



United States Department of Agriculture
Before The Secretary of Agriculture

In re: [Docket No. 23-J-0067; AMS-DA-23-0031]

Milk in the Northeast and Other Marketing Areas

Hearing beginning August 23, 2023

Testimony Presented By:

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I am Marin Bozic, President of Bozic LLC, and advisor to the Board of Directors of Edge Dairy Farmer Cooperative. I hold a doctorate in Agricultural Economics from the University of Wisconsin-Madison. I have worked as a faculty at the University of Minnesota-Twin Cities since 2011. In my academic career, I have extensively researched dairy markets and policy and dairy risk management. Since 2018, I have participated, with American Farm Bureau Federation and other partners, in creation of Dairy Revenue Protection (DRP), and today, my company manages both DRP and Livestock Gross Margin for Dairy Cattle.

Edge Dairy Farmer Cooperative, based in Green Bay, Wis., is the third largest dairy cooperative in the country based on milk volume. In addition to milk verification services, Edge provides dairy farmers throughout the Midwest with a voice in Congress, with customers and within our communities. Our over 800 member farms are located in Illinois, Indiana, Iowa, Kansas, Minnesota, Nebraska, Ohio, South Dakota and Wisconsin. With modifications, Edge is supportive of Proposal 1, submitted by the National Milk Producers Federation (NMPF) and Proposal 2, submitted by the National All-Jersey Inc.

A fundamental pricing principle within Federal Milk Marketing Orders is to establish Class I price high enough to reflect the opportunity cost of using that milk in manufactured products. As component tests have increased over the years, so has the opportunity cost of using that milk in Class III or Class IV products, instead of fluid milk (Class I) products.

In Multiple Component Pricing (MCP) orders, Class I handlers' obligations to the pool are based on standard milk component tests, yet their draws from the pool are based on actual component tests in producer milk. Producer receipts in MCP orders in 2022 were 134,888,000 pounds, or

approximately 88% of total pooled pounds across all eleven federal milk orders, which justifies basing the national pricing formulas based on the impact of rising milk components in MCP orders.

As the spread between actual and standard component tests has grown over years, net obligations to the pool have been reduced. In my study with Dr. Christopher Wolf, published in the Journal of Dairy Sciences in 2022 (enclosed as Exhibit Edge-2), we found that rising actual component tests combined with outdated standard component tests, has led to lowering of statistically uniform prices between 2010 and 2020 by $-\$0.08/\text{cwt}$ in FO 1 – Northeast, $-\$0.05/\text{cwt}$ in FO30 – Upper Midwest, $-\$0.16/\text{cwt}$ in FO32 – Central, $-\$0.14/\text{cwt}$ in FO33 – Mideast, $-\$0.12/\text{cwt}$ in FO124 – Pacific Northwest and $-\$0.29/\text{cwt}$ in FMMO126 – Southwest.¹

Unless a regulation is promulgated that considers the rising opportunity cost of milk used in Class I milk due to rising protein and other solids tests, the spread between actual and standard component tests will continue to contribute to negative trend in Producer Price Differentials (PPDs). Lower baseline PPDs make it easier for other price shocks to induce depooling, which is a symptom of disorderly marketing.

That said, we believe the NMPF proposal can be improved by two design changes. First, we believe the methodology used to update the standard protein and other solids test should also be used to set the standard butterfat test. While updating standard butterfat test would not affect pool obligations, it would ensure that producers can effectively use Class III and Class IV futures and other risk management tools based on class prices to manage their price risk. Second, we believe the implementation delay should be longer than proposed by NMPF, to support utilization of more CME Group open interest of Dairy Revenue Protection used by dairy producers.

1. Adjusting Standard Butterfat Test

The NMPF proposal does not adjust the standard butterfat test to track rising actual butterfat tests more closely. This design decision is likely driven by the fact that setting a higher standard butterfat test would not have any effect on handler obligations to the producer settlement fund, and thus producer price differentials or uniform prices.

However, our analysis suggests that not changing the standard butterfat test could adversely impact producers' ability to use Class III futures and Class IV futures in hedging their gross pay price.

Many dairy producers actively manage risk to their gross pay price. Available risk management tools include Chicago Mercantile Exchange futures and options contracts, Dairy Revenue Protection insurance plan, forward contracts, and Livestock Gross Margin for Dairy Cattle, . The most heavily used tool is the Dairy Revenue Protection (DRP) insurance plan, offered through USDA Risk Management Agency. DRP expected prices are quarterly averages of Class III milk futures and Class IV milk futures. For quarters falling in the calendar year 2022, total declared

¹ Bozic, M. and C. Wolf (2022) Negative producer price differentials in Federal Milk Marketing Orders: Explanations, implications, and policy options. Journal of Dairy Sciences, January 2022, Pg 424-440.
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covered milk under Dairy Revenue Protection was 56,732,768,416 pounds. Of that amount, 85.13% is protected using Class Pricing Option, and 14.87% using Component Pricing Option.

The NMPF proposal maintains the butterfat standard test unchanged at 3.5 pounds of butterfat per hundredweight of milk. Their initial proposed protein standard is 3.36 pounds per hundredweight of skim milk. That would result in butterfat to protein ratio of 1.08.² This is a decline from the current butterfat-to-protein ratio of 1.17.³

Across the six MCP orders that were in effect in both 2000 and 2022, simple average butterfat-to-protein ratio increased from 1.23 in 2000 to 1.27 in year 2022. While the industry average butterfat-to-protein ratio *increased* over the last 23 years, NMPF proposal would have that ratio *reduced*. This would impair the ability of dairy producers to effectively use any risk management tools related to Class III milk futures to manage their milk price risk. In almost all cases, risk management does relate to Class III. To illustrate this point, consider hedging against a COVID-19-style crisis. Consider a producer with component tests as following: butterfat test at 4.10, protein test at 3.25, other solids at 5.78. To keep the example simple, assume that producer gross pay price will be set as butterfat test × FMMO butterfat price + protein test × FMMO protein price + other solids test × FMMO other solids price + a constant basis of \$0.25/cwt. On January 15th, producer hedges their May gross pay price using available futures prices. They hedge 100% of their marketings, and we assume that their total milk marketing is an exact multiple of the Class III futures contract size. In late March, a major pandemic is announced, with public health measures similar to those instituted in 2020.

Consider two scenarios:

- 1) NMPF proposals regarding make allowances and component standards are adopted, but butterfat standard remains at 3.5 pounds per hundredweight of milk (as proposed).
- 2) NMPF proposals regarding make allowances and component standards are adopted, but the butterfat standard is also increased, to 4.06 pounds per hundredweight of milk (2022 annual average for “all markets combined”, as published by USDA AMS).

The table below replicates butter, cheese and dry whey futures using close prices for January 15, 2020, and implied butterfat, protein, other solids and Class III futures price consistent with scenarios #1 and #2 listed above. The table also contains the expected gross producer price as of January 15, 2020. The table also contains actual butter, cheese and dry whey prices for May 2020, and implied butterfat, protein and other solids, and actual gross pay price to the producer.

	<i>Futures or Expected, Jan 15 2020</i>	<i>Actual for May 2020</i>	<i>Change Jan to May</i>
<i>Butter</i>	2.0978	1.3074	-0.7904
<i>Cheese</i>	1.7850	1.2990	-0.4860
<i>Dry Whey</i>	0.4335	0.3818	-0.0517
<i>Butterfat</i>	2.2861	1.3290	-0.9571
<i>Protein</i>	2.5711	2.0129	-0.5582

² $3.5 / ((100-3.5)/100) * 3.36 = 1.08$.

³ $3.5 / ((100-3.5)/100) * 3.1 = 1.17$

<i>Other Solids</i>	0.2096	0.1564	-0.0532
<i>Class III (Scenario #1)</i>	17.63	12.14	-5.48
<i>Class III (Scenario #2)</i>	18.85	12.84	-6.00
<i>Producer Gross Pay Price</i>	19.10	13.09	-6.05

Producer gross pay price declined by \$6.05 vs. what the producer expected to receive for May based on January 15th futures. The producer sold Class III milk futures in hope that hedging gains on Class III milk futures would offset and unexpected declines in the producer's mailbox price.

If the standard components were set per scenario #1 (NMPF proposal), hedging gains would be \$5.48, and producer would suffer a loss of \$0.52/cwt despite fully hedging their milk.

If the standard components were set per scenario #2 (NMPF proposal with higher butterfat test as proposed in this testimony), hedging gains would be \$6.00 and would almost fully offset losses on their milk check, with the residual loss not offset by hedging gains of only \$0.05/cwt.

Another way to measure hedging effectiveness is to assess impact of hedging on conditional standard deviation of hedged vs unhedged price:

In the analysis that follows, we attempt to estimate the impact of implementing scenario #1 (NMPF proposal) vs #2 (NMPF proposal, but with higher butterfat test proposed here) on hedge effectiveness for a representative producer described above.

For this exercise, we assume the producer has component tests as following: butterfat test of 4.40, protein test of 3.30, and other solids test at 5.78. We assume that on producer hedges their gross milk price which will be received 14 months after the hedge is placed. We further assume that the NMPF proposal will be implemented before the hedge expires, and that regulatory changes are fully and accurately priced into futures prices. For illustration we use August 18, 2023, butter, cheese and dry whey futures for December 2024, and derive expected butterfat, protein, and other solids price, and implied Class III futures price per scenario #1 and #2. We use 5,000 simulated October 2024 butter, cheese, and dry whey prices based on Dairy Revenue Protection, Actuarial Data Master Record 831 as applicable for DRP sales on August 18, 2023. This allows us to create a vector of 5,000 simulated gross pay prices, and 5,000 simulated butter, cheese, dry whey, butterfat, protein, other solids and announced Class III prices for December 2024.

Using December 2024 futures prices as observed on August 18, 2023, and the assumptions listed above, we find:

- 1) Butter futures price is \$2.2470/lb
- 2) Cheese futures price is \$1.9090/lb
- 3) Dry Whey futures price is \$0.3800/lb
- 4) Implied butterfat futures price is \$2.4668/lb
- 5) Implied protein futures price is \$2.7804/lb
- 6) Implied other solids futures price is \$0.1545/lb
- 7) Implied Class III milk futures price per scenario #1 (3.5 butterfat standard) is \$18.63/cwt
- 8) Implied Class III milk futures price per scenario #2 (4.06 butterfat standard) is \$19.95/cwt

9) Expected Gross Pay Price is \$21.20/cwt

Examining the simulated data, we find:

- 1) Average simulated (average of 5,000 simulated prices) producer's gross pay price is \$20.20/cwt and standard deviation is \$4.20/cwt.
- 2) Average simulated Class III Milk Price per Scenario #1 is \$18.63/cwt and standard deviation is \$4.01/cwt.
- 3) Average simulated Class III Milk Price per Scenario #2 is \$19.95/cwt and standard deviation of \$4.01/cwt
- 4) Average hedging gains per scenario #1, defined as the average of 5,000 differences between Implied Class III milk futures price (Scenario #1) and simulated Class III Milk price (Scenario #1) is \$0.0007/cwt
- 5) Average hedging gains per scenario #2, defined as the average of 5,000 differences between Implied Class III milk futures price (Scenario #2) and simulated Class III Milk price (Scenario #2) is -\$0.0002/cwt

We assume that producer sold Class III milk futures, protected 100% of their expected marketings, and that there is no difference between expected and actual milk production, butterfat test, protein test or other solids test.

Hedged gross pay price is defined as the sum of the gross pay price and hedging gains or loss.

Under scenario #1 (NMPF proposal) average simulated hedged gross pay price is \$21.20/cwt. Conditional standard deviation is \$0.43/cwt.

Under scenario #2 (NMPF proposal, but standard butterfat test at 4.06) average simulated hedged gross pay price is \$21.20/cwt. Conditional standard deviation is \$0.20/cwt.

We see that conditional standard deviation of hedged producer pay price is twice as large in Scenario #1 vs Scenario #2. Adjusting standard butterfat test meaningfully improves hedge effectiveness.

In conclusion, adjusting standard butterfat test materially improves dairy farmers' ability to manage their gross pay price risk.

2. Proper advance notice to the industry

NMPF is correct to request that increased standard component tests be implemented with a delay. Edge proposes that such delay be longer. In particular, we propose that by September 15 of each year, USDA announces the revised butterfat, protein and other solids tests that will be implemented on January 1st following the announcement date by fifteen and a half months. This would align well with the schedule used by USDA RMA for Dairy Revenue Protection. September 16 of each year is the first sales date when USDA RMA allows dairy producers to hedge January-March quarter of the year following the next year, e.g. on September 16, 2023, dairy producers will have the ability to start hedging Jan-Mar 2025. My ongoing and unpublished academic research suggests that due to slow speed of reversion to long-term mean in aftermath of major shocks in milk prices, dairy producers should initiate hedges up to 15 months ahead of the month they wish

to cover. Intuitive explanation is that crises in milk prices tend to last up to 5 quarters. For example, Class IV milk prices which declined precipitously in March 2020 did not recover to pre-pandemic levels until May 2021.

In absence of regulatory certainty, RMA may be legally obliged to suspend DRP offers for quarters for which the DRP 508(h) submitter (Bozic LLC) advises increased likelihood of indemnities being driven not by market supply and demand shocks, but changes in milk futures prices due to regulatory announcements.

DRP is regulated under the Federal Crop Insurance Act². 7 C.F.R. § 1508(a) states:

To qualify for coverage under a plan of insurance, the losses of the insured commodity must be due to drought, flood, or other natural disaster (as determined by the Secretary).

To be in alignment with the enabling legislation, Dairy Revenue Protection policy, Section 4, stipulates:

This policy provides insurance only for the difference between the final revenue guarantee and actual milk revenue, times your actual share and protection factor, caused by natural occurrences in market prices and yields in your pooled production region. This policy does not insure against the death or other loss or destruction of your dairy cattle, or against any other loss or damage of any kind whatsoever.

DRP expected prices are based on CME futures prices. If futures prices may drop due to unexpected regulatory shock (i.e., actual make allowances being higher than expected make allowances or standard component tests set higher than expected by the industry), then DRP could inadvertently provide coverage against policy risk. Consequently, the legality of DRP may be challenged as policy risk is not a natural occurrence in market prices. Ultimately, the program may need to be suspended, at least for the Class Pricing Option. In addition, Livestock Gross Margin for Dairy Cattle (LGM-Dairy) may also need to be suspended.

To underline, our request for proper advance notice of forthcoming regulatory changes is not limited to standard components but also extends to make allowance changes.

Concluding comments

Edge Dairy Farmer Cooperative thanks Secretary Vilsack and the Department for the opportunity to testify at the hearing. Edge worked across several Upper Midwest states over the past few years to study and develop proposals and responses to Federal milk marketing order changes.