Testimony on Class I

Presented at the

Federal Milk Marketing Order Hearing

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by

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[1] I retired from the University of Wisconsin in November 2022 as the Director of Dairy Policy Analysis and the Director of the Center for Dairy Profitability.

Background

Judge Clifton and personnel of AMS Dairy Programs. My name is Mark W. Stephenson, Ph.D. I recently retired after 12 years as the Director of Dairy Policy Analysis from the University of Wisconsin. Prior to that, I spent 17 years as the Associate Director for Outreach with the Cornell Program on Dairy Markets & Policy. I have a bachelor's and a master's degree in Dairy Science from Michigan State University and a second master's and doctorate degrees in Agricultural Economics from Cornell University. Today I am here to testify about a few aspects of what I believe should be under consideration in the formulation of a recommended decision from this hearing process. Specifically, I would like to focus on the Class I issues being deliberated at this time.

I have spent 43 gratifying years working to help individuals, firms, regulatory branches, and government make decisions to improve lives and livelihoods in the dairy industry. I have great friendships and strong bonds on all sides of almost any issue and I offer my comments as a capstone to this career.

My first university position was in Cooperative Extension after my degrees at Michigan State in Dairy Science—the production side of our business. At that time, I was confused by milk prices and the regulatory structure that appeared to move them. In fact, that was why I returned to school and pursued my degree in Agricultural Economics. There I began to learn about dairy markets and the regulations that played a role in those markets.

I have taken great pleasure in talking and working with pillars of our industry, and I have made use of those conversations, papers, unpublished documents and letters of the folks who were molding the very ideas that became our Federal Milk Marketing Orders. One of the authors in particular—Dr. Leland Spencer at Cornell University—was like Hamilton: "In the room where it happened." I was not a part of that place or time, but their documents have shaped my understanding of what the problems of the day were and what tools they crafted to correct those issues.

History of Federal Milk Marketing Orders

Pricing regulation, of any kind, is generally a last resort and employed only when we have some evidence of "market failure". Problems of the Great Depression inspired a 1934 amendment to the Agricultural Adjustment Act (AAA) of 1933. This amendment authorized the primary tools of classified pricing and marketwide or handler pooling that we have today. And it allowed the creation of Marketing Agreements. A 1935 amendment to the AAA authorized Marketing Orders which had greater regulatory and enforcement authority than the Agreements.

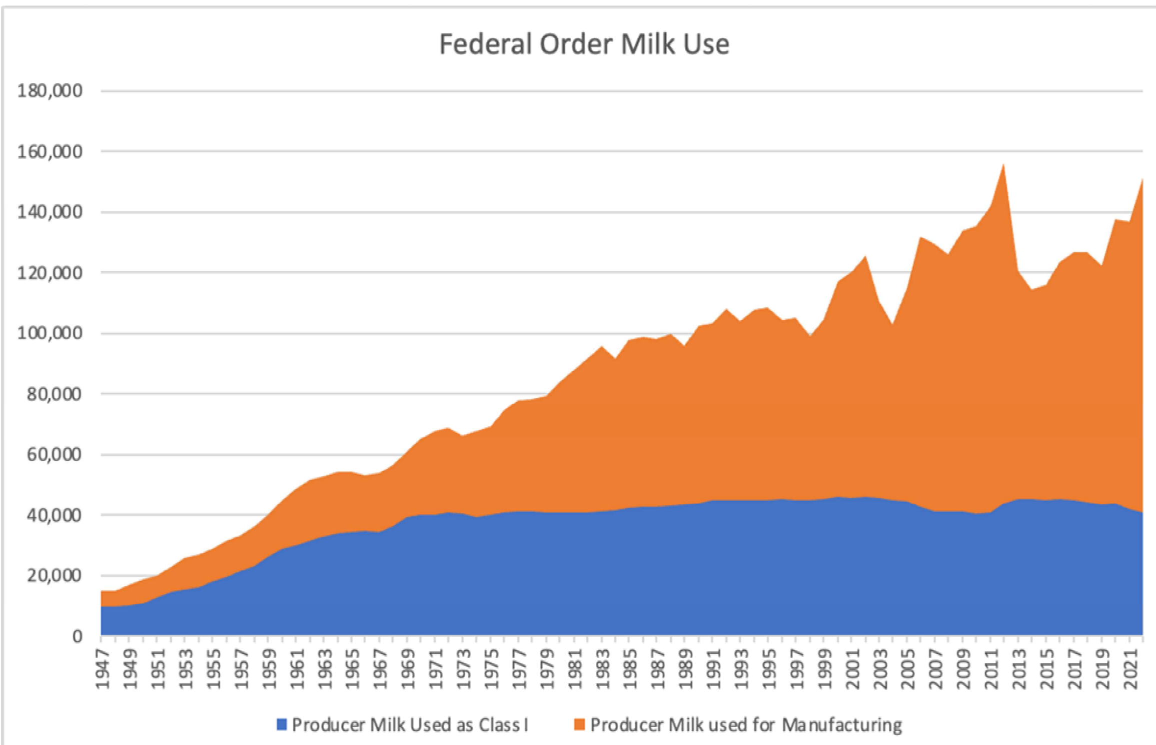
On June 3, 1937, the Agricultural Marketing Agreement Act was passed which preserved Order language and added new structure such as: 1) it became permanent law, 2) it was permissive, not mandatory, 3) it allowed four forms of regulation including today's marketing orders without agreements.

Since that time, Congress has had minimal input into our Federal Orders which largely rely on the same basic tools the Orders utilized to prevent the market failures of the 1930's. This stagnation has probably been both a blessing and a curse. A blessing because it requires the hearing process where the dairy literati can present their ideas which USDA is charged to distill into a balanced decision. And a curse because the shackles of the 1937 act do not let us directly address the problems of today's modern dairy industry.

Early market failure was largely due to destructive competition. In a commodity market, such as milk, the only effective means of expanding your market share is by offering your product to the customer at a lower price. The competition between milk handlers to sell to customers had a tendency to drive producers to accept lower prices. The very special properties of milk: that it is produced and sold 365 days a year, highly perishable, bulky and expensive to transport, etc., also meant that farmers were not in a position to strongly protest the price received.

Fluid milk was the most important dairy product of the time in the 1940's (Figure 1), but that has changed over the years. In 1947 Class I milk represented about two thirds of regulated milk. By 2022, Class I use in FMMOs was only about 27%. If we look at fluid milk use as a percent of all milk produced (both regulated and unregulated), today Class I use is less than one fifth (about 18 percent).

Figure 1. Use of Milk in Federal Milk Marketing Orders.[2]



It is important to remember that in 1950 only 60 percent of U.S. milk sold was Grade A and eligible for fluid use (thus potentially regulated).[3] Today, more than 99 percent of U.S. milk production is Grade A.[4]

Classified pricing and pooling had been introduced by cooperatives into the Boston market in the late 1800s—50 years before they became the primary tools of FMMOs. These tools provided a

[2] Measures of Growth in Federal Orders, Agricultural Marketing Service, various bulletins.
[3] Milk—Final Estimates for 1979-82, USDA Statistical Reporting Service, Statistical Bulletin Number 722.
[4] Milk Production, disposition, and Income 2022 Summary.

means of assuring that a higher minimum price was paid by fluid milk plants and shared equitably amongst cooperative members. These cooperatively enforced tools demonstrated that the ideas could work but needed the weight of government enforcement to be broadly effective.

Federal Orders have always operated under guiding principles whether objectively stated or revealed by decades of action. I have heard various explanations of the use of classified pricing. One of those is that the cooperatives of yesteryears were trying to exploit the differences in price elasticity between dairy products and consumer groups. More generically, this behavior would be thought of as a monopolist practicing third-degree price discrimination. I suspect that those cooperatives certainly had price enhancement on their minds, but I can also imagine that the cost of service also differed between their buyers.

During the course of this hearing, I have heard testimony from economists whose area of expertise is demand. That is not my area of specialty, but if their recent research is correct and fluid elasticity has moved from the long-accepted range of inelastic to elastic, increasing prices to consumers will actually lower total revenues to producers rather than increase them.

Fluid milk handlers have also been considered to be a higher maintenance group until more recently. Because their product was the most perishable of dairy products, they were not able to buffer production and sales gaps with any significant inventory. This meant that seasonal fluid demand, which is almost counter-cyclical to milk production, had to be balanced with raw milk supplies from manufactured dairy plants. Moreover, many fluid bottlers did not process on the weekend, creating intra-week balancing needs. It was expensive to accommodate fluid milk balancing needs. Manufacturing plants taking extra milk on weekends or giving milk up for fluid needs on Mondays or in the fall incur additional operating costs. Thus, the thought was they should not have to pay as much for milk as the fluid processor.

So, whether classified pricing arose because farmers and their cooperatives were practicing price enhancement and were aware of dairy product demand relationships, or because they simply recognized costs were different servicing various types of plants, classified pricing made sense.

Federal Milk Marketing Orders are built around fluid milk. This is partly demonstrated by the concepts that fluid plants ***must*** be regulated and manufacturing plants ***may*** be regulated if they so choose. An AMS document also explicitly states:

> *Federal orders are used to stabilize conditions for fluid milk to make the buying and selling of fluid milk an orderly process upon which dairy farmers, milk dealers and consumers alike can depend.*[5]

And, it is further reinforced by the concepts that, "*A marketing area is generally defined as a geographic area where handlers compete for packaged fluid milk sales*."[6] I.e., methods to achieve the goals of federal orders are built around fluid milk, which is also known as Class I.

Classified pricing has hinged on monthly price discovery since the inception of Federal Orders. FMMOs have always relied on ***minimum*** pricing. I.e., you are welcome to pay more for milk, but if you are regulated, you cannot pay less. Figure 2 illustrates the market clearing price goal as the intersection of supply and demand. If you are below the market-clearing price of P*, then farms

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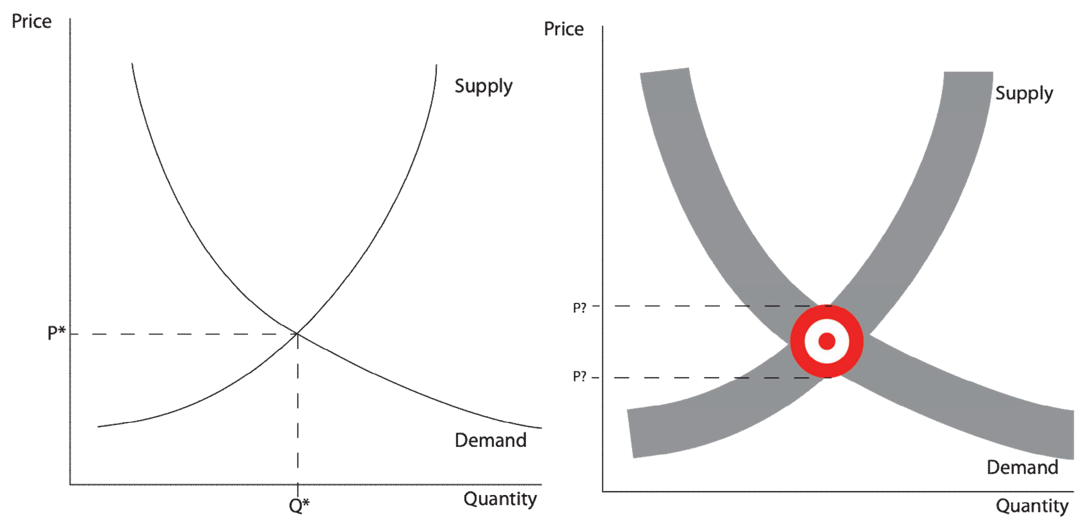
[5] Questions And Answers On Federal Milk Marketing Orders. United States Department of Agriculture, Agricultural Marketing Service Dairy Division, AMS — 559, page 1.
[6] https://www.ams.usda.gov/rules-regulations/moa/dairy

will not produce as much milk as consumers demand at that price. If you are above P*, then farms will supply more milk than consumers are willing to buy, creating a surplus of milk.

Being above the market clearing price is a cardinal sin in minimum price regulation—which means it governs milk price regulation, too. A lower price can be rectified by paying voluntary premiums and climbing back up to P*. A higher price mistake can only be fixed by opting out of regulation if you are a manufacturing plant. Unfortunately, fluid plants cannot pull that ejector cord.

Figure 2. Discovering a Market Clearing Price.



The sharp lines of the left-hand graph in Figure 2 make it appear as though we can know P* with precision. The right-hand graph is a better representation of reality. The lines are thick and heavy and we may know when we have not hit the target, but being somewhere within the target mostly works. Being slightly above for short periods of time may be accommodated by accumulating dairy product stocks. However, this is also a signal that markets are not clearing and may suggest a disorderly marketing condition. **It is better to err on a too-low price than one that is too high—especially for fluid plants which cannot opt out of regulation.**

<u>Discovering a Market Price</u>

Early orders were relatively small geographies and each order could look just beyond their boundaries to observe unregulated milk and see what prices were being paid nearby. This satisfied the need to recognize free-market supply and demand forces and regional differences in prices to land on an appropriate regulated minimum price.

Later, the Minnesota-Wisconsin, or MW, price was used as a national benchmark. This was a regular survey of Grade B manufacturing plants in the Upper Midwest to see what they had paid in an unregulated market to get milk into the door of many plants. The method was useful until the volume of Grade B milk became so small that it was thought to be an unreliable indicator of milk's value across the country.

Federal order reform, implemented in the year 2000, employed our contemporary end product price formulas to discover milk's value from weekly surveys of product prices. With these we could impute the value of the milk used to make those same dairy products.

A single product price fails to recognize that there are regional differences in milk supply and dairy product demand. These differences arise because some regions of the country have agronomic or other factors that either favor milk production or make it more difficult and expensive. For example, cows like the cooler climate of the northern states but many people would rather avoid cold winters and choose to live in the South.

The FMMOs try to capture these differences by adding a Class I differential onto a base Class I skim price mover that is discovered monthly. Like the price of corn or avocados, it has long been recognized that milk prices have a basis or geographic relationship. This fact means that milk has relative regional values, where milk in certain locations can be "more valuable" than milk in other locations because of its relatively tighter supply. Federal Orders try to capture regional variation with Class I differentials.

U.S. Dairy Sector Simulator Model ("USDSS")

I have studied regional price relationships in dairy markets for most of my career. The U.S. Dairy Sector Simulator model, or USDSS, has been constructed by a handful of folks first associated with the Cornell Program on Dairy Markets and Policy over many years. It is a straight-forward transshipment model of the dairy industry which has evolved to capture the most important economic drivers of dairy markets. Dr. Charles Nicholson, who has testified about current runs of this model, and I, are the current caretakers of the USDSS.

The USDSS solves a complex task of simulating assembly of raw milk from dairy farms across the contiguous 48 states and shipping it to plants where dairy products are manufactured to be distributed to consumers across those same states. The model's task is to find the most efficient (low cost) movements of milk assembly, product processing and distribution of final products, subject to many constraints. The model does not develop or reflect actual values for milk, but rather the relative value.

The USDSS solves this task for a single period of time. I.e., it represents a snapshot in time. We typically choose a specific flush and short-season month to represent seasonal variation. We take several inputs as given. Those include the volume and composition of milk production in the months of interest, the location of actual plants as well as the specific products they produce and an approximation of the plant's volume capacity, and the demand for dairy products which will differ by season, composition (in the case of fluid milk) and location. Imports and exports of dairy products and changes in stocks are also accounted for. And, current estimates of transportation costs differ for raw milk, refrigerated and unrefrigerated finished products. All movements must take place across the known miles of a road network which places restrictions on truck capacity based on the weight limits of the states traversed. Labor and fuel costs also vary by region of the country.

We utilize two versions of the USDSS: a smaller model with hundreds of milk supply and product demand locations, and a larger version which solves for milk production and demand at the more than 3,000 counties of the 48 contiguous states. The model's output provides us with the "primal" solution, which describes the specific product flows achieving the lowest cost for the entire supply chain. However, the model also generates a "dual" solution which tells us the marginal value of the next unit which relaxes one of the constraints in the model. For example, we can see what the impact of a new plant, or closure of an existing one, would be. Or we can see the value of another cwt of milk at a plant location.

AMS dairy programs have relied on this model to provide guidance into Class I differentials in the past. But it is important to note that the model dual values are "price relatives" which describes the cost savings that the model can achieve with the next unit of milk. There will be one or more locations in the country where that value is $0.00. Such a location says that the model cannot lower costs by reconfiguring anything. This will typically occur in regions with much surplus milk located some distance from areas of great deficit.

Currently, there are no $0.00 differentials in the FMMO system. An increment must be added to all of the dual values in the model to get to what we think of as differentials today. If you consider our current differential values, as provided by AMS, then $1.60 is the low value which we see in 150 counties found in California, Idaho, Minnesota, Montana, North Dakota, Oregon, Utah, and Wyoming.

Class I Differential—Grade A

The $1.60 Class I differential was implemented during Federal Order reform, but it is worthwhile today to reconsider the justification for this base value.

It has been suggested that the $1.60 addition is justified for several reasons. Part of that value was to support conversion from Grade B to Grade A milk production. That justification may have been warranted in the 1940s or 50s when the majority of farms did not meet Grade A standards, and perhaps was a lingering thought during Order reform when the $1.60 was set.[7] In fact, inclusion of this amount would have furthered the goal of ensuring "an adequate supply of fluid milk" when fluid milk was the largest category of milk use and Grade B production was still found in many states. But today, compensation to support conversion to or maintenance of Grade A status is not needed.

Maintenance of Grade A status is no longer a Class I issue—it is an industry-wide standard. Facilities are built to keep cows comfortable and clean and such standards are not an additional expense of servicing the fluid market. Maintaining Grade A status is basically a minimum requirement for marketing farm milk in today's world. This reality is reflected in the fact that more than 99 percent of U.S. milk production is Grade A. Maintenance of Grade A standards includes such things as fly and rodent control, records to track drug use in cattle, water sampling, etc. – all requirements that are standard on every farm today. Additionally, in order to service the manufactured products export market (which most farms need to be able to do), milk must be Grade A.

Voluntary premiums have been and are used to incentivize milk production. When rBST was made available to the industry, many handlers paid a premium to receive milk that did not have that product used in the production process. As more farms elected not to use rBST, the premiums became smaller and I am not aware that anyone pays them today. I.e., rBST free milk became a *de facto* standard. A bit later, plants wanted lower SCC in milk and were paying premiums to farms producing a cleaner product. But, as more farms adopted practices to produce lower SCC milk, it too has become commodified and there is no need to pay that premium as most farms produce to that new standard. Grade A production is certainly of a similar character and there is no need to incentivize conversion or maintenance anymore.

Class I Differential—Balancing

Another justification for the $1.60 has been said to be balancing. As I mentioned earlier, there is a cost to balancing whether because of seasonal or intra-week reasons. A variety of seasonal

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[7] Milk Production, Disposition and Income, NASS, at the time of Order reform shows a few dairy states that still produced only about 60 percent fluid grade milk. The April 2022 publication shows that currently Fluid Grade milk production is 99.6% of total U.S. production.

incentive plans have been employed in FMMOs to alter milk production patterns. There have been so-called "take-out—pay-back" plans, and popular at one time was the "Louisville" plan named after the order where it was first employed. These are no longer in use as seasonal production, while still evident, is not as pronounced as it used to be. And the incentives were not large enough to motivate producers to perfectly match seasonal demand patterns.

Intra-week balancing has been a cost to the system. Traditionally, fluid plants that elected to not process on Saturday and/or Sunday pushed that milk off to manufacturing plants to balance. And, on Monday's when retail shelves needed to be refilled from weekend shopping, additional milk was needed taking extra loads from manufacturing plants. The push and pull for milk meant that manufacturing plants were not operating optimally and increased their operating costs with periodic excess processing capacity.

However, these justifications no longer exist for making the balancing expense a pool-wide obligation. First, cooperative incentives for fluid plants to at least unload and store milk on the weekends has been successful in many locations. These incentives come in the form of credits to over-order charges otherwise negotiated in the various milk markets. Second, fluid plants have erected additional silos and run crews to receive milk on the weekends. This has become a standard practice now in the industry and also demonstrates that market incentives work. I would expect that similar to low SCC milk and Grade A status, this practice will become commodified and no longer require incentive built into the Class I differential in the future. Third, in looking at the shifts in utilization between Class I and manufacturing classes, the balancing "burden" carried by the non-Class I market (farmers and manufacturing plants alike) is no longer a meaningful expense that Class I must reimburse in order to ensure a sufficient supply of fluid milk. Manufactured milk, traditionally seen as more of a balancing role, is now a majority of the milk use in most regions. This shift means that there is more than a sufficient supply of milk for Class I to attract when needed, as opposed to needing Class I to fund the pool to ensure that milk remains available for the short days or months.

Class I Differential—Incentive to Serve Class I

The third reason for the $1.60 has been identified as the cost to move milk (largely via diversion) from manufacturers to fluid plants when it is needed. I am not persuaded that this is still a factor.

Logistically, the actual costs of a transfer do not align solely with the Class I differential structure. The cost of loading a truck at a manufacturing plant and the time and miles of transport to the fluid plant are still costs that the fluid plant would have to bear directly—it does not somehow come out of the pool from the $1.60 already paid. Thus, in reality, if a fluid plant wants to attract milk from a manufacturing plant, they currently have to pay for it twice—once in the form of that portion of the $1.60 that goes to the pool and again as a premium directly to the supplier/manufacturing plant to transfer the milk.

I think that a better explanation of this "incentive" element in the Class I differential, is a simple thought experiment. If a cheese plant exists just across the road from a fluid plant and the fluid plant needs an extra load of milk, what does it take to get milk from the manufacturing plant? Presumably, the cheese plant could just divert a milk truck coming in from farm assembly to drop it off at the fluid plant with no additional cost for loading or unloading, no additional time or miles. So, the real question is, what are the opportunity costs for the cheese plant giving up that load of milk and the product not produced on that day? I am not sure that I know what those costs are, but they could conceivably be some amount below $1.60 or even the entire $1.60.

The important question is whether that cheese plant feels like it has already been paid the "give up value" of $1.60 paid by its pool draws (equalization payments) so that it is willing to release the load without additional incentives. In some orders a call provision (now in the form of performance standards) might persuade the cheese plant to accommodate the fluid plant's needs. In an economist's view, it would be when the marginal cost equals the marginal revenue of that transaction. However, I think that we have ample evidence from market premiums and incentives that this is no longer a pool-wide consideration—the fluid plant will come to agreement with the cheese plant as to what it will take to provide that load of milk. It would be far more market efficient to let the transaction take place between the two participants than to dilute the incentive through the pool and share it across all handlers and farms—even those who did not contribute milk to the fluid market.

I do hear that it is getting harder to move milk. But this fact shows what is needed is that this money not be included in the pool but instead allowed to be used by the Class I plants to directly incentivize their suppliers. I am not trying write Federal Order policy, which is for folks who are direct participants in the system. But if it is determined that the $1.60 is necessary to ensure service to Class I plants, it would be more effective to require that Class I plant prices include the $1.60 but that they can pay that $1.60 directly to their supplier and not into the pool. This would reward performance directly and not indirectly.

Additional Insights from the USDSS

Both the primal and dual solutions of the USDSS represent values from the optimal solution. USDSS model validation does show us that the evolution of regional processing structure closely correlates with the optimal model solution. Examples include that the most milk deficit regions have primarily fluid and few manufacturing plants. Surplus regions have more manufacturing than fluid plants. Fluid plants are located closer to metropolitan centers and raw milk supplies will move greater distances than packaged fluid distribution. More nutrient dense manufactured products, like cheese and butter, have plants located closer to the milk surplus milk supplies and ship their final products long distances to meet consumer demand.

A model is a simplification of the market realities. However, the USDSS model has been decades in the making and almost every major model run has incorporated new details that we believe are of importance to a deeper understanding of spatial dairy markets. Actual milk movements (not model representations) may differ from the optimal, but differing by much is like swimming against an economic current.

The USDSS model can give us an idea of the relative value of milk used in different types of plants. As mentioned earlier, AMS has only asked for the dual values at fluid plants. In fact, the model can generate these dual values anywhere there is a plant of any type, or a farm, or a population center, so we can get values at a fluid plant, but we can also look at those values at cheese plants. And, if those plants happen to be across the road from one another, you might think that the dual values would be the same. But they can actually differ based on the global need for the finished product. So, a plant making cheese in some location might be more valuable to the global optimal solution of the USDSS than the fluid plant across the road. This comparison can approximate the "incentive" value or "give up" charge for delivering milk to a fluid plant instead of a manufacturing plant.

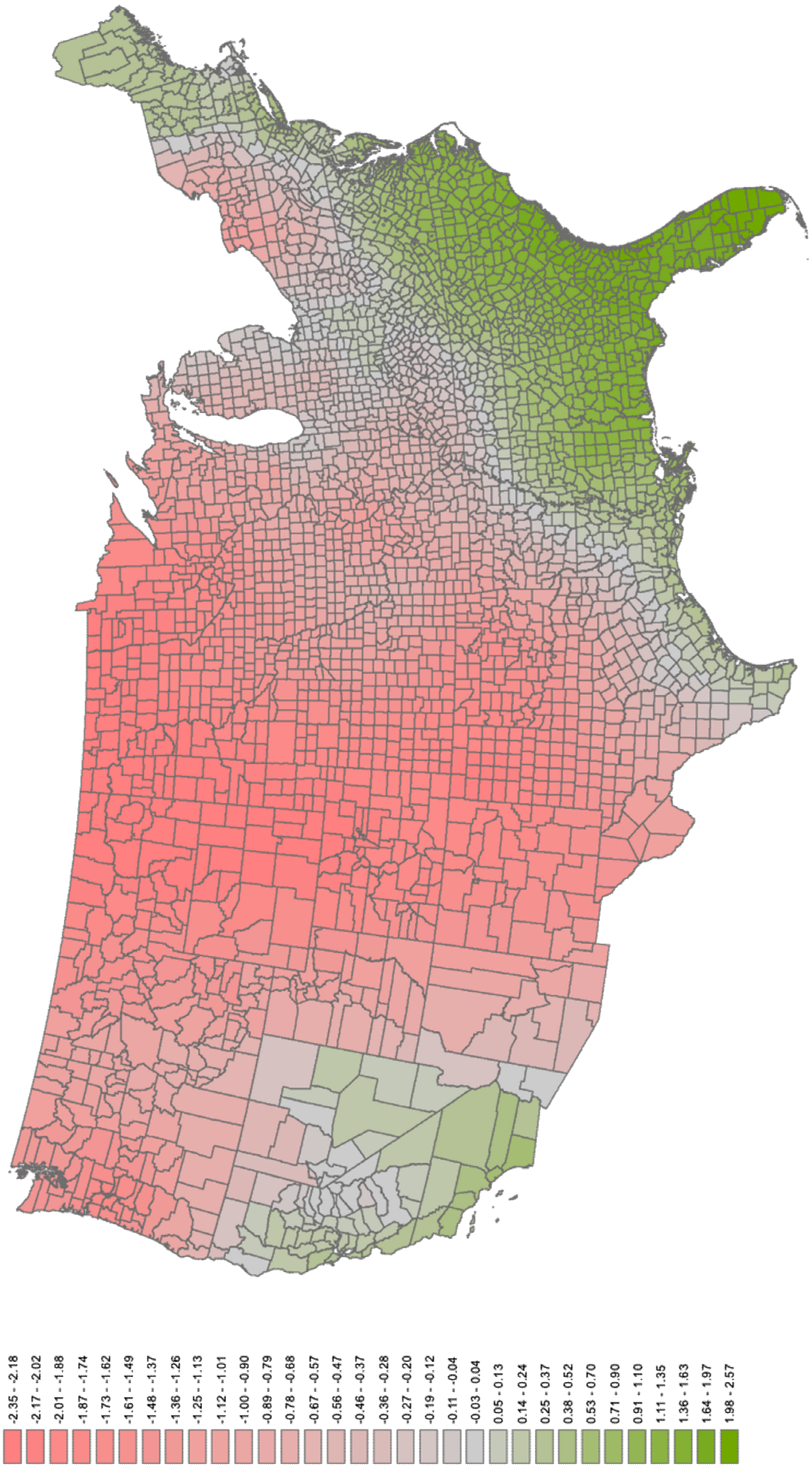

Figure 3. Difference in the Marginal Value of Milk in Class I Minus Class III Plants.

Figure 3 using the USDSS model[8] shows the difference in the dual or marginal values of milk at all locations across the 48 states. It represents Class I minus Class III dual values with shades of red to green. Green colored counties are locations where delivering milk to a fluid plant is of more value (model can lower total cost more, i.e., there is a more efficient market if milk goes to a fluid plant) and the intensity of red color shows where delivering milk to a cheese plant is of more value to the overall market. A fluid plant located in a red colored region of the map would find that cheese plants in the area were unwilling to give up milk unless you compensated them for at least their opportunity costs which are greater than the fluid plant's cost of milk.

For example, fluid needs are easily met in a location like Fargo, ND and another cwt of milk in a fluid plant is of little value there. But another cwt of milk in a cheese plant at that location can make a product that is needed throughout the country and shipped at a lower cost to the deficit regions like the east. The nutrient density of cheese makes it a better product to ship long distances than the greater volume and weight of a fluid product. In contrast, in Miami-Dade County, Florida is dark green. That means fluid needs are higher in that location and it is of more value overall to the system for another cwt of milk in Miami-Dade to go to a fluid plant, as opposed to a manufacturing plant.

The US average value of these differences was -38¢ which indicates that on a national average it is more valuable (cost saving) to the model to have milk in a cheese plant than in the fluid plant in most counties. The range goes from somewhat more than $2 per cwt more favorable to a cheese plant (in red) to somewhat more than $2 per cwt more favorable to a fluid plant (in green) in the southeast. But, on average the cheese plants are favored by about 38¢.

I believe this model result bolsters the argument to not dilute the value of the $1.60 into the pool, but rather let the fluid plants directly pay the farms, cooperatives or manufacturing plants who supply the milk. Moreover, the range from higher value to cheese vs. higher value to fluid means that a single national minimum regulated value is inappropriate. Setting a national average Class I differential in light of such significant regional differences means that for the majority of the country, Class I plants are overpaying the necessary amount needed to attract fluid milk. And for other parts of the county, Class I plants are underpaying the necessary amounts overall, which means that in addition to the $1.60 that plant is already paying into the pool, that Class I plant will now likely have to pay even more money as a premium to the supplier directly in order to attract the milk. It would be better, if even necessary in the regulated system at all, to be a regional number. But given the varying degree, I believe that it should be excluded all together given market dynamics in 2023.

Concluding Comments

The dairy industry has evolved a long way from the conditions of the 1940s. Although milk is still produced and sold every day, and farm milk is still perishable, and water is still expensive to ship long distances, the problems of today are much different than those of previous generations. The structure of FMMOs was conceived to solve fluid milk problems when fluid bottling was the most important use of farm milk and the overwhelmingly dominant class of milk overall. Today, manufacturing uses are ascendant and the FMMOs are functioning as a fluid-based system in a manufacturing-dominant world. I believe that this is why we are seeing many of the issues being raised at this hearing. Handler actions, such as de-pooling, are more of a symptom of the underlying problems than the problems themself.

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[8] County-level values are given in Appendix A.

Federal Orders were constructed to solve fluid milk problems with fluid milk mechanisms. Higher Class I prices and regional differential values should still encourage milk to flow in the direction of greatest need. While that is a reasonable function of Orders, it is insufficient to support the complex structure needed to solve today's primary problems.

Milk use for manufactured dairy products cannot be ignored. They have a geographic basis just like fluid milk does. And, in many locations they can out-compete fluid plants for the local milk supply under our current FMMO regulations. Individual handler pools are a concept still allowed in FMMO authorizing language. Even if we are unwilling to go all the way, perhaps we can move in that direction to allow a portion of the differential to be paid directly by plants to their supplier and not be shared across the pool. This would lessen the unnecessary burden on Class I and make Class I prices more potent to attract milk to the fluid plants.

Many of the market-wide justifications for the fixed increment added to the base Class I price value are no longer valid. Grade A conversion and maintenance is not justified with current production practices. Intra-week balancing is being done by fluid plants accepting milk on the weekends, and even seasonal balancing is being challenged by the increasing production of ESL products. And market-wide pooling of the entire Class I premium has attracted far more milk to most orders than is necessary to assure fluid needs. A portion of the Class I value would be better directed to compensate suppliers directly rather than diluting the payment across the entire pool.

Thank you for the time to speak on this important issue.

Exhibit 16A, attached excel

Shadow Price Values for Class I, Class III, and Price Difference
for March, 2016, USDSS Model Run.