Understanding Milk Pricing-
If That's Even Possible: Part 1

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There is an old saying in the dairy industry that there are two people who understand how milk is priced, and that one of them is dead and the other is retired. I've never understood how milk is priced. In an effort to remedy my ignorance, I started researching how the Federal Milk Marketing Order (FMMO) works. It is a complicated process but below I will explain the basic principles as I have learned them. This is part one of a two part series.
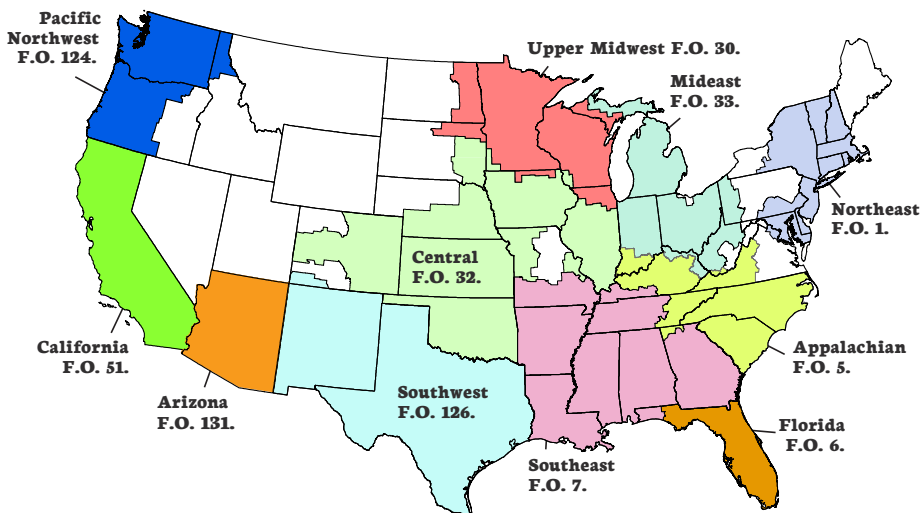
A Brief History

In 1933 the federal government created the Agricultural Adjustment Act, which sought to address some of the challenges facing milk production, such as its inherent perishability, uneven production levels throughout the year and general lack of milk handlers/buyers when compared to all the small farmers of the time. The law was further refined in 1937 with the Agricultural Marketing Agreement Act. At its peak in 1962, the United States was broken up into 83 different regions or milk marketing orders. In 2000, what we know today as the Federal Milk Marketing Order (FMMO) was created. Due to consolidation, the number of milk marketing order regions shrank and there are now 11 regions that make up the current FMMO.

11 Federal Milk Marketing Order Areas

Pacific Northwest F.O. 124.

Upper Midwest F.O. 30.

Mideast F.O. 33.

Northeast F.O. 1.

Central F.O. 32.

California F.O. 51.

Appalachian F.O. 5.

Arizona F.O. 131.

Southwest F.O. 126.

Florida F.O. 6.

Southeast F.O. 7.

Source: USDA, https://www.ams.usda.gov/sites/default/files/media/Federal%20Milk%20Marketing%20Orders%20Map.pdf

Understanding the "Three C's" of FMMO Pricing

The easiest way to understand milk pricing in the United States is that the current commodity pricing of cheese, butter, dry whey and nonfat dry milk go into equations that calculate the value of the components within the milk (protein, fat, other solids, etc). The calculated values of the components within the milk then go into a separate set of equations to create the class price for class

1-4 milk. Confused yet? **See the flowchart below** for a visual representation of how the Commodity, Component and Class pricing all interrelate.

Commodity: defined as food items, like butter and cheese.

Component: defined as the parts that make up the milk, like protein and fat.

Class: defined as how the fluid milk is used for the further manufacture of food products.

Milk is sold and broken down into four classes, depending on how it is used in the further manufacture of products.

Class 1: Fluid milk

Class 2: "Soft" products like cottage cheese, yogurt, sour cream, etc.

Class 3: "Hard" cheese and ice cream

Class 4: Butter

How is milk pricing different from other industries?

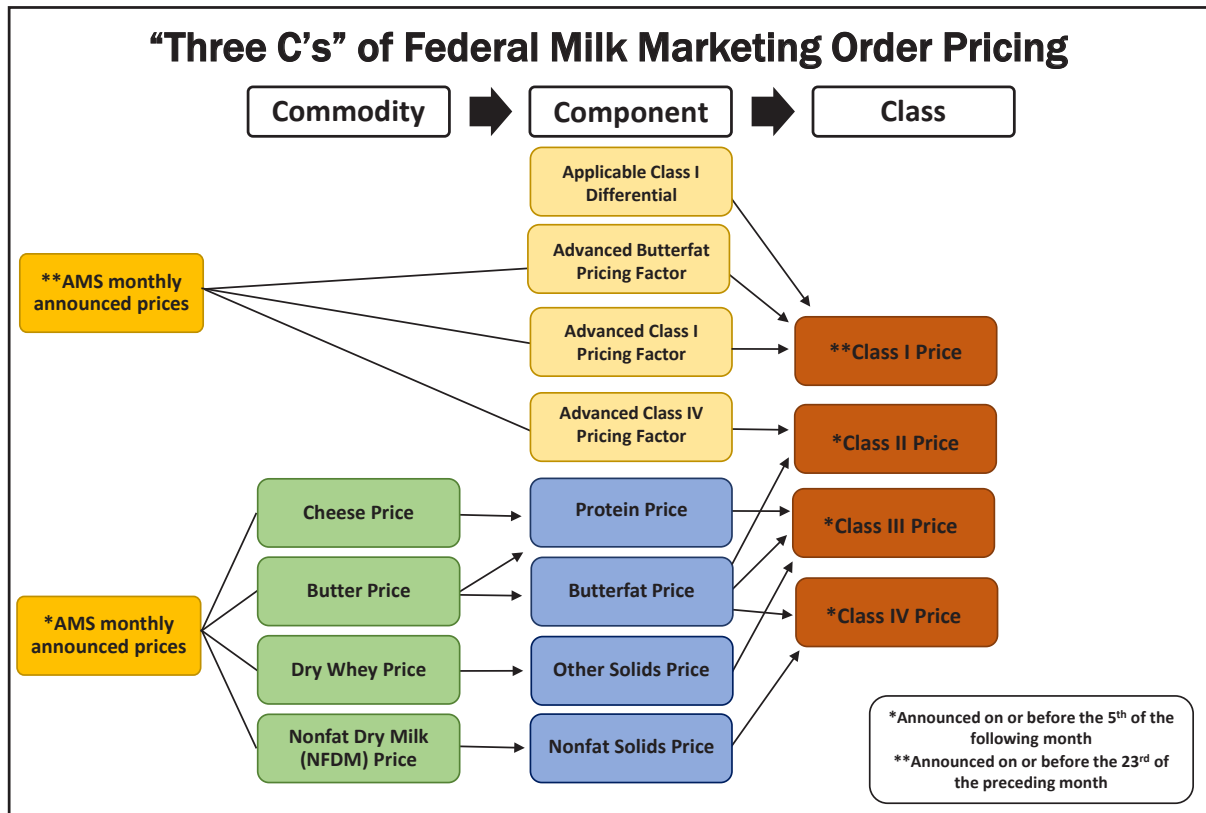In short, the answer is simple: end-product pricing vs. margin pricing.

Think of it like this: margin pricing moves forward, taking input costs and desired profit margins and adding them together to arrive at a price that an item will be sold for. The majority of commerce done around the world is done on some variation of a margin pricing system.

End-product pricing moves backwards, taking the desired end (retail) price for something like cheese or butter, and then subtracting all the production costs, thus arriving at the maximum price one can pay for the milk that is used to make the cheese or butter.

Milk is priced with an end-product pricing scheme. The inherent problem with any end-product pricing is

Figure 2

USDA — United States Department of Agriculture

"Three C's" of Federal Milk Marketing Order Pricing

Commodity → Component → Class

*Announced on or before the 5th of the following month
**Announced on or before the 23rd of the preceding month

Source: USDA, https://www.ams.usda.gov/sites/default/files/media/ThreeCsVisual.pdf

*updated June 2019 based on changes within the 2018 Farm Bill

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that it leaves the base commodity originator, in this case the milk producer/dairy farmer, with no way to pass along any production cost increases or desired profit margin to the end consumer.

How does the government get data to implement end-product pricing?

Every week the United States Department of Agriculture (USDA) collects and oversees mandatory commodity sales surveys. Take cheese for example. Each week the government collects and compiles data on what cheese manufacturers sold their cheese for. That data from the commodity sales surveys sets the value of cheese for the week.

Then the USDA works backwards, knowing the price of cheese (the Commodity), to determine how much the protein and fat (the Components) within the milk, are worth.

Next, the USDA subtracts the make allowance for the milk handler and from there they back-calculate the value of the milk (according to the Class).

For example, the calculation of Class 1 Fluid Milk follows the three equations below (**See Figure 3**).

For the equations that determine the price of the other classes of milk, please visit the USDA's Agricultural Marketing Service website at https://www.ams.usda.gov/resources/price-formulas.

When looking at the equations below, you might wonder what is the "Make Allowance"? Stay tuned for our next newsletter because the Make Allowance and understanding PPD's will be the topic of Part II of this article.

References available upon request.

Figure 3 — **CALCULATING CLASS 1 FLUID MILK PRICE**

Formula Details

1 To calculate the Base Class I Skim Milk Price, both the Class III and IV Advanced Skim Milk Pricing Factors must be calculated. These calculations are identical to those used to compute the Class III and IV Skim Milk Prices announced on or before the 5th of the following month, except for the time series of data used. The average of the Advanced Class III and IV Skim Milk Pricing Factors, plus $0.74, determines the Advanced Base Class I Skim Milk Price.

1 $\underset{\text{Advanced Component Price}}{\boxed{\begin{array}{l}\text{Average of Advanced}\\\text{Class III and Class}\\\text{IV Skim Milk Pricing}\\\text{Factor (\$/cwt)}\end{array}}}$ **+** $\underset{\text{Differential}}{\boxed{\begin{array}{l}\$0.74\\(\$/cwt)\end{array}}}$ **=** Base Class I Skim Milk Price ($/cwt)

2 $\underset{\text{Advanced Commodity Price}}{\boxed{\begin{array}{l}\text{Advanced}\\\text{Butter}\\\text{Price (\$/lb)}\end{array}}}$ **−** $\underset{\text{Make Allowance}}{\boxed{\begin{array}{l}\$0.1715\\(\$/lb)\end{array}}}$ **X** $\underset{\text{Yield}}{\begin{array}{l}1.211\\(\text{lb butter/}\\\text{lb butterfat})\end{array}}$ **=** $\underset{\text{Advanced Component Price}}{\begin{array}{l}\text{Advanced}\\\text{Butterfat Pricing}\\\text{Factor (\$/lb)}\end{array}}$

3 $\underset{\text{Calculated in Step 1}}{\boxed{\begin{array}{l}\text{Base}\\\text{Class I}\\\text{Skim Milk}\\\text{Price (\$/cwt)}\end{array}}}$ **X** $\underset{\text{Yield}}{\begin{array}{l}0.965\\(\text{cwt skim/}\\\text{cwt milk})\end{array}}$ **+** $\underset{\text{Calculated in Step 2}}{\boxed{\begin{array}{l}\text{Advanced}\\\text{Butterfat}\\\text{Pricing}\\\text{Factor (\$/lb)}\end{array}}}$ **X** $\underset{\text{Yield}}{\begin{array}{l}3.5\\(\text{lb butterfat/}\\\text{cwt milk})\end{array}}$ **=** $\underset{\begin{array}{c}\text{Advanced Class}\\\text{Price}\end{array}}{\begin{array}{l}\text{Base}\\\text{Class I}\\\text{Price}\\(\$/cwt)\end{array}}$

2 **$0.1715 =** Manufacturing cost to produce 1 pound of butter, excluding cost of raw milk ($/lb).

1.211 = Factor representing pounds of butter that can be made from 1 pound of butterfat (lb butter/lb butterfat).

To calculate the Advanced Butterfat Pricing Factor, use the Butter Price from the Advanced Prices and Pricing Factors series released on or before the 23rd of the preceding month. This price series uses the most recent two weeks of price data available at that time.

3 **0.965 =** 96.5 pounds of skim in 100 pounds of milk (cwt skim/cwt milk).

3.5 = 3.5 pounds of butterfat in 100 pounds of milk (lb butterfat/cwt milk).

Source: USDA, https://www.ams.usda.gov/sites/default/files/media/Class1worksheetfinal.pdf