Department of Agricultural Economics

The History and Class Pricing of Federal Milk Marketing Orders

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The regulation of milk is an important part of the development of the milk industry and an understanding of the history of milk regulation is critical to understanding the pros and cons of the current industry. Additionally, to understand milk pricing it is important to understand the history of the federal milk marketing orders. This publication will provide information on how milk became regulated and how the class pricing system works. A glossary is provided at the end for reference.

Background

In 1933, the Agricultural Adjustment Act gave the federal government the authority to regulate the handling of milk. The Agricultural Marketing Agreement of 1937 then gave the Secretary of Agriculture the authority to issue marketing orders, and one of those marketing orders was for milk. The Federal Milk Marketing Orders (FMMOs) have evolved considerably since they were authorized in 1937.

Initially the marketing orders were designed to coordinate the supply and demand of milk. Since milk is a perishable commodity, regional boundaries were established to help ensure that milk produced could meet demand from local economies. Both technology and transportation have improved over the last 80 years and this has allowed regional boundaries to expand. The milk marketing orders have consolidated to a low of 10 orders, as of 2016, and under these 10 milk marketing orders roughly “60 percent of all milk marketed in the United States is marketed…” (Federal Milk Marketing Orders, Section 10 Review, 2015). Roughly, one-fifth of the remaining 40% of milk marketed comes from California (California Milk Advisory Board, 2016). Figure 1 shows the current regional boundaries of the 10 FMMOs and Table 1 details the names and numbers of each milk marketing order.

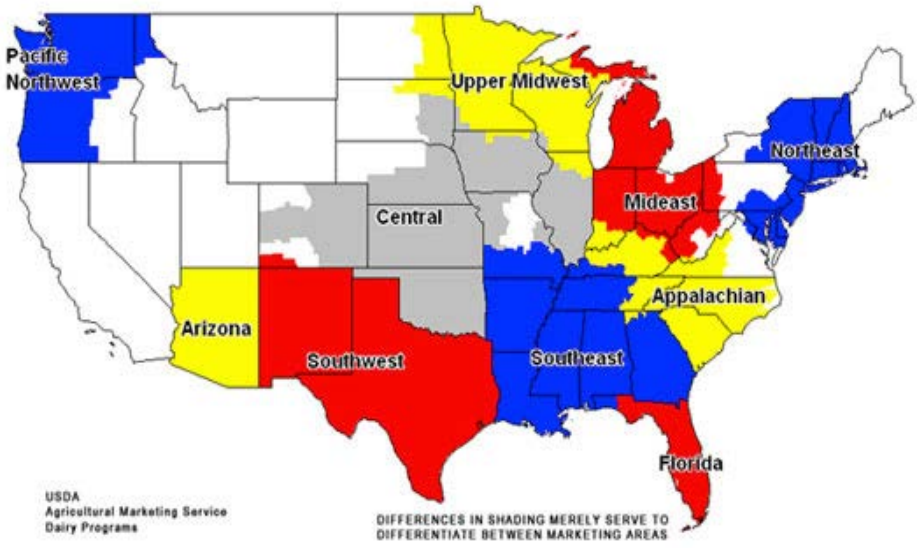

Figure 1. Map of Federal Milk Marketing Orders

Federal Milk Marketing Orders	
Order 1	Northeast
Order 5	Appalachian
Order 6	Florida
Order 7	Southeast
Order 30	Upper Midwest
Order 32	Central
Order 33	Mideast
Order 124	Pacific Northwest
Order 126	Southwest
Order 131	Arizona

Table 1. List of Federal Milk Marketing Orders

The current orders were shaped by the 1996 Farm Bill, also known as the Federal Agriculture Improvement and Reform (FAIR) Act of 1996. This bill required the Secretary of Agriculture to reduce the 31 milk marketing orders to between 10 and 14. The Secretary originally consolidated the orders to 11 under the Consolidated Appropriations Act of 2000. In 2004 the Western FMMO – Utah, and parts of Nevada, Idaho, and Oregon – was terminated, which is why there are currently only 10 orders. The full federal milk marketing order timeline can be viewed below in Figure 2.

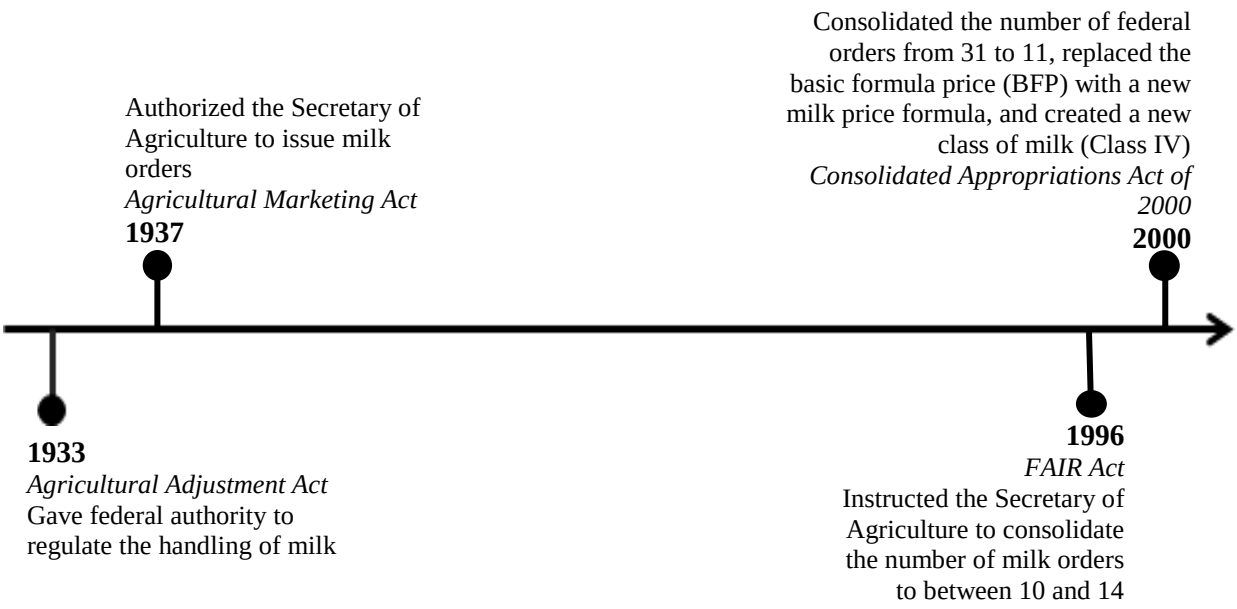

Figure 2. Federal Milk Marketing Order Timeline

Class Pricing

Originally, there were only three classes of milk, but after the Consolidated Appropriations Act of 2000 the third class of milk was divided up into Class III and IV. These four classes of milk are:

Class I – fluid milk
Class II – Soft manufacturing products (ice cream, cottage cheese, etc.)
Class III – Hard cheese and cream cheese
Class IV – Butter and dry milk

Each of the four classes of milk has a specific pricing formula that is calculated using a set of component prices (see glossary). Class I and II have advanced pricing and are "based on the previous month's end product pricing (McCullock, 2011)." Class I incorporates the higher of the advanced Class III and IV skim milk prices. Advanced prices are based on the first two weeks of the preceding month. The Class II formula uses the advanced Class IV skim milk price. For example, Class III pricing uses the components of other solids, protein, and butterfat, while Class IV uses butterfat and nonfat solids as can be seen below (USDA-AMS, Current Price Formulas).

The Class III and IV prices are determined using three steps (Jesse & Cropp, 2008). The first stage of formulating the Class III and IV price involves setting prices for milk components – butterfat, protein, nonfat milk solids, and other milk solids – by developing product price formulas. Jesse and Cropp (2008) describe the product price formula as:

$$\frac{Component\ price}{lb} = \left(\frac{product\ price}{lb} - \frac{make\ allowance}{lb}\right) x\ yield$$

Breaking that formula up, there are three important parts: product price, make allowance, and yield. The product price is the monthly average of the wholesale prices for each product – cheese, dry whey, butter, and nonfat dry milk (Jesse & Cropp, 2008). The cheese component of the product price is specifically the wholesale prices of block and barrel cheddar cheese, and butter is Grade AA butter (Jesse & Crop, 2008). The second part of the product price, the make allowance, is the estimated manufacturing cost per pound and is determined through a survey of processors' costs. The current make allowance for butter, for example, is $0.1715 (Class III butterfat price formula below) (Stephenson, 2007), which suggests that it costs roughly 17 cents to make one pound of butter.

$$Butterfat\ Price\ =\ (Butter\ price\ -\ 0.1715)\ x\ 1.211.$$

Lastly, the yield factor estimates how much of a product can be produced from one pound of a component. For example, from the Class III butter price formula, the yield factor for butter is 1.211. This suggests that one pound of butterfat (the component) can yield 1.211 pounds of butter (the product). After the component prices have been determined, stage one has been completed.

In the second stage, the skim milk price is determined using the component prices that were previously discussed. Since a hundredweight of Class IV skim milk has been calculated to "contain 9 pounds of nonfat milk solids", the Class IV skim milk price is as follows:

$$Class\ IV\ Skim\ Price\ Price = Nonfat\ Solids\ Price\ x\ 9$$

The skim milk prices for Class III and IV are important because they are also part of the Class I and II pricing formulas. Class II uses the advanced Class IV skim milk price to help determine the Class II skim milk price, and Class I uses the higher of the advanced Class III or IV skim milk price as part of the Class I skim milk price.

The third and final stage in determining the Class III and IV prices is dependent on butterfat content. The Class III butterfat component price that was derived in the first stage is used with the Class III skim milk price that was discussed in the second stage to come up with the final Class III and IV prices. The Class IV price also uses the Class III butterfat price to determine its final price. Figure 3 shows applicable pricing formulas for all four classes of milk.

Class I:

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

$Class\ I\ Skim\ Milk\ Price$
$= Higher\ of\ advanced\ Class\ III\ or\ IV\ skim\ milk\ pricing\ factors$
$+\ applicable\ Class\ I\ differential.$

$Class\ I\ Butterfat\ Price$
$= Advanced\ butterfat\ pricing\ factor$
$+\ (applicable\ Class\ I\ differential\ divided\ by\ 100).$

Class II:

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

$Class\ II\ Skim\ Milk\ Price\ =\ Advanced\ Class\ IV\ skim\ milk\ pricing\ factor\ +\ \$0.70.$

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

$Class\ II\ Nonfat\ Solids\ Price\ = \frac{Class\ II\ skim\ milk\ price}{9}.$

Class III:

$Class\ III\ Price\ =\ (Class\ III\ skim\ milk\ price\ x\ 0.965)\ +\ (Butterfat\ price\ x\ 3.5).$

$Class\ III\ Skim\ Milk\ Price\ =\ (Protein\ price\ x\ 3.1)\ +\ (Other\ solids\ price\ x\ 5.9).$

$Protein\ Price\ =\ ((Cheese\ price\ -\ 0.2003)\ x\ 1.383)$
$+\ ((((Cheese\ price\ -\ 0.2003)\ x\ 1.572)\ -\ Butterfat\ price\ x\ 0.9)\ x\ 1.17).$

$Other\ Solids\ Price\ =\ (Dry\ whey\ price\ -\ 0.1991)\ x\ 1.03.$

$Butterfat\ Price\ =\ (Butter\ price\ -\ 0.1715)\ x\ 1.211.$

Class IV:

$Class\ IV\ Price\ =\ (Class\ IV\ skim\ milk\ price\ x\ 0.965)\ +\ (Butterfat\ price\ x\ 3.5).$

$Class\ IV\ Skim\ Milk\ Price\ =\ Nonfat\ solids\ price\ x\ 9.$

$Nonfat\ Solids\ Price\ =\ (Nonfat\ dry\ milk\ price\ -\ 0.1678)\ x\ 0.99.$

$Butterfat\ Price\ =\ See\ Class\ III.$

Figure 3. Current Pricing Formulas (USDA-AMS, Current Price Formulas)

Class utilization refers to the share of milk that is processed in each class. Regions with a relatively low level of milk production will see a greater share of their milk sold for fluid use and regions with relatively higher milk production will see more of their milk sold into the lower classes. For example, 70% Class 1 utilization would mean that 70% of the milk is processed as Class I, meaning it is processed for fluid consumption. Since the Appalachian, Florida, and Southeast Orders are largely milk-deficit orders, more of the milk produced is processed as Class I for these regions. The Upper Midwest Order, Order 30, has very low Class I utilization compared to the Southern orders, as can be seen in Table 2.

	2016 Class I Utilization			
	Appalachian	Southeast	Florida	Upper Midwest
Jan	70.46	72.83	84.57	9.14
Feb	69.8	73.25	83.37	9.16
Mar	67.23	65.61	84.37	9.44
Apr	66.02	64.29	84.48	8.88
May	63.96	64.46	81.11	8.85
June	64.84	64.79	83.56	8.64
July	67.84	68.71	83.32	9.53
Aug	74.23	80.98	84.14	13.2
Sept	74.07	78.91	87.88	12.54
Oct	70.57	74.29	83.09	10.24
Nov	75.09	78.81	83.14	15.74
Dec	71.53	71.64	83.24	14.5

Table 2. 2016 Class I Utilization Percentages (USDA-AMS, 2016 Class I Utilization Percentage of Producer Milk, 2016)

The Upper Midwest Order, for example, has a high Class III utilization given the large number of cheese processing plants located within order. Florida has the highest Class I utilization because a majority of their pool plants process Class I milk and the order has very low diversion limits compared to the rest of the orders. Florida's diversion limits, set between 10% and 20% depending on the month, limit excess milk being pooled on the order. This prevention of excess amount of milk means a lower amount of milk will be potentially diverted into a lower class of milk which would lower the Class I utilization.

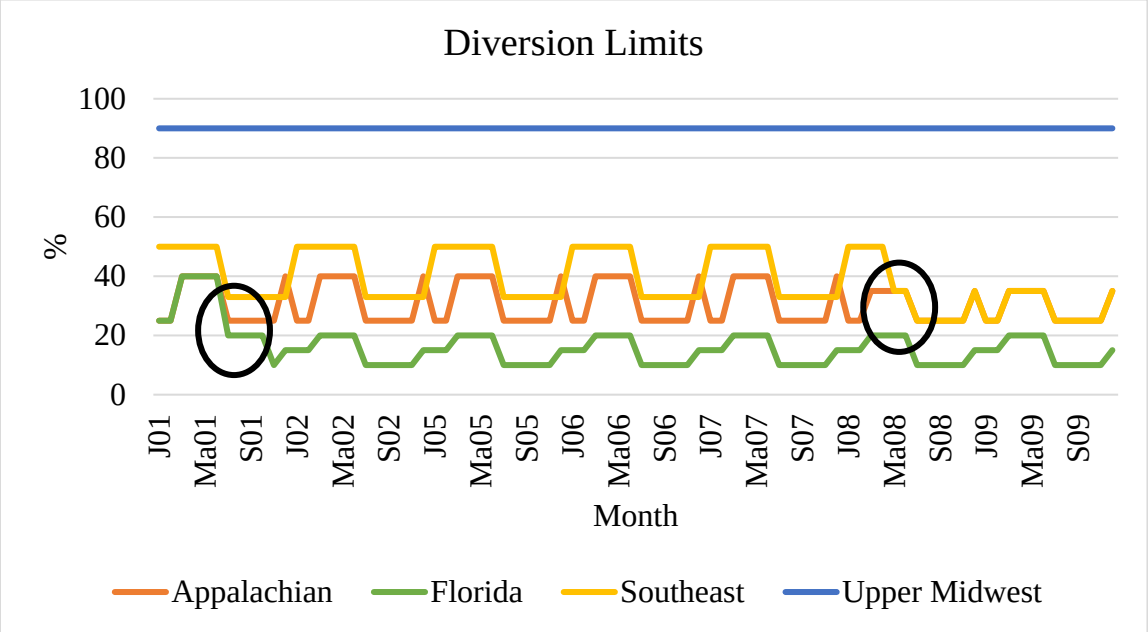

Figure 4. Diversion Limits (USDA-AMS, Diversion Limit)

Diversions are excess milk not needed at a pool plant and thus diverted to a non-pool plant. Each order is allowed a certain percentage of the total amount of pooled milk to divert, which can be seen from Figure 4. Two relevant points of time circled in Figure 4 represent changes in diversion limits. The circle on the left highlights when the diversion limits were lowered for the Florida Order from diversion limits of 20%, 25%, and 40% to 10%, 15%, and 20%. The second circle on the right side of Figure 4 depicts the 2008 lowering of the Appalachian and Southeast Orders diversion limits. This change also created consistent limits between the two orders. For the southern orders – the Appalachian, Florida, and Southeast – the lower the diversion limits the less likely milk will be utilized for a class other than Class I.

Class I differentials were intended to encourage movement of milk from high supply areas to low supply areas. The differentials were meant to approximate estimated transportation costs from these high supply areas to the low supply areas (Jesse & Cropp, 2008). Under the Consolidated Appropriations Act of 2000, there was an alteration of Class I differentials. Currently, the federal milk marketing order system has location-specific Class I differentials. These differentials focus on location and economic value. Orders that are milk deficit – like the Appalachian, Florida, and Southeast Orders – have higher Class I differentials than most other regulated areas. These differentials can differ by county. Two producers that are under the same milk marketing order and live in the same county can receive different prices for their milk if they happen to deliver to plants that are located in different counties because of the Class I differential.

Due to Class I differentials being included in the Class I price, milk that is sold for fluid use will net the highest price per hundredweight. Typically, Class II prices will be the second highest price and Class III and IV prices can vary behind Class I and II. The blend price is a weighted average price for all milk that is sold. So, the more milk that is sold into higher classes, the higher the blend price will be. For this reason, blend prices are higher in regions where Class I utilization is higher. Diversions are important because they have the potential to impact class utilizations. Every pound of excess milk that is pooled on the order has the potential to be used for Class II, III, or IV, which could lower the blend price. This is especially true in the south where Class I utilization is typically higher.

Beyond the uniform price, the term mailbox price is often used in milk marketing. Similar to blend prices, mailbox prices can differ based on which order a producer pools their milk on. The term pooled means an order's total amount of milk that was received at a regulated pool plant. Pooled milk is eligible to receive federal order milk pricing. There are types of plants other than pool plants, but only pool plants are regulated by an order. Pooling can impact class utilization which then can impact the blend price that milk producers will receive in an order.

The blend price is the price based on how much milk was used in each class of milk that was pooled in an order. However, while the blend price should be the same for all producers, the amount that producers actually receive will be impacted by the Class I

differential and other costs. These other costs are incorporated into the mailbox price. The term mailbox price can be "defined as the net price received by dairy farmers for milk, including all payments received for milk sold and deducting costs associated with marketing the milk. All payments for milk sold include: over-order premiums; quality, component, breed, and volume premiums; payouts from state-run over-order pricing pools; payments from superpool organizations or marketing agencies in common; payouts from programs offering seasonal production bonuses; and, monthly distributions of cooperative earnings" (USDA-AMS, Mideast Marketing Area, Mailbox Prices). Essentially, the mailbox price includes a wide number of additional payments that are not calculated within the blend price, but it is more representative of what is truly received by producers for milk.

Additionally, mailbox prices are determined by different regions and these regions do not align with federal milk marketing order regional boundaries. Figure 5 is a representation of the current federal milk marketing orders and Figure 6 depicts regions on which mailbox prices are reported. While the regions are extremely similar, there are some areas where the differences are significant. Some mailbox price regions are a state such as Minnesota and Wisconsin (which are both a part of the Upper Midwest Order) and New York (which is within the Northeast Order's boundaries). The Southeast mailbox price, for example, includes the states: Alabama, Arkansas, Georgia, Louisiana, and Mississippi. However, the Southeast marketing order's region includes parts of Tennessee, Kentucky, and southern Missouri.

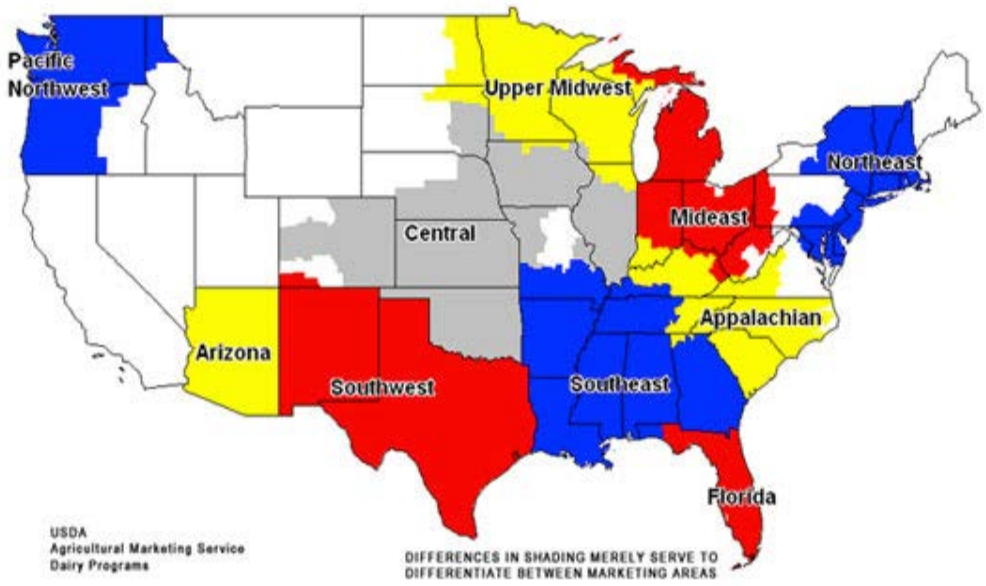

Figure 5. Map of Federal Milk Marketing Orders

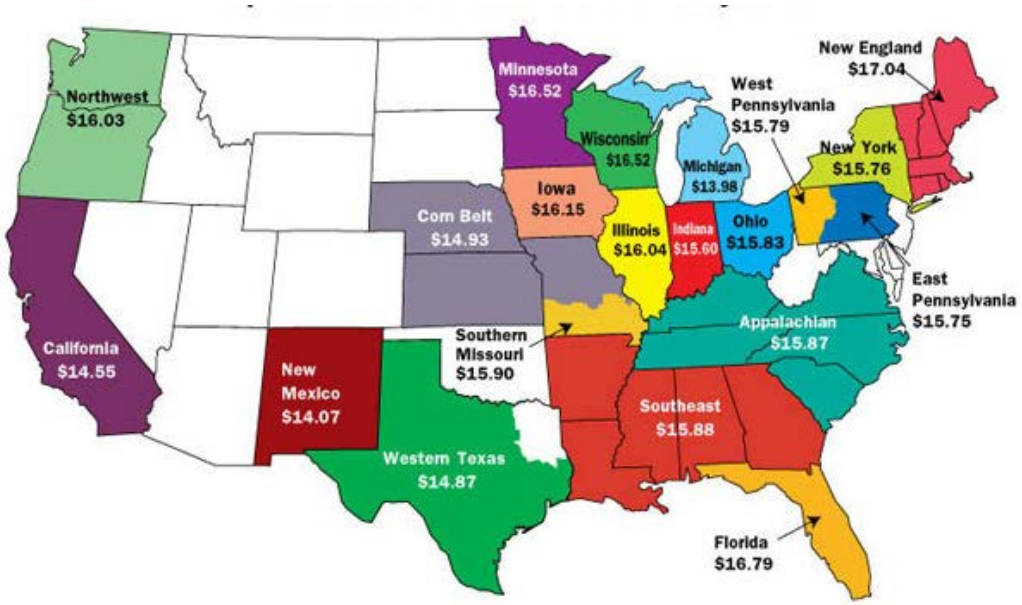

Figure 6. July 2016 Mailbox Prices (Hoard's Dairyman, Mailbox Prices; USDA-AMS, Mailbox Milk Prices)

The pricing of milk can be complicated with the different kinds of prices, the range of prices across FMMOs, and the various regulations that affect the amount of milk regulated under an order. However, these differences are put in place to benefit both producers and processors within an order's regional boundaries. This publication explained how the federal milk marketing orders developed into their current state and summarized how milk prices are determined via those milk marketing orders. The goal was to make the complicated nature of the regulation of milk a little less complicated.

References:

California Milk Advisory Board, Real California Milk Facts. http://www.californiadairypressroom.com/Press_Kit/Dairy_Industry_Facts

Federal Milk Marketing Orders; Section 10 Review, Vol. 80 No. 28 (February 11, 2015) (to be codified at 7 C.F.R. pts. 1000, 10001, 1005, 1006, 1007, 1030, 1032, 1033, 1124, 1126, and 1131).

Jesse, E., & Cropp, B. (2008). Basic milk pricing concepts for dairy farmers. Economic Research, 180, 200.

Mark, T. B., Burdine, K. H., Cessna, J., & Dohlman, E. (2016). The Effects of the Margin Protection Program for Dairy Producers.

McCullock, K. (2015). Federal Milk Marketing Order Pricing, Livestock Marketing Information Center.

Stephenson, Mark. (2007) What is the make allowance and why do processors get it when dairy producers don't? Cornell Program on Dairy Markets and Policy. http://articles.extension.org/pages/39039/what-is-the-make-allowance-and-why-do-processors-get-it-when-dairy-producers-dont

U.S. Department of Agriculture. 2016 Class I Utilization Percentage of Producer Milk – Monthly and Year – to- Date, Agricultural Marketing Service. https://www.ams.usda.gov/sites/default/files/media/Class_I_Utilization_Percentage_YTD_2016_dairy.pdf

U.S. Department of Agriculture. Current Price Formulas, Milk Marketing Order Statistics, Agricultural Marketing Service. https://www.ams.usda.gov/resources/current-price-formulas

U.S. Department of Agriculture. Federal Order Mailbox Prices, The Upper Midwest Marketing Area, Dairy Programs, Agricultural Marketing Service. http://www.fmma30.com/Homepage/FO30-MailboxPrices.htm

U.S. Department of Agriculture. Diversion Limit, Percentages of Producer Receipts, by Order – January 2000 – June 2015, Agricultural Marketing Service. https://www.ams.usda.gov/sites/default/files/media/DYFMMOCA%20Table%2016%20Diversion%20Limit%20Percentages.pdf

U.S. Department of Agricultural. Mailbox Prices, Mideast Marketing Area, Agricultural Marketing Service. http://www.fmmaclev.com/mailboxprices.htm

Glossary

Class I Differentials: A differential that is added to the Class I Skim Milk Price. The differential is based on location and can range from $0.00 to $4.50.

Class Utilization: The percentage of pooled milk that is processed per class within a federal milk marketing order

Component Prices: The price of butterfat, protein, nonfat milk solids, and other milk solids using the product price, make allowance, and yield.

Make Allowance: The estimated manufacturing cost of a component per pound produced.

Mailbox Price: The net price received by dairy farmers at their farm gates. This includes all payments received for milk sold less the cost associated with marketing the milk (ERS, 2016).

Diversion Limits: The maximum percentage of pooled milk within a federal milk marketing order that a pool plant may divert to a non-pool plant.

Uniform (Blend) Price: The minimum price in a federal milk marketing order that a milk producer can receive if they pool their milk on that order.

Yield Factor: How much one pound of a milk component can produce of a certain product.