AN OVERVIEW OF FACTORS DETERMINING HOW MILK IS PRICED AT THE FARM

Introduction

The price farmers receive for raw (unprocessed, unpasteurized) milk is largely determined by supply and demand forces that are influenced by federal and state dairy programs. Prior to January 2000, class prices under Federal Orders (FOs) were calculated from competitive pay prices for Grade "B" milk in Minnesota and Wisconsin. Currently, product price formulas are in place which set the price for milk components under FOs. Milk utilization patterns in the Federal Order market area, in which farm milk is sold, dictates the type of pricing system used to determine the price received for raw milk. The state of Arizona belongs to the Arizona-Las Vegas marketing area. This marketing area encompasses all of the state of Arizona and Clark County, Nevada. This particular Federal order (131, and three others, 5, 6, & 7) use the skim milk/butterfat pricing system. The price to producers is the average of class prices weighted by market wide utilization. Uniform prices are announced at 3.5% butterfat at the base zone, which is Phoenix, for Federal Order marker 131.

Other parts of the country use component pricing which prices the volumes of protein, butterfat, and other solids. This price mechanism is commonly referred to as Multiple Component Pricing (MCP). Within this process the components of the milk determine the major portion of the milk price. Under both systems, as the component prices fluctuate, so does the resulting farm prices. Because the two pricing systems are inherently related, it is difficult to talk about one system without talking about the other. However, for the purposes of this paper, focus will be given to the Arizona-Las Vegas (Skim/Butterfat) pricing system.

Federal Milk Marketing Orders

For the majority (74%) of farm milk produced in this country, the price is set by the Federal milk Marketing Order (FMO). The idea of classified pricing and pooling began in the late eighteen hundreds. In 1932 there were 68 FMO's, in 1950 there were 39 FMO's that represented 16% of US milk production, and in 1962 there were 83 FMO's. Currently there are 11 FMOs that set the minimum price for a specific geographical area (Figure 1). A Federal Marketing Order is a regulation issued by the Secretary of Agriculture which places certain requirements on the handling of Grade "A" milk in its respective area. FMO's require that regulated handlers of Grade "A" milk pay not less than a certain minimum price established according to how milk is used. In addition, payments for milk are pooled and paid to individual dairy farmers or Co-operative associations of dairy farmers on the basis of the uniform or average price for Grade "A" milk and/or its components.

Federal Orders

Federal Orders were created because of the physical characteristics of milk (highly perishable), because it is produced every day (24/7/365), and since production varies by season and contrary to demand. Federal orders also generate bargaining power among producers because there are few handlers of milk compared to the number of dairy farms. In addition, FO's assist dairy farmers in developing dependable markets for their milk. They help prevent conditions that result in price instability, disorderly marketing, and guarantee a minimum price for milk. Federal orders can be changed under a legal process driven by a proposal from Co-ops and/or industry. There must be a public hearing, recommended decisions, comments period, a final decision, polling of Co-ops or producer referendum (66% is needed for an approval), and finally, an order amending the order. A FO can be terminated by a majority vote (51%) of Co-ops/producers, or a

CONSOLIDATED
FEDERAL MILK MARKETING ORDER AREAS

Final Decision
March 1999

USDA
Agricultural Marketing Service
Dairy Programs

DIFFERENCES IN SHADING MERELY SERVE TO
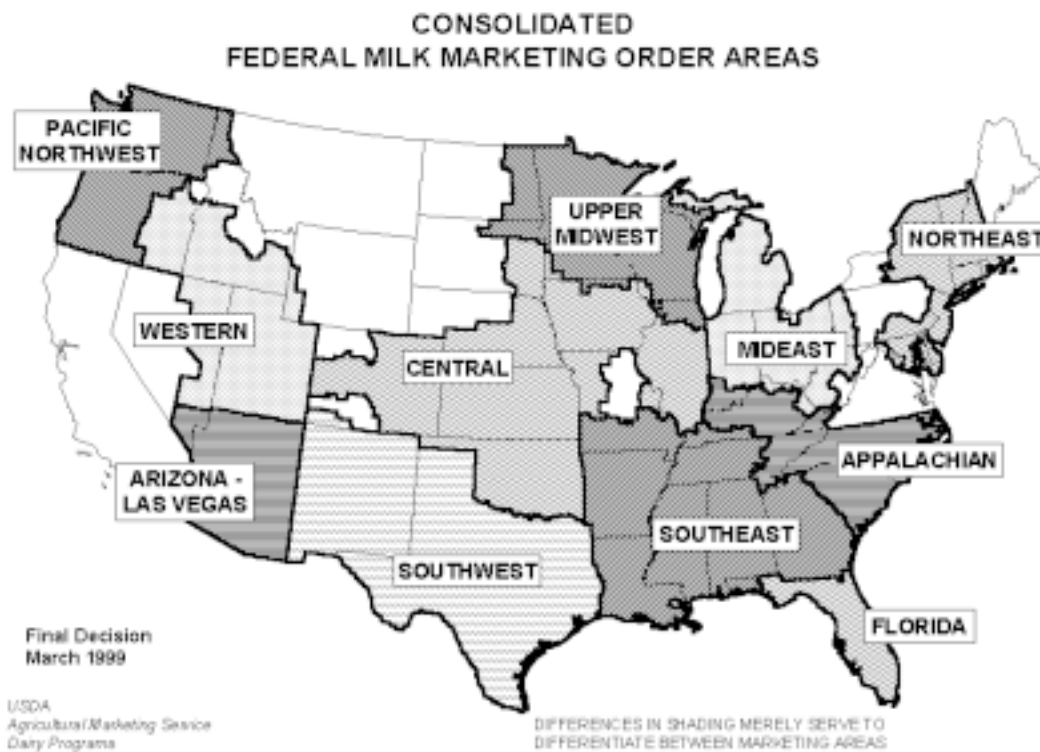DIFFERENTIATE BETWEEN MARKETING AREAS

Figure 1. *Consolidate Federal Milk Marketing Order Areas.*

decision by the secretary of agriculture. For more on Federal orders see WWW.FMMASEATTLE.COM

Federal Orders do not regulate producers, nor guarantee them a market for their milk. FO's do not establish sanitary or quality standards, set wholesale or retail prices, set maximum prices paid for farm milk, or guarantee a fixed level of price to producers. In addition, a FO does not regulate whom a plant may buy milk from, to whom a plant shall sell milk, how much milk a plant can buy or sell, what price a plant may sell milk, or restrict production.

Milk Classification

The Federal Orders classify milk as class I, II, III, or IV. The value of the milk in its various product uses is also incorporated in the farm milk price through the respective class prices. Class I milk reflects the value of milk used in products intended for beverage usage, such as fluid milk, skim milk, low fat milk, milk drinks, cultured butter milk, eggnog, milk shakes and other fluid products containing more than 6.5% nonfat solids, less than 9% butterfat, and meant to be consumed as a beverage. Class II milk products consist of cottage cheese, yogurt, ice cream, and other soft products containing more than 9% milkfat. Class III products consists of hard cheeses, cream cheeses and other spread-able cheese. Class IV products are made into butter and powdered milk. All class I milk in the United States receives a base price derived from voluntary surveys of the dairy product manufacturers that

sell specific products on a bulk, wholesale basis. The class I price (only) receives an additional value for products depending on the county milk is sold in (Figure 2). The class I price structure is designed to reflect cost of production, and typically is higher where there is more people and less milk or lower where there is more milk and fewer people.

As mentioned previously, for the Arizona market and the other three non-component markets the market average value is referred to as the Uniform Price and it is comparable to the former Blend Price. Simply stated, the greater the percentage that the component value is of the classified fluid use (Figure 3), the higher the farm milk price will be.

Federal Order Pricing

The Federal milk order pricing system which uses dairy product prices collected by the National Agriculture Statistics Service (NASS) conducts weekly, voluntary surveys of the dairy product manufacturers that sell specific products on a bulk, wholesale basis; prices are f.o.b. processing plant or storage center. NASS collects prices and volume traded for Cheddar cheese, 40-lb. block and 500-lb. barrel styles, butter, nonfat dry milk, and dry whey. NASS releases information for the previous week's trading period on Friday mornings in "Dairy Product Prices" (see http://usda.mannlib.cornell.edu/reports/nassr/price/dairy/). Federal milk order price formulas use two-

Figure 2. *Class I Price Structure*

week and monthly averages of these dairy product price series. These averages are the average applicable weekly prices weighted by the sales volume for the week.

Two surveys are available on or before the 23rd of the month which set the "Advanced" class I skim and butterfat and class II skim prices. Four or five surveys are available on or before the 5th of the month which set the Class II, III, and IV butterfat, and Class III and Class IV skim "Final" prices (Table 1).

The actual base price for skim and butterfat is computed by taking the average prices released from NASS, in table 1, and following the appropriate formulas in table 2.

The base price for Class I skim and butterfat is the higher of the advanced Class III or IV skim price (5.92 from table 2) and the advanced Class III/IV butterfat price + a fixed differential (Class I Price Structure). The fixed differential is $2.35 for Pinal & Maricopa counties for skim and 0.0235 for butterfat (lbs. vs. cwt).

Once the base prices are determined, formulas (figure 4) are used to calculate the respective prices from the respective classes for both skim and butterfat. The Uniform Price for FO 131, 5, 6, and 7 is the producer skim price multiplied by 0.965 + producer butterfat price multiplied by 3.5. The UP takes into account the weighted average of all milk uses in the month. In July 2003, class I, II, III, and IV utilizations for FO 131 were 34, 7, 42, and 17 percent respectively (Figure 5).

Payments for milk

Once the advanced and final pricing for raw milk have been established, the handler's of milk must report the market utilization to the milk market administrator on or before the 7th of the month. The market administrator then computes the "Blend" price of milk, by taking the sum of the total dollars of skim and butterfat from each class divided by the sum of skim and butterfat pounds. This must be completed on or before the 11th of the month. The respective price is given to the handlers who in turn have until the 13th to pay the value of the amounts of milk received to the producer settlement fund. The milk market administrator turns right around and pays (settles with) the handlers on the following day (on or before the 14th).

On or before 25th day of the month, dairy producers are paid a "partial payment" for the milk shipped from their farms during the first 15 days of the month. The partial payment price is based on the lowest class price from the previous month times 1.3 (the 1.3 factor acknowledges that the blend should be higher than the lowest class price). The final payment paid to producers is for the equivalent of the milk produced between the 16th and the end of the month minus the partial payment. Thus, the final payment price = the blend value minus the partial payment received on the 25th for milk produced between the 16 and the end of the month.
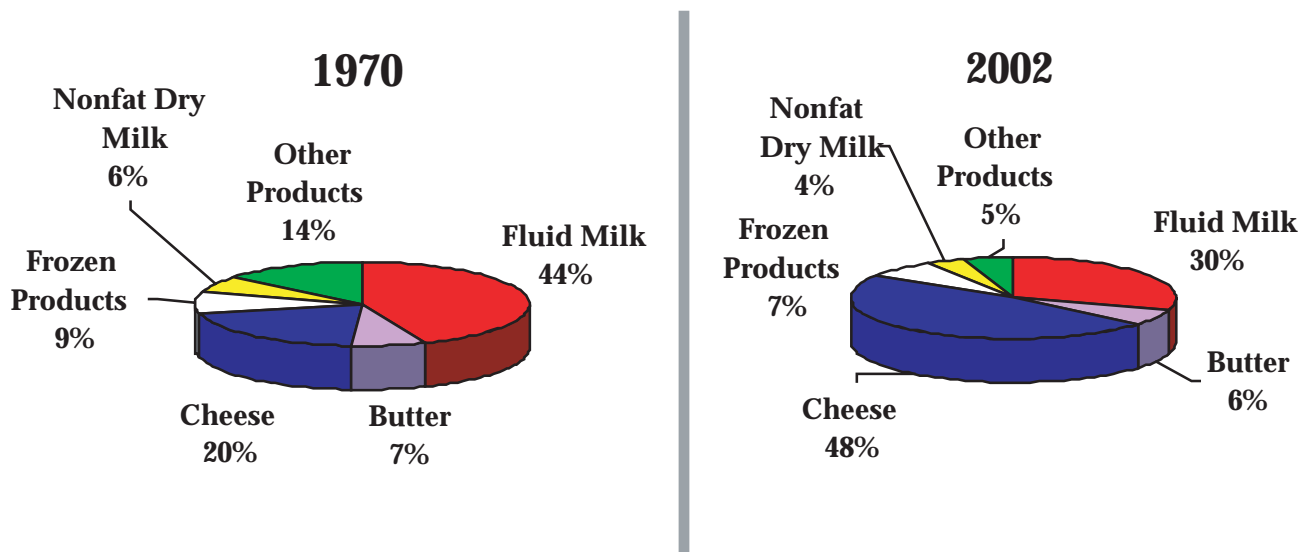
1970

Nonfat Dry Milk 6%
Other Products 14%
Frozen Products 9%
Fluid Milk 44%
Cheese 20%
Butter 7%

2002

Nonfat Dry Milk 4%
Other Products 5%
Frozen Products 7%
Fluid Milk 30%
Butter 6%
Cheese 48%

Figure 3. *Share of commercial disappearance by product, 1970 – 2002.*

Table 1. *NASS Survey for Advanced and Final Milk Prices.*

Monthly Prices	Advanced Prices/Pricing Factors		Class and Components Prices Final	
	Release Date	NASS Prices	Release Date	NASS Prices
September	Aug. 22nd	August 9 &16	Oct. 3rd	September 6,13, 20, 27
October	Sep. 19th	September 6 & 13	Oct. 31st	October 4, 11, 18, 25
November	Oct. 17th	October 4 & 11	Dec.5th	November 1, 8, 15, 22, 29

Table 2. *An example of base pricing calculations from July, 2003.*

Supplemental Price Data From NASS Surveys			Class and Components Prices Final	
Surveys from 6/7/03 and 6/14/03	Price/lb	Pounds	Advanced Pricing	
Grade AA Butter	$1.0808	7,984,921	Butterfat = $1.1590	
Cheese 40 lb blocks	$1.1330	18,499,010	Class III skim = $5.81	
Cheese 500 lb Barrels	$1.1132	23,535,394	Class IV skim = $5.92	
Average Cheese Price	$1.1387	42,034,404	Base skim Class I = $5.92	
Nonfat Dry Milk	$0.8040	57,861,468	Base Class I = $9.77	
Dry Whey	$0.1372	27,485,988		
1BF = ((NASS - 0.115)*1.2), NFS = ((NASS - 0.1 4)*0.99), OS = ((NASS - $0.159)*1.03), PR = ((NASS - $0.165)*1.383) + ((NASS - $0.165)* 1.572) - (BF*0.9)*1.17).				

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 pricing factor + (applicable Class I differential divided   by 100) + differential.

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 = ((Cheese price – 0.165) x 1.383) + ((((Cheese price – 0.165) x 1.572) –   x Butterfat price x 0.9) x 1.17)

Other Solids Price = (Dry whey price – 0.159) times 1.03.

Butterfat Price = (Butter price – 0.115) times 1.20.

Class IV

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

Class IV Skim Milk Price = Nonfat solids price times 9.

Nonfat Solids Price = (Nonfat dry milk – 0.14) times 0.99.

Butterfat Price = See Class III

Figure 4. *Federal Milk Order Pricing Formulas.*

Arizona-Las Vegas July 2003

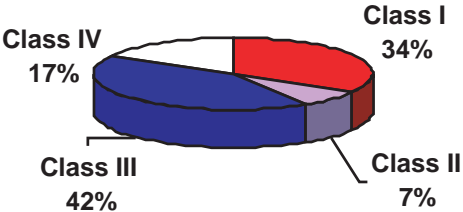Class IV 17%
Class I 34%
Class III 42%
Class II 7%

Figure 5.

Conclusion

Milk utilization patterns in the Federal Order market area in which farm milk is sold dictates the type of pricing system used to determine the price received for raw milk. The state of Arizona uses the skim milk/butterfat pricing system. The price to producers is the average of class prices weighted by market wide utilization. The National Agriculture Statistics Service (NASS) conducts weekly, voluntary surveys of the dairy product manufacturers that sell specific products on a bulk, wholesale basis to derive at the base price, and then the respective pricing formulas are employed to establish final prices. The uniform "Blend" price of milk is then figured by taking the sum of the total dollars of skim and butterfat from each class divided by the sum of the total skim and butterfat pounds (Table 3).

The formulas and mathematics associated with the Federal Orders pricing of milk are cumbersome and relatively complex. In addition Co-ops across the country have their own specific parameters for paying producers for raw milk. Variation among Co-ops exists in all parts of the country and should be considered when determining the price of milk for an individual producer. However, the base price for milk, formulas used to calculate each class and products and the timelines set for payment by the milk market administrators is uniform throughout the United States.

For further reading on this topic or others regarding milk price please refer to:

Manchester, Alden C., and Don P. Blayney (2001). *Milk Pricing in the United States.* Agricultural Information Bulletin No. 761. Market and trade Economics Division, Economic Research Service, U.S. Department of Agriculture, Washington, DC.

Available at: http:/www.ers.usda.gov/publications/agoutlook/mar1998/ao249e.pdf

Stillman, Richard P. "Federal Milk Marketing Orders: Consolidation and Reform, "Agriculture Outlook, March 1998. Pp. 20-23.

Available at: http://www.ers.usda.gov/publications/agoutlook/mar1998/ao249e.pdf

Table 3. Computation of uniform price, FO 131, July, 2003.

		Skim Pounds	BF Pounds	$lb/cwt	Total $
Class I	Skim	81,187,821		5.92	4,806,319.00
	BF		1,737,676	1.159	2,013,966.48
	Differential	$2.35	$0.0235		1,941,043.26
Class II	Skim[1]	16,257,060		6.62	1,076,217.37
	BF[2]		2,151,082	1.212	2,608,
Class III	Skim	97,695,327		7.83	7,649,544.10
	BF		4,055,274	1.205	4,888,632.81
Class IV	Skim	40,037,760		5.94	2,378,242.94
	BF		731,449	1.205	881,761.76
Skim Total		235,452,397			17,980,305.46
BF Total			8,675,481		10,434,800.25
Uniform Price Skim[3]		17,980,305.46 / 235,452397		7.636 0.0464 = $7.59	
Uniform Price BF[4]		10, 434, 800.25 / 8,675,481		= $1.2026	
Uniform Price		($7.59*0.965 (7.32) + $1.2026*3.5 (4.21)) = $11.53			
[1]ClassIV + $0.70, [2]ClassIV + . 007, [3][4]Total dollars of skim and BF values from all class ÷ total skim milk and BF pounds and aggregate value (total pounds from all classes disappearance + inventories, location adjustments, and other respective source values).					

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