting under Federal orders. In July 2000, the final rules for this pilot program were issued. The Agricultural Marketing Service has provided detailed information and frequently asked questions and answers on its web site (see information sources). Producer risk is not totally eliminated by the forward pricing—producers can lock in a price that ends up being below the prevailing market price in the future period. However, these types of arrangements do remove uncertainty and that can be advantageous for producers as they make decisions about their futures.

The Milk Pricing System in the Future

Economic theory posits that the role of pricing is to balance the supply of a product with the demand for it. We have shown that the pricing system that has evolved for milk in the United States is a complex set of market and public institutions. Many of the pricing arrangements that have arisen can be tied to the unique physical properties of milk. Creating a balance between supply and demand for milk requires establishing and maintaining a balance among the following:

- The need for producer prices to remain high enough to maintain production, but not so high as to encourage surplus production,
- The willingness and ability of consumers to pay for milk and dairy products, and
- The interest of producers, handlers, and the public in the orderly flow of milk and dairy products from producers to consumers.

The milk pricing system has been responsive to changes in the economic and political forces affecting dairy farming. The fact that one can trace the various changes through legislative histories illustrates this facet of the system. There is pressure currently to continue making changes—with the elimination of public pricing institutions as a stated goal of some. Whether that happens remains to be seen but further changes in the system will likely be forthcoming. International trade negotiations carry the potential for further import and export regulations of some significance. The continuing restructuring of dairy cooperatives and proprietary dairy companies (such as Dean Foods and Suiza) has included and will likely continue to include joint ventures that could alter milk pricing relationships. We have used the term “evolved” in several instances in the text; that term will continue to describe the milk pricing system into the future.

Glossary

Bacteria count. A measure of milk quality. There are some organisms capable of surviving milk pasteurization or refrigeration processes. Keeping the level of these organisms low is a quality standard.

Balancing. A service usually provided by dairy cooperatives to tailor milk supplies to each handler in a market to that handler's needs. It involves directing milk movements between farms and handlers' plants and among plants, managing imports from outside the region and stocks, and diverting supplies in excess of handlers' needs to alternative outlets, such as manufacturing plants.

Basic Formula Price (BFP). An adjusted competitive pay price for manufacturing grade milk used as the mover of most Federal milk marketing order class prices from mid-1995 to January 1, 2000. The adjustment to the competitive pay price was a formula based on the month-to-month change in the prices of manufactured dairy products. It also established the current Class III price under the orders.

Blend price. A minimum weighted average price in Federal milk market orders based on the proportion of Grade A milk allocated to each use class. Producers receive the blend price with adjustments for butterfat content and plant location if so specified.

Class I differential. The amount added to the class price mover (see BFP) in a Federal milk marketing order to obtain the given order's minimum Class I price. The same procedure is used in State marketing programs, but the nomenclature might be different.

Classified pricing. A structure of prices that differ according to category of use. In Federal and some State orders, regulated processors are required to pay a minimum price for Grade A milk according to the class in which it is used. States, like California, have price structures analogous to the current Federal milk marketing orders (as of January 1, 2000) that have four classes (uses):

Class I. Grade A milk used in all beverage milks.

Class II. Grade A milk used in fluid cream products, yogurts, or perishable manufactured products (ice cream, cottage cheese, and others).

Class III. Grade A milk used to produce cream cheese and hard manufactured cheese.

Class IV. Grade A milk used to produce butter and any milk in dried form.

Composition (of milk). Milk components are usually defined as fat solids, solids-not-fat (SNF), and fluid carrier (water). The SNF include proteins, minerals, and sugars. Milk pricing can be based on the values of the components and their proportions in producers' milk. This is generally called component pricing.

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).

Dairy Export Incentive Program (DEIP). A program that provides cash bonuses (subsidies) to exporters of U.S. dairy products to sell targeted dairy products in targeted overseas markets. Under recently implemented trade policy agreements, this program is being downsized in terms of both quantities to be exported and expenditures.

Economies of size. Increasing returns as use of factors is expanded in least-cost combinations. A situation where efficiently operated larger firms (farms) are more profitable than efficiently operated smaller firms (farms). The advantage can arise from lower production costs, volume premiums for products (outputs), or volume discounts for inputs. Once an operation reaches a certain size, the marginal cost of producing additional output begins to decline.

Federal milk marketing order. A regulation issued by the Secretary of Agriculture specifying minimum prices and conditions under which regulated milk handlers must operate when selling fluid milk products within a specified geographic area.

Fluid grade (Grade A) milk. Milk produced under sanitary conditions that qualify it for fluid consumption. Only Grade A milk is regulated under Federal milk marketing orders.

Fluid milk. Packaged dairy products used as beverage milks.

Fluid products. A term traditionally used to define the products including beverage milks, fluid cream items, and yogurts.

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

Interstate compact. A formal agreement between or among States, enacted through State and Federal legislation, which allows the combined States to exert authority not granted to them by law.

Manufacturing grade (Grade B) milk. Milk not meeting the fluid grade standards. Less stringent standards generally apply.

Manufacturing milk. Grade B milk or the Grade A milk used in the production of manufactured dairy products.

Manufacturers. Generally refers to the producers of cheese, butter, nonfat dry milk, and other storable dairy products.

Minnesota-Wisconsin (M-W) price. A monthly average price per hundredweight paid by plants for manufacturing grade milk in Minnesota and Wisconsin. The price is obtained from a survey of cheese and butter-powder plants conducted in the two States by USDA's National Agricultural Statistics Service.

Over-order payment. Payment above Federal order minimum prices negotiated between buyers and sellers to cover the cost of providing market services or attracting adequate milk supplies for both fluid and manufacturing uses. Over-order payments also could result from market power or regulation (see Compacts section, p. 10).

Parity price. Originally defined as the price that gives a unit of an agricultural commodity the same purchasing power today as it had in a base period, traditionally 1910-14. In 1948, parity procedures were modified to adjust for changes in relative farm prices between the base period and the most recent 10 years.

Perishable manufactured dairy products. Manufactured dairy products with limited storage life, including ice cream, cottage cheese, and bulk condensed milk.

Pooling. With a classified pricing system such as that used in Federal and State orders, processors pay different prices for milk in each category of use. Producers are paid a weighted average, or "blend," price for all uses of milk in a particular order or market. Processors pay into or draw out of the pool on the basis of their

utilization of milk relative to market average utilization. Producers participating in the pool receive identical uniform blend prices, with adjustments for butterfat content and location of the plant to which the milk is delivered. In markets with multiple component pricing, adjustments also are made for protein and other solids.

Price system (mechanism). An expression referring to the role of prices in a market economy in conveying information and providing incentives.

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

Somatic cell count. A measure of milk quality based on the number of somatic cells that appear in the milk. Somatic means "of or related to the body" so that almost any body cell is included. The number of the white blood cells (infection-fighting cells) is relevant here. High levels of these cells appear in response to inflammations that can be a sign of mastitis. The composition of milk can be influenced by somatic cell counts.

Storable manufactured dairy products. Manufactured dairy products, including butter, nonfat dry milk, and hard cheeses, that can be stored for relatively long periods of time.

Support price for milk. When a support purchase program is in operation, the price of manufacturing grade milk that the Government must ensure is received, on average, by farmers.

Support purchase prices. Announced prices at which the Government will purchase any offered manufactured dairy products meeting its specifications. They are set at levels where plants will pay the support price for milk.

Surplus. The difference between commercial milk supplies and the amount demanded by the market at a given price. CCC net removals (price-support purchases plus DEIP shipments minus domestic sales for unrestricted use) approximate the surplus during a particular period.

Test. Commonly in the phrases "at test" or "test weight," the measure of fat in milk. The predominant method used in the United States is the Babcock test, developed in 1890.

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Appendix A: Federal Milk Marketing Order Price Formulas¹

Note: Milk prices are per 100 pounds or cwt, rounded to the nearest cent. Component prices are per pound, rounded to the nearest one-hundredth cent. Cheese, dry whey, butter, and nonfat dry milk prices are weighted averages of weekly NASS survey prices.

Class I

Class I price = (Class I skim milk price x 0.965) + (Class I butterfat price x 3.5).

Class I skim milk price = Higher of advanced Class III or IV skim milk pricing factors + applicable Class I differential.

Class I butterfat price = Advanced butterfat price + (applicable Class I differential divided by 100).

Note: Advanced pricing factors are computed using applicable price formulas listed below, except that product price averages are for 2 weeks.

Class II

Class II price = (Class II skim milk price x 0.965) + (Class II butterfat price x 3.5).

Class II skim milk price = Advanced Class IV skim milk pricing factor + \$0.70.

Class II butterfat price = Butterfat price + \$0.007.

Class II nonfat solids price = Class II skim milk price divided by 9.

Class III

Class III price = (Class III skim milk price x 0.965) + (butterfat price x 3.5).

Class III skim milk price = (protein price x 3.1) + (other solids price x 5.9).

Protein price (true protein) = ((cheese price – 0.165) x 1.405) + (((cheese price - 0.165) x 1.582) – butterfat price) x 1.28).

Other solids price = (dry whey price – 0.140) divided by 0.968, snubbed at zero.

Butterfat price = (butter price – 0.115) divided by 0.82.

Class IV

Class IV price = (Class IV skim milk price x 0.965) + (butterfat price x 3.5).

Class IV skim milk price = nonfat solids price x 9.

Nonfat solids price = (nonfat dry milk price – 0.140).

Butterfat price = See Class III.

Producer Prices:

Butterfat price = See Class III.

Protein price = See Class III.

Other solids price = See Class III.

Somatic cell adjustment rate = cheese price x 0.0005, rounded to fifth decimal place. Rate is per 1,000 somatic cell count difference from 350,000.

¹Formulas have been modified by a tentative decision that took effect January 1, 2001. However, the Agricultural Marketing Service (AMS) accepted comments on the changes until early February. Further changes may be made based on those comments. Further details of the tentative decision can be found on the AMS Dairy Program web site, <http://www.ams.usda.gov/dairy/index.htm>.