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Weekly Dairy Outlook

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In the month of June, the Producer Price Differential (**PPD**) was negative in most of the Federal Milk Marketing Orders (**FMMOs**) - FMMO 6 (Florida) being the exception. Why was it so? Given that the PPD is supposed to represent the *added value* of the Class I (fluid) milk over the 3 other milk classes in a given FMMO, shouldn't the PPD be a positive number? Conceptually it should, but not necessarily given how prices are calculated for each of the 4 classes of milk. In this special edition of the *Weekly Dairy Outlook* I will try to explain as simply as possible why and how the PPD can sometimes be negative. In doing so, I will need at times to be slightly incorrect so that the explanations can be brief and understandable. The details of the laws and rules regulating FMMO can be daunting and difficult to understand. However, the general underlying principles are generally sufficient to understand price determination. But first we need to clarify a few things about FMMO that often are misunderstood or unknown.

A Few Things to Know about FMMO

- The FMMO system was designed in the mid 1930s to ensure orderly marketing of milk. At the time of its implementation:
  - There were more than 1 million dairy producers in the United States. There are now less than 40,000 remaining.
  - There was no highway system. Raw, fluid milk could not travel far from its production point. Because of the limitations on the transportation of raw milk, there were over 100 orders (i.e., milk sheds) when the system was first implemented. Now only 11 orders remain.
  - Nationally, the largest utilization was in Class I (fluid milk). At the time, fluid milk was the dominant form of dairy consumption in this country. Nowadays, fluid milk represents a bit less than 20% of milk utilization whereas cheese production accounts for nearly 60% of utilization.
  - Then and now, all Class I milk in a FMMO *must* be reported and pooled. However, the pooling of Class III and IV is not mandatory. Under 'normal' circumstances, it is advantageous for handlers of Class III and IV to report and pool their milk utilization with the order, but there are times, such as right now, where prices are such that there is an incentive to de-pool.
  - Milk prices were not determined by supply and demand, nor calculated using end product pricing formulas as is done today. Prices were determined from what USDA's economists calculated as the national average cost of production. This was called parity pricing.

- A few more things to know about FMMO:
  - In a FMMO, the cooperative is the producer. That is, non-cooperative-owned and regulated milk processing plants are required to pay minimum prices to farmers. However, re-blending provisions provided to cooperatives under the Agricultural Marketing Agreement Act allow cooperatives to pay prices below the regulated minimum to their members.
  - Milk is not priced where it is produced (i.e., the farm), but where it is processed (i.e., location of the plant).
  - Some rules are the same across all FMMOs (e.g., formulas used to calculate butterfat prices), whereas other rules vary across FMMOs (e.g., rules regarding the pooling and de-pooling of Class III or Class IV milk).
  - Class I differentials are fixed numbers (i.e., they do not vary each month) based on the location of the bottling plant. In general, they are higher the greater the distance from Wisconsin. They range from a low of $1.60/cwt in the Upper Midwest to $6.00/cwt in Florida.

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- Pricing is based on the wholesale price of 4 dairy commodities: cheddar cheese, butter, dry whey, and nonfat dry milk. Each week, there is a *mandatory* reporting of value and sales volume to USDA Agricultural Marketing Service (AMS) by dairy manufacturers of butter, nonfat dry milk, cheddar cheese, and dry whey. The USDA uses these prices to compute 2-week prices (middle 2 weeks of the month), which are used to calculate advance pricing factors for pricing fluid milk (Class I) and cultured products (Class II) for the *following* month. The USDA also uses these commodity prices to compute monthly prices used to calculate components (butterfat, protein, other solids, nonfat solids) and Class III and Class IV prices for the *preceding* month. This is important to understand! AMS announces the advanced Class I price and the advance Class II skim milk price on or before the 23rd of the *preceding* month. AMS announces the commodity prices, and therefore the Class II fat and Class III and Class IV prices on or before the 5th of the *following* month.
- The PPD is simply the difference between the handler value and the component value, divided by total pounds in the pool. That is, processors pay into or take money from the order's pool depending on whether the price they paid was below or above the producer value of milk. In 'normal' times, Class I and Class II processors pay in the pool while Class III and Class IV processors (mostly cooperatives) take money from the pool to (hopefully) be passed to the producers.

Simple Examples to Explain Negative PPD

Example 1. The first example is what would be expected under 'ideal' conditions. In this order, there are only 2 classes of milk: Class I, 250 million pounds (2,500,000 cwt) used during the month of both *May* and *June*, and Class III, 750 million pounds (7,500,000 cwt) also used during the month of *May* and *June*. During the weeks of May 9th and May 16th, the AMS calculated an advance Class I price for the month of *June* based on the price of the 4 dairy commodities during those 2 weeks. The advance Class I price was computed as $14/cwt from the advance Class III skim milk price plus $0.74/cwt and the advance butterfat price, plus a $2.00/cwt Class I differential (the bottler is in Cleveland, Ohio). Hence, the price of Class I milk in *June* was predetermined to be $16/cwt in *May*. It turns out that the commodity prices did not change from May to June, so the actual Class III price in June was also $14/cwt.

The blend price for June is: ($14 for Class III x 0.75) + ($16 for Class I x 0.25) = $14.50/cwt
The PPD is: $14.50 - $14.00 = $0.50 cwt
Class I handlers pay $0.50/cwt into the pool. Class III handlers (cooperatives) get $0.50/cwt from the pool.

Example 2. We use the same months and the same amounts of milk being pooled. During the weeks of May 9th and May 16th, the AMS calculated an advance Class I price for the month of June based on the price of the 4 dairy commodities during those 2 weeks. The advance Class I price was computed as $14/cwt plus a $2.00/cwt Class I differential as in example 1 because prices and volumes were the same in the month of May. Hence, the price of Class I milk in *June* was predetermined to be $16/cwt and was announced before *May 23rd*. However, commodity markets went way up in June, resulting in a Class III price of $18/cwt announced in early July.

The blend price for June is: ($18 for Class III x 0.75) + ($16 for Class I x 0.25) = $17.50/cwt
The PPD is: $17.50 - $18.00 = -$0.50 cwt (i.e., a negative PPD of $0.50/cwt)
Class I handlers are paid $0.50/cwt from the pool. Class III handlers (cooperatives) have to pay $0.50/cwt in the pool. They get this $0.50/cwt from their producer members.

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This is as simply as I can explain a negative PPD. The actual price calculations are a bit more complicated, but the two examples provide the essence as to why the PPD can be negative.

If the volume of milk marketed in a given FMMO remained constant throughout the year and if the utilization in each class also remained the same across time, then what is lost in the PPD during an up market would be recovered during a down market. In that case the average PPD would simply be the Class I differential multiplied by the fraction of the milk going to Class I. For a producer in FMMO 33, with a Class I differential of $2.00/cwt and a Class I utilization of ~35%, the average PPD during a given year should be close to $2.00 x 0.35 = $0.75/cwt. In 2019 the PPD in FMMO 33 averaged $0.26/cwt. So why this difference?

The Pooling Game

You must have noticed that in the second example, if I am a cheese processor and I pool the milk that was used to make cheese, then I will have to pay $0.50/cwt to the pool and the FMMO administrator will be using this money to pay Class I handlers $0.50/cwt. Now, if I don't pool this milk I won't have to pay $0.50/cwt into the pool. The price of unpooled milk is not regulated so I likely can get the milk I need for less than the regulated price because all other milk classes have a lower price than Class III. In fact, if I am a cooperative, I don't have to pay the Class III minimum price. Whenever the Class III (or Class IV) price is greater than what the blend price would be, there is an incentive for Class III (or Class IV) handlers to not pool the milk. For non-cooperative-owned plant, the incentive is pretty clear and only the FMMO's rules regarding pooling and depooling might inhibit the decision to pool or not to pool. However, this price situation places a cooperative-owned plant in a difficult economic (if not moral) decision. As a cooperative, if I pool the milk then I do what is best for dairy producers (non only my members, but all producers whose milk is pooled in the order). However I then put the cooperative in an unfavorable competitive situation (i.e., the cooperative will be paying more for its milk going to cheese than what its 'unpooled' competition is paying). If I don't pool this milk, I lower the blend price paid to dairy producers, but my cooperative is in a more competitive position. If you were the C.E.O. of a cooperative facing this decision, what would you do? Do you pool or not? Most don't…

You may wonder how extensive is this pooling game. I'll use the data for Order 33 (IN, OH, MI, W-PA) to illustrate how extensive this gets. In June 2019, 1,692 million pounds of milk were pooled in the order, of which 647 million pounds were in Class III. In May 2020, 1,787 million pounds were pooled, with 592 million pounds being in Class III. In June of this year, only 1,293 million pounds were pooled of which only 127 million pounds were in Class III. So roughly 500 million pounds of milk that normally would have been pooled in Class III (at a price of $21.04/cwt) didn't get pooled because Class I was priced at $13.42/cwt, Class II at $12.99, and Class IV at $12.90. Hence the PPD in Order 33 was -$7.05/cwt and the uniform price remained abysmal at $13.99/cwt. The system was just never designed to handle the current abnormal prices. And brace yourself because the same situation will most definitely be repeated in July. Why?

Higher of versus Average of: It Makes Quite a Difference

Until May 1st 2019, the Class I skim milk price was determined by the *higher* of the Class III and Class IV advance skim milk factors. Using commodity prices for the weeks of June 6 and June 13, the USDA-AMS calculated the July advance Class III skim milk price at $13.29/cwt, and the advance Class IV skim milk price at $6.46/cwt. Hence, under the formulas used until May 1, 2019, the Class I price would be entirely driven from the $13.29/cwt advance Class III skim milk price plus the applicable adjusted Class I differential ($2.00 for Cleveland,

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OH), plus a $0.20/cwt processor assessment, which is $15.49/cwt in total. However, as of May 1, 2019, the Class I skim milk price formula is the *average* of the monthly Class III and IV advance skim pricing factors, plus 74 cents/cwt plus the applicable adjusted Class I differential, plus the processor assessment, which equates to $12.82/cwt. This is $2.67/cwt less than what it would have been before the formula change. You read this right: Class I milk will be priced in July at $2.67/cwt less than if the old 'higher of' formula had been retained. In a world where in the long run the average producer nets $1.00 to $1.50/cwt of milk produced, a price shrinkage of $2.67/cwt is a big deal.

The difference between the two formulas will be even greater in August. We already know what the Class I price will be in August. This price was computed using commodity prices during the weeks of July 11 and July 18. The advance Class III skim milk price was calculated at $18.08/cwt whereas the advance Class IV skim milk price was calculated at $7.12. Under the old formula, Class I skim milk price for Cleveland would have been $18.08 + $2.00 + $0.20 = $20.28. Based on the new formula, Class I skim milk will be priced at ($18.08 + $7.12)/2 + $0.74 + $2.00 + $0.20 = $15.54/cwt, a net loss of $4.74/cwt of milk in Class I.

The change in the formula was made mostly to facilitate milk price hedging by Class I handlers. The 74 cents/cwt was the average difference between the prior 'higher of' based formula and the current 'average of' formula. Unfortunately, this change inevitably increased the volatility of milk prices paid to milk producers. Whether the two formulas will produce the same averages over the long run remains to be seen. Cumulatively from May 1, 2019 up to now, dairy producers have lost money from the new formula.

What's in the Forecast for Dairy Producers?

Based on the known Class I prices for July and Class III and Class IV prices on the futures markets for July, most FMMOs will once again see significant negative PPD in July. Likewise, we should also see some significant depooling of Class III milk in most FMMOs. Based on today's July futures closing prices for Class III ($24.49/cwt) and Class IV ($13.70/cwt), there will be an incentive for Class III handlers to depool in those FMMOs where Class I differentials are less than ~ $4.50/cwt, which is the vast majority of them.

In component-priced FMMOs (the majority of the milk in FMMOs), July component prices used for Class III milk pricing should be: $1.75-$2.00/lb of butterfat, $5.50-$5.75/lb of protein, and $0.12-$15/lb of other solids. Nonfat solids used for pricing Class IV milk should be around $0.80/lb.

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