Regulatory Economic Impact Analysis of the Final Decision to Establish a California Federal Milk Marketing Order

USDA Agricultural Marketing Service, Dairy Program - Economics Division, March 2018

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I. PURPOSE OF THE REGULATORY IMPACT ANALYSIS

From September 22, 2015, to November 18, 2015, the Agricultural Marketing Service (AMS) held a hearing to consider and take evidence on proposals to establish a Federal Milk Marketing Order (FMMO) for the state of California. Based on the evidentiary record, USDA issued a recommended decision proposing the establishment of a California FMMO and requested public comment on the proposed order. Twenty-three public comments on the proposed order provisions and five concerning the economic analysis were received.

On March 28, 2018, USDA released a final decision addressing the public comments received regarding order provisions. This analysis examines the economic impact the final decision proposed for a California FMMO could have on the state's dairy industry, as well as the milk supply, product demand, product prices, and milk allocation throughout the United States. Consumer welfare and producer revenue changes are also examined.

The AMS Dairy Program Regional Econometric Model has been updated to include 2015 data and is based on the USDA Agricultural Baseline Projections to 2026 published in February 2017.[1] The Regional Econometric Model was also revised to address concerns expressed in the public comments received on the previous economic impact analysis and on the model. The updated data, new USDA baseline, and model changes responsive to comments make the results presented here not directly comparable to the results found in previous impact analyses of the proposals and of the recommended decision.[2]

A. Scope of Analysis

The impacts of promulgating a California FMMO are estimated as deviations from the Regional Econometric Model baseline, which is aligned with the USDA Agricultural Baseline Projections to 2026. Assumptions for the cost of feed are provided by the USDA Baseline Projections.

The Regional Econometric Model simultaneously forecasts annual regional milk production, regional fluid milk and national manufactured dairy product consumption, regional dairy class utilization, national

[1] U. S. Department of Agriculture, Office of the Chief Economist, World Agricultural Outlook Board, Interagency Agricultural Projections Committee- Long-term Projections Report OCE-2017-1, February 2017. https://www.ers.usda.gov/webdocs/publications/82539/oce-2017-1.pdf?v=42788

[2] Preliminary Economic Impact Analysis of the Proposals – https://www.ams.usda.gov/sites/default/files/media/Preliminary%20Impact%20Analysis%20-%20Final.pdf
Regulatory Economic Impact Analysis of the Recommended Decision - https://www.ams.usda.gov/sites/default/files/media/RegulatoryImpactAnalysisoftheRecommendedDecision.pdf

dairy product prices, and regional farm milk prices from 2016 through 2026. The explanation of the operation and assumptions of the Econometric Model Documentation is available on the AMS Dairy Program website.[3]

The Regional Econometric Model baseline operates under the following assumptions:

- Milk is produced in all 50 States. The states are grouped into 14 milk supply regions.
- Milk produced in each supply region is allocated to one or more of the 12 marketing areas (10 existing FMMO pools, the proposed California pool, and an unregulated "pool").[4]
- Regional cow numbers are functions of the all-milk price, feed costs, slaughter cow prices, non-farm earnings, and other variables.
- Milk production per cow is estimated as a function of all-milk prices, feed costs, and other variables.
- Milk marketings are estimated as milk production less farm use.
- The classified (or class) prices are calculated by the FMMO end-product price formulas, which determine component values based on wholesale commodity prices for butter, nonfat dry milk, cheddar cheese and dry whey.
- The blend price at test reflects the total marketwide pool value and is calculated from the class prices, component levels, and class utilization of the respective FMMO and proposed California FMMO.
- The all-milk price for the supply region reflects the historical relationship to the regulated blend price of the FMMO that most closely matches the geographic area of the supply region.
- Only the regulated prices for 11 of the FMMO pools are estimated (10 existing FMMOs and the proposed California FMMO). Prices for the unregulated milk are not estimated independently due to a lack of data.
- A modified California State Order (CSO) statewide blend price is used in the model baseline as the California statistical uniform price. The CSO uses an 8.7 percent solids nonfat test to compute its standardized CSO prices; in the model baseline and in this analysis, the statistical uniform solids nonfat percentage for California is set at 8.685 to keep the component tests comparable with those used in the FMMOs.
- Producer revenues are the product of milk marketings and the all-milk price.
- Milk movements among milk supply regions are functions of relative blend prices between FMMOs.
- Milk movements are summed to create pools for all FMMO marketing areas, the proposed California FMMO, and an unregulated "pool."
- Regional demands for fluid milk per capita consumption are functions of the Class I price, income, and population under five years of age.
- Milk supplies for manufactured milk products are based on total pooled milk minus volumes demanded for Class I products.
- Classifications of manufactured milk within the pools are functions of ratios of the wholesale prices to their respective class prices and other variables.
- Fluid use for the unregulated milk is classified as Class I and its estimation is driven by income.
- The Class II, III, and IV utilizations for unregulated milk in the Former Western and Unregulated West regions are proportional to the average class utilizations of FMMO 30.
- The unregulated milk not produced in the Former Western and Unregulated West regions is proportional to the average Class II, III and IV utilizations across all FMMOs.

[3] Regional Econometric Model documentation: https://www.ams.usda.gov/sites/default/files/media/FinalDecisionEconometricModelDocumentation.pdf

[4] In FMMO terms, a pool is all the milk regulated by a FMMO. Therefore, unregulated milk is not a "pool" by definition. However, the unregulated milk is grouped together as a unit for modeling purposes.

- Manufacturing milk not pooled under a proposed California FMMO that was previously pooled under the CSO is assumed to be used in the same class as it would have been under the CSO and is included with the other unregulated milk in the appropriate class.
- National demands for manufactured dairy products per capita consumption are functions of respective prices, per capita income, and other factors.
- A two-step process is used to estimate ending stocks. First, average stock values of the monthly ending stocks from the last half or last quarter of each year are estimated as functions of the product price. Second, year-end stocks are estimated from average stocks.
- Imports above the tariff rate quota and commercial exports for American cheese, other cheese, butter, nonfat dry milk and dry whey are estimated as functions of the difference between the domestic product price and the free-on-board international price.[5]
- Observed butterfat and other milk components tests are used for FMMOs where such data are available. Otherwise, default standards are used for comparisons.

The Regional Econometric Model generates long-term baseline supply, demand, and price projections consistent with USDA's official baseline projections. The model's baseline projections for 2016 are adjusted to reflect observed data for 2016. The model considers movements of milk among FMMOs, but not within a FMMO. The FMMO minimum prices are used for all the pools. The unregulated milk prices are not estimated due to a lack of data, but FMMO minimum prices are assumed for this milk. The effects of seasonal changes in production, consumption, and price are not analyzed in this annual model.

The Regional Econometric Model structure used for this analysis is fundamentally the same as the model used for the previous impact analyses of the hearing proposals and of the recommended decision for a proposed California FMMO. The model equations have been updated to include 2015 data and the model is based on the USDA Agricultural Baseline Projections to 2026 published in February 2017. Furthermore, upon release of the recommended decision and its accompanying Regulatory Economic Impact Analysis (REIA-R), AMS solicited comments from the public on its econometric model. Some of the concerns put forth in the comments were addressed by adjusting how the model calculates the unregulated manufacturing milk class utilizations and the amounts of milk that a handler may elect not to pool in California under a FMMO.[6] The equations for the milk-not-pooled analysis were updated to include 2016 data. Thus, the results presented herein are not comparable to those found in the previous analyses.

B. Methods of Analysis

Baseline estimates are constructed assuming that if a California FMMO is established, for modeling purposes, the FMMO regulations are assumed to supersede the CSO beginning January 1, 2018.

This analysis estimates the potential impacts resulting from adoption of the provisions contained in the final decision for a proposed California FMMO. Deviations from the baseline of current CSO policy are identified and modeled. The analysis assumes that all other model parameters would remain unchanged during the comparison period. The impacts of the proposed California FMMO are then compared to the

[5] Free-on-board international prices are exogenous to the model and do not change between the model baseline and the impact analysis of the proposed California FMMO. Thus changes in domestic prices from the baseline cause changes in imports and exports. It is beyond the scope of the current model to project international prices and the interaction of the domestic and international dairy markets.
[6] See the model documentation and Appendix C: Technical supplement to the Milk Pooling Analysis for more details.

model's baseline projections for the period 2018 through 2026. The results of this comparison are found in Appendix B, Tables 1-18.

The following indicators are evaluated:

- Changes in the uniform price, all-milk price, and producer revenues, which indicate a farmer's ability and willingness to produce milk, and
- Changes in milk marketings, Class I use, and other class prices, which measure the adequacy of milk supplies to meet fluid needs and the effect on consumer expenditures for fluid and manufactured dairy products.

II. AN EXAMINATION OF THE FINAL DECISION

The final decision proposes a California FMMO that includes the following features:

- Uniform FMMO product classification provisions and end-product pricing formulas.[7]
- Performance-based pooling standards tailored to the California market.
- Uniform FMMO definition of producer-handlers.
- Uniform FMMO accounting for fortification of fluid milk products.
- A provision to allow for an authorized deduction from producer payments for the administration of the California quota program by CDFA. The quota program would operate independently of the proposed California FMMO.

This section highlights the differences between the existing CSO and the proposed California FMMO, and describes the methodology of determining the potential impact that could occur as a result of adopting the proposed California FMMO. Instances where certain features of the proposed California FMMO could not be modeled are noted.

A. Classification

The proposed California FMMO would adopt the uniform classification provisions of the 10 existing FMMOs.

The table below provides an approximate comparison of CSO classes and the uniform FMMO classes.

CSO Class	California FMMO Class
Class 1	Class I
Class 2 & 3	Class II
Class 4b	Class III
Class 4a	Class IV

[7] "Uniform" in this and other similar cases refers to provisions that are uniform across all Federal milk marketing orders.

Under the proposed California FMMO, the classification of certain products would change to align with uniform FMMO classification:

- Reassigning buttermilk from CSO Class 2 to FMMO Class I.[8]
- Reassigning half and half from CSO Class 1 to FMMO Class II.
- Reassigning eggnog from CSO Class 2 to FMMO Class I. This change is not accounted for in the model due to lack of available data.
- Reassigning dry or condensed nonfat solids used in fortifying fluid milk products from CSO Class 1 to FMMO Class IV.
- Assigning the Class I skim volume increase attributable to fortifying fluid milk products with dry products to FMMO Class I.
- There are instances where the CSO classifies products based on product type and location of where the product is sold. The proposed California FMMO would classify all products based solely on product type. This change is not accounted for in the model due to lack of available data.

B. Pricing

The proposed California FMMO would replace current CSO classified price formulas with uniform end-product pricing formulas currently used in the 10 existing FMMOs. In this analysis, FMMO pricing formulas are used to calculate the Class I, II, III and IV prices. Therefore, the component and Class II, III, and IV prices under the proposed California FMMO are uniform with the existing FMMOs. In this analysis, Class I prices are computed using the same base price used in the existing FMMOs and adjusted based on the Class I differential of the county where the plant is located.

No specific adjustments are made to any potential premiums in response to changes in regulated prices under the proposed California FMMO because of the lack of public premium data in California. Changes in premiums are captured to some extent by changes in the all-milk price.

Under the proposed California FMMO, producer prices would be computed the same as current FMMOs under multiple component pricing using the protein, other solids, and butterfat prices from the Class III price formulas and a producer price differential. The producer price differential would be announced at the principle pricing point of Los Angeles County, California ($2.10), and adjusted based on the location of the plant using the uniform FMMO Class I differentials. The Class I price in this analysis is shown for the principle pricing point. California FMMO statistical uniform prices at 3.5 percent butterfat and blend price at test have been calculated.[9]

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[8] All buttermilk is assumed to move to Class I under FMMO classification. A small volume of buttermilk is classified as Class II when labeled as baking buttermilk with > 2% added starch or sold in bulk to a commercial food processing establishment, but there were no data available on this volume. The volume is likely to be small and to have negligible impact on the results.

[9] The blend prices are a weighted average of the class prices, weighted by their utilization, for all FMMOs. The statistical uniform price is calculated as either the Class III price plus the producer price differential (PPD) (for FMMOs 1, 30, 32, 33, 124, 126, and the proposed 51) or as 0.965 times the uniform skim price plus 3.5 times the uniform butterfat price (for FMMOs 5, 6, 7, and 131). Therefore, using the actual test or the standardized 3.5 test can make a large difference in the resulting number. The utilization changes can also impact the results. Utilization is influenced by many factors such as blend prices and milk movements. See model documentation for further information.

C. Milk Pooling

Currently the CSO requires almost all California Grade A milk received at a California plant to be pooled.

The proposed California FMMO contains performance-based pooling standards conceptually similar to the 10 existing FMMOs, but tailored for the California market. The pooling provisions are designed to determine those producers whose milk is consistently available to supply the Class I market, and therefore should share in the revenues from the market. There would be no regulatory producer payment difference given to milk based on the location of the dairy farm where it was produced.

The proposed California FMMO would fully regulate all Class I distributing plants when their total route disposition and packaged transfers are at least 25 percent of the milk received at the plant and 25 percent of total route disposition and transfers are to outlets in the California marketing area. Handlers have the option to pool their Class II, III and IV milk receipts if a minimum of 10 percent of the Grade A milk received at the plant is shipped to qualified pool distributing plants.

Additionally, during the months of April through February, milk pooled by handlers under the proposed California FMMO may not exceed 125 percent of the producer milk receipts the handler pooled during the previous month. For March, the limit would be 135 percent. (New handlers on the order and handlers with significantly changed milk supply conditions can be exempted from this limitation based on a determination made by the market administrator.)

The pooling provisions in the proposed California FMMO are similar to those in the Upper Midwest FMMO, which, like California, has a high share of manufacturing milk. In the proposed California FMMO, the pooling decision lies with the handlers. This is a significant change, since under the current CSO nearly all milk must be pooled. Since no California data are available to estimate the volume of milk that handlers would elect to pool, a separate pooling analysis was conducted to estimate monthly volumes of milk-not-pooled using data from the Upper Midwest. (See Appendix C: Technical Supplement to the Milk Pooling Analysis.)

The current pooling standards in the Upper Midwest were first put in place in December 2006, so monthly data from January 2007 through December 2016 was used to estimate how manufacturers' pooling decisions respond to the class-to-uniform price relationship. The analysis also accounted for the differences in Class I differential surfaces with the proposed California FMMO having a wider range from high to low, $0.50 per cwt, compared to the $0.20 per cwt range in the Upper Midwest FMMO.

This milk pooling analysis found that manufacturers in the Upper Midwest chose to pool less Class II, III, or IV milk when the respective price was high relative to the uniform price. That is, handlers collectively elect to pool less milk when their pool draw is lower and they elect to pool more milk when their pool draw is higher. Under the CSO nearly all milk produced in California is pooled. On average, the analysis found that approximately 41.6 percent of the manufacturing milk pooled on the CSO would not be pooled because of class-to-uniform price relationships. On a classified-use basis, the analysis estimated 32.7 percent of Class II, 42.4 percent of Class III, and 41.8 percent of Class IV milk currently pooled under the CSO would not be pooled because of price. [10] Under the CSO nearly all milk produced in California is

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[10] The following econometric relationships were found between milk-not-pooled and the monthly class-uniform price difference in the Upper Midwest FMMO ('milk-not-pooled' includes only milk that is 'normally' pooled):
Class II milk not pooled/Class II milk pooled = 1.009297 - (0.62034x (Uniform Price – Class II Price))
Class III milk not pooled/Class III milk pooled = 0.33371 - (0.65422x (Uniform Price – Class III Price))
Class IV milk not pooled/Class IV milk pooled = 1.297897 - (0.59969x (Uniform Price – Class IV Price))

pooled; under the proposed California FMMO handlers have the option to pool manufacturing milk. Therefore the volume of milk estimated to be pooled is less than the volume of milk estimated to be produced in California.

The Regional Econometric Model assumes California manufacturers would respond to these class-to-uniform price relationships under the proposed California FMMO in a similar manner as manufacturers in the Upper Midwest. The Regional Econometric Model uses this analysis to estimate the amount of California milk that would not be pooled under the proposed FMMO as the pooling of manufactured milk would no longer be mandatory. Most of the milk that handlers are projected not to pool is Class III and Class IV, as shown in the table below.

California Milk-Not-Pooled Under the Final Decision

Class	Units	2018	2019	2020	2021	2022	2023	2024	2025	2026	Average	Min	Max
CA Class II Milk Not Pooled	Mil. LBS	777	786	774	824	844	859	868	856	905	833	774	905
CA Class III Milk Not Pooled	Mil. LBS	9151	9641	10211	10225	10339	10578	10783	10537	10545	10223	9151	10783
CA Class IV Milk Not Pooled	Mil. LBS	5269	5424	5071	5555	6048	6322	6572	7576	7647	6165	5071	7647

In the Regional Econometric Model, estimated California milk-not-pooled volumes are included with the unregulated milk volumes (see model documentation for more details).

D. Out-of-State Milk

The CSO does not have the authority to regulate interstate commerce; therefore milk produced outside of the state is ineligible to participate in the CSO.

The proposed California FMMO recommends performance-based pooling standards tailored to the California market. Milk meeting these standards would be eligible for pooling regardless of its origin. Therefore, milk produced outside of California could become eligible to participate in the proposed California FMMO and receive the order's blend price. Volumes of out-of-state milk entering California are assumed to remain at current levels.

The following assumptions are made in the Regional Econometric Model:

- The most recent three-year average of out-of-state milk movements is used for the forecast period.
- The model baseline assigns the out-of-state milk sold into California, but not regulated by the CSO, to the unregulated milk volume.[11]
- Under the proposed California FMMO, this unregulated out-of-state milk moving into California is pooled as Class I milk on the proposed California FMMO.

There is greater than 99.99 percent statistical confidence that there is a positive relationship between the price difference and the amount of milk pooled, for each class. The 'R-squared' of the equations are 0.6244, 0.5003, and 0.3574 for the Class II, III, and IV pooling equations, respectively.

[11] Published CDFA data include out-of-state Class 1 milk sold into California in its CSO Class 1 sales data. The Regional Econometric Model baseline removes those out-of-state Class 1 volumes from the California data and includes them with the unregulated milk.

E. Producer-Handlers

The proposed California FMMO recommends FMMO producer-handler provisions contained in some of the existing FMMOs. Under the proposed California FMMO, producer-handlers who have Class I packaged sales of less than 3 million pounds per month and do not take delivery of more than 150,000 pounds of milk from other regulated handlers would be exempt from pricing and pooling provisions. Handlers not meeting this standard would not be granted producer-handler status under the proposed California FMMO.

This analysis assumes smaller producer-handlers, referred to as Option 66 producer-handlers by the CSO, would meet the FMMO producer-handler definition and therefore would not be subject to the pricing and policy provisions of the order. The analysis also assumes current CSO producer-handlers exceeding the 3 million pound per month threshold, referred to as Option 70 producer-handlers by the CSO, would become fully regulated handlers, and accordingly, all their milk sales would be priced and pooled under the proposed California FMMO.

F. Fortification Allowances

Currently, handlers regulated by the CSO receive a credit against their pooling obligations for fortifying fluid milk products with either condensed skim milk or nonfat dry milk.

Under the proposed California FMMO, California handlers would no longer receive credits for fluid milk fortification. Instead, accounting for fortification would be uniform with existing FMMOs. The classification of the fluid milk equivalent of the milk solids used to fortify fluid milk products would be classified as Class IV and the increased volume of Class I product due to fortification would be classified as Class I.

G. Transportation Allowances and Credits

Currently, the CSO provides for transportation credits to handlers on plant-to-plant milk movements and transportation allowances to producers for milk movements between farms and Class 1, 2 or 3 plants.

The proposed California FMMO does not contain a transportation credit or transportation allowance program. In the baseline analysis, the values of the CSO transportation credit and allowance programs are deducted from the pool; but they are not subtracted from the market-wide pool value before calculating the uniform prices for a proposed California FMMO.

H. Quota

The California quota program is a state-administered program that entitles the quota holder to an additional $0.195 per pound of solids-not-fat (SNF) above the CSO overbase price. The money to pay the quota premium is deducted from the CSO market-wide pool before the CSO overbase price is calculated.

The proposed California FMMO leaves the quota program, including both regular and exempt quota, entirely within the jurisdiction of CDFA. Recognition of quota under the proposed California FMMO is through an "authorized deduction" from payments due to producers.[12] Therefore in this analysis, the quota premium is not removed from the market-wide pool before the California FMMO blend price is computed.

The proposed California FMMO would have uniform producer prices. Separate quota and non-quota producer prices would not be announced and consequently they are not calculated in this analysis. In the proposed California FMMO, funds for the California quota program would be collected and transferred to quota holders as determined by CDFA. No additional revenue would be added or subtracted from the California market-wide pool due to the quota payments. That is, the total revenue for California dairy producers and the average California all-milk price would be uniform, whether or not it is allocated between quota-holders and non-quota-holders.

III. ANALYSIS OF THE IMPACTS

A. Introduction

This section summarizes the estimated impacts from the adoption of the proposed California FMMO. These impacts are described as deviations from the Regional Econometric Model baseline based on the USDA Agricultural Baseline Projections to 2026.

The structure of the Regional Econometric Model used in this analysis is fundamentally the same as for the Regulatory Economic Impact Analysis of the Recommended California FMMO (REIA-R). However, the results presented here are not comparable to the results presented in the REIA-R for several reasons:

1. A new USDA baseline was published in February 2017, with estimates to 2026. The baseline utilized in the REIA-R was based on the USDA baseline to 2025 published in February 2016.
2. The specification of the model equations were updated and re-estimated to include 2015 data.
3. The calculations for class utilization of unregulated manufacturing milk were adjusted to better reflect more realistic estimations of Class utilization of unregulated milk.
4. The milk-not-pooled analysis was revised to better reflect expected pooling decisions in California under the proposed FMMO.

B. Impacts on Dairy Farmers

Changes in statistical uniform blend prices at 3.5 percent butterfat (3.5 percent BF) and at test are used to evaluate the impact of the California FMMO on dairy farmers (Tables B1 and B2, respectively).[13] Also, changes in dairy product prices (Table B3), all-milk prices (Table B4), milk production (Table B5), total milk marketings (Table B6), and producer revenue (Table B7) in the 14 supply regions are examined.

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[12] An "authorized deduction" is a deduction from a handler's payment to a producer or cooperative association, authorized by the producer or the cooperative or by other legal authority that is not counted against the handler's obligation to pay a minimum value to the producer. Examples include payment of promotional assessments or for reasonable hauling charges.

[13] A modified California State Order (CSO) statewide blend price is used in the model baseline as the California statistical uniform price. The statistical uniform solids nonfat percentage for California is set at 8.685, comparable with those used in the FMMOs

The analysis shows that adoption of the proposed California FMMO would increase the California statistical uniform milk price at 3.5 percent BF in each year analyzed, except for 2019. The statistical uniform milk price averages $0.04 per hundredweight (cwt) higher under the proposed California FMMO for the 9-year period, 2018 through 2026 (Table B1).[14]

The Upper Midwest FMMO statistical uniform price also increases over the baseline in each year 2018-2026, with an average increase of $0.20 per cwt. The Florida FMMO statistical uniform price averaged $0.04 per cwt over the baseline for the 9-year forecast period, but was lower for 2024 and 2026. The remaining FMMOs' statistical uniform prices average lower than the baseline over the forecast period with the adoption of the proposed California FMMO, ranging from -$0.02 per cwt in the Southwest FMMO to -$0.23 per cwt for the Arizona FMMO. However, statistical uniform prices for all regions show an increase over the baseline for 2018.

Under the proposed California FMMO, California blend prices at test for 2018-2026 show an average annual increase over the baseline of $0.45 per cwt (Table B2). The Appalachian, Upper Midwest and Southeast FMMOs also have higher blend prices at test each year 2018-2026, and average higher than the baseline over the forecast period by $0.35, $0.17, and $0.10 per cwt, respectively. The impact on the Appalachian Order for blend price at test may be somewhat overstated due to a limitation in the current model specification.[15]

The Florida and Southwest FMMOs show annual average blend price increases of $0.06 and $0.04 per cwt, respectively, over the forecast period. However, in several years, the blend prices in these two FMMOs show a decrease with the implementation of a proposed California FMMO. The blend prices at test increase over the baseline in 2018 for the remaining FMMOs but average lower over the 8-year period, from -$0.16 per cwt in the Central FMMO to -$0.30 per cwt in the Mideast FMMO.

Changes in the blend price also reflect changes in prices for the different classes of milk. Driving the changes in classified milk prices are the changes in the national average dairy product prices due to adoption of a proposed California FMMO (Table B3). Cheddar cheese and dry whey prices increase $0.0288 and $0.0064 per pound (annual average), respectively, over 2018-2026. In contrast, butter and nonfat dry milk prices decrease an average of $0.0948 and $0.0435 per pound, respectively, over 2018-2026. Nationally more milk goes into butter and nonfat dry milk production compared to cheese and whey production, leading to decreased prices for butter and nonfat dry milk nationally. Consequently, less milk is utilized in Class III and more milk is utilized in Class IV nationally (Table B13). California shows declines in Class II, III and IV utilization due to milk that handlers are estimated to elect not to pool under the proposed California order (Table B12).[16]

In addition, blend prices are affected by class prices, fat content, and class utilization. Changes from the baseline in average utilizations and component tests are shown in the two tables below. The changes represent the annual average for the 2018-2026 forecast period. Forecast California utilization and

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[14] The California FMMO statistical uniform price is computed as the FMMO Class III price plus the California FMMO producer price differential (PPD).

[15] Under the proposed California FMMO, Class II, III, and IV pounds increase in relation to the baseline for the Appalachian order. The model does not explicitly account for diversion limits, which would in practice, likely prevent that additional milk from being pooled. The higher butterfat content of manufacturing milk in the Appalachian order increases the total butterfat for the pooled milk of that order. Therefore, the model results most likely overstate the impact to the Appalachian order blend price at test and the all-milk price due to the higher butterfat percentage of pooled milk.

[16] California milk volumes estimated to not be pooled are accounted for in the unregulated milk volume.

component test changes account for both milk that elects not to pool under the proposed California FMMO and the resulting change in class utilizations. Therefore, forecast California utilization and component test changes are not included in the tables presented here because they are not comparable to the other FMMOS.

Average Forecast Utilization Changes, 2018-2026[17]

Federal Order	Percentage points change in utilizations			
	Class I	Class II	Class III	Class IV
Northeast (1)	0.01	0.00	-0.12	0.11
Appalachian (5)	-3.32	1.70	0.53	1.08
Florida (6)	-0.57	0.42	-0.06	0.21
Southeast (7)	-1.66	0.51	0.62	0.52
Upper Midwest (30)	-0.12	0.01	0.16	-0.05
Central (32)	0.33	-0.14	0.26	-0.45
Mideast (33)	0.09	-0.12	-0.05	0.08
Pacific Northwest (124)	1.19	-0.12	-0.87	-0.20
Southwest (126)	-0.92	0.43	0.03	0.47
Arizona (131)	0.13	-0.10	0.87	-0.90

Forecast changes from baseline for fat, SNF, protein and other solids tests in pooled milk with the adoption of the proposed California FMMO are shown below. Changes in the average tests reflect changes in pool utilization, not in the average tests of producer milk.

Average Fat, SNF, Protein and Other Solids Tests Changes, 2018-2026

Federal Order	Percentage points change in average test			
	Fat	SNF	Protein	Other Solids
Northeast (1)	0.00	0.0000	0.0000	0.0000
Appalachian (5)	0.18	-	-	-
Florida (6)	0.07	-	-	-
Southeast (7)	0.09	-	-	-
Upper Midwest (30)	0.00	0.0005	0.0000	0.0005
Central (32)	-0.02	0.0018	0.0000	0.0018
Mideast (33)	0.00	0.0005	0.0000	0.0005
Pacific Northwest (12	-0.03	0.0020	0.0000	0.0020
Southwest (126)	0.04	-0.0042	0.0000	-0.0042
Arizona (131)	0.04	-0.0035	-	-

Adoption of the proposed California FMMO is estimated to increase the United States all-milk price in each year forecast, averaging $0.08 per cwt higher over the 2018-2026 period (Table B4). The Appalachian, Florida, Southeast, Southwest, Upper Midwest, California, the Former Western region (covering parts of Utah, Idaho, and Nevada), and Hawaii and Alaska regions all average higher all-milk

[17] The California FMMO is proposed to be 7 CFR part 1051.

prices for 2018-2026. The forecasted increases in all-milk prices range from $0.04 per cwt in the Southwest region to $0.43 per cwt in California. The remaining 6 regions show annual average decreases from the baseline ranging from -$0.11 per cwt in the Unregulated West to -$0.27 per cwt in the Mideast region.

The higher milk prices forecasted with adoption of a proposed California FMMO encourage increased U.S. milk production over the baseline, with an annual average increase of 545 million pounds for 2018-2026 (Table B5). Eight regions show higher milk production over all the forecast years, led by California with an average increase of 383 million pounds, followed by the Upper Midwest with an annual average increase of 143 million pounds. The increase in milk production in the Appalachian, Florida, Southeast, Southwest, Former Western and Hawaii-and-Alaska regions is estimated to average between 1 and 113 million pounds annually. Six regions (Northeast, Central, Mideast, Pacific Northwest, Arizona and Unregulated West) show an average annual decrease in milk production over the forecast period, ranging from 67 million pounds (Mideast) to 2 million pounds (Unregulated West) below baseline estimates.

The impact of the proposed California FMMO on milk marketings (Table B6), which are defined as milk production less farm use of milk, follows the same pattern as estimated milk production.

Adoption of the proposed California FMMO would increase U.S. producer revenue by an average of $284 million per year (Table B7) over the 9-year forecast period. This impact reflects the combined impact of the various changes on prices and production forecast from implementation of the proposed California FMMO. Adoption of FMMO classified prices in a California FMMO leads to higher classified prices in California which in turn leads to increased California milk production (Table B5). Adoption of the FMMO Class III price in California, which is higher than the current CSO Class 4b price, would reduce the amount of pool milk used for cheese and whey production in California (Table B12) that is priced as Class III through the California FMMO.

The reduction of cheese and whey production that is priced and pooled through the proposed California FMMO contributes to a national increase in their product prices and consequently an increase in the FMMO Class III price (Table B9). Further decreases are seen nationally in Class III utilization (Table B13) due to the increased FMMO Class III price. The higher FMMO Class III price shifts milk supplies nationally from making cheese to increased butter and nonfat dry milk production. The increased national butter and nonfat dry milk production leads to decreased prices for these products nationally (Table B3). It is important to note that the changes in utilization forecast should not be interpreted as reductions or increases in production. Rather, they are reductions or increases from the forecasted growth of production and utilizations in the baseline[18] with the implementation of the proposed California FMMO.

The combined result of the proposed California FMMO is a $284 million average annual increase in U.S. producer revenue (Table B7). This change in average annual revenue is largely accounted for by the following impacts. The annual average change in consumer expenditure on domestically produced dairy products is $6 million lower with the proposed California FMMO, compared to the baseline. It is an aggregation of the change in consumer expenditure on Class I, II, III and IV products from the baseline, calculated using the model results. Similarly, the model projects the quantity of dairy products exported to add another $13 million in annual average U.S. dairy revenues compared to the baseline. Manufacturers' annual average gross returns are reduced by $177 million, due to margin reductions for Class III and IV products. The change in manufacturers' gross returns are estimated as the projected

[18] The AMS Dairy Program Regional Econometric Model estimates supply and demand through a simultaneous dynamic regional econometric model. The product supplies are balanced against demand for dairy products iteratively until an equilibrium is reached year-by-year.

change in American cheese, other than American cheese, butter, nonfat dry milk and whey consumed domestically and exported, valued at their projected domestic product prices, less the changes in Class III and Class IV milk cost at class prices.

C. Impacts on Fluid Milk Processors and Dairy Product Manufacturers

To evaluate the impact of adoption of the proposed California FMMO on fluid milk processors and dairy product manufacturers, dairy product prices (Table B3), FMMO component prices (Table B8), FMMO class prices at 3.5 percent BF (Table B9), CA to FMMO class prices at 3.5 percent BF (Table B10), FMMO class prices at test (Table B11), and national class utilization (Table B13) are considered.

The adoption of the proposed California FMMO is forecast to increase national cheddar cheese and dry whey prices and decrease national prices for butter and nonfat dry milk for the analysis period of 2018-2026 (Table B3). These increases lead to a sharp increase in the forecast average protein price, $0.21 per pound above the baseline for the forecast period (Table B8). In contrast, the average butterfat price declines $0.11 per pound, on average, for 2018-2026. Nonfat solids prices decrease $0.04 per pound on average over the baseline while other solids prices are forecast to be $0.01 per pound higher, on average.

The estimated changes in dairy product prices result in reductions in butterfat and nonfat solids prices that in turn lead to lower FMMO Class II and Class IV prices at 3.5 percent butterfat (Table B9). The Class III price is driven upward by the higher protein price and marginally higher other solids price. The proposed California FMMO is forecast to lower Class II, III and IV prices at 3.5 percent butterfat in California compared to the baseline (Table B10).[19]

Class I prices at test are forecast to increase in each of the existing FMMOs with the adoption of the proposed California FMMO, from a $0.45 per cwt average increase in three FMMOs (Florida, Southeast, and Southwest) to an average $0.52 per cwt increase in the Upper Midwest (Table B11). Class II prices are estimated to be lower on average for all FMMOs with the adoption of the proposed California FMMO, ranging from $1.03 per cwt lower in the Northeast FMMO to $2.08 per cwt lower in the Florida FMMO, for 2018 - 2026.

Class III prices at test increase in most FMMOs, ranging from an average increase of $0.03 per cwt in the Appalachian to $0.29 per cwt in the Upper Midwest. Class III prices at test increase $0.28 per cwt on average in four other FMMOs (Central, Mideast, Pacific Northwest and Southwest). However, the Arizona FMMO[20] Class III price is estimated to decrease annually $0.04 per cwt, on average, with the adoption of the proposed California FMMO.

In contrast, Class IV prices at test in the existing FMMOs are forecasted to decrease from the baseline with the adoption of the proposed California FMMO. Class IV prices, on average, decrease $2.47 per cwt in the Upper Midwest FMMO to $0.47 per cwt lower in the Arizona FMMO.

In California, adoption of the proposed California FMMO would decrease the California Class I price at test by $1.08 per cwt on average (Table B11). Conversely, California Class II prices at test are forecast to

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[19] This analysis compares the CSO Class 1 price to the FMMO Class I price; a weighted average of the CSO Class 2 and 3 prices to the FMMO Class II price; the CSO Class 4b price to the FMMO Class III price; and, the CSO Class 4a price to the FMMO Class IV price.

[20] The Arizona Class III price decreases due to its higher Class III fat test, which is more adversely affected than other regions by the lower butter price.

increase $1.64 per cwt on average over 2018-2026. California Class III and Class IV prices at test are forecast to increase $0.31 per cwt and $1.07, respectively, on average for the 9-year period.

Minimum class prices at test are the regulated prices fluid milk processors and dairy product manufacturers must pay, and are examined to better assess handler impacts (Table B11). The changes in the underlying prices (fat, skim, and component prices) and the class prices at 3.5 percent BF are uniform in all FMMOs (Table B8 and B9). Impacts on class prices at test (B11) in the various FMMOs differ based on the differences in class use component levels among the orders.

For the proposed California FMMO, milk pooled annually in Classes II, III and IV decreases by an average of 1.100, 9.274, and 6.291 billion pounds, respectively (Table B12). The decreases in these class utilizations largely reflect milk produced and processed in California that, under the proposed California FMMO, would no longer be pooled. At the national level, both Class I and Class III average annual utilization are forecast to decrease, averaging 210 and 345 million pounds lower, respectively (Table B13). National utilization of Classes II and IV are estimated to increase an annual average of 602 million and 505 million pounds, respectively. The national class utilization includes estimates for utilization of unregulated milk.

Class I revenues are estimated to increase in all FMMOs, including a proposed California FMMO, over the forecast period (Table B14). The largest annual average increase is in California with $42.1 million. The Northeast FMMO has the second largest average annual increase with $36.4 million. The Arizona FMMO has the smallest annual average increase with $3.9 million. The difference in the magnitude of the average impact is influenced by the relative change in Class I prices and the relative change in the amount of Class I milk pooled.

D. Impacts on Consumer Welfare

The proposed California FMMO has consumer welfare implications for dairy product consumers. This analysis estimates consumer welfare impacts through changes in consumer surplus. Consumer surplus is defined as "the difference between what a consumer pays for a unit of a good and the maximum amount the consumer would be willing to pay for that unit."[21] Consumer surplus changes in the United States were estimated using price and utilization factors that were forecast by the Regional Econometric Model. The consumer surplus calculation accounted for welfare changes from changes in the consumption of domestically produced and imported dairy products.

To evaluate the total impact to consumers for the period 2018-2026, consumer surplus changes were estimated for butter, nonfat dry milk, American cheese, other than American cheese, dry whey, frozen products, other Class II products and fluid milk and aggregated.

In order to derive these changes in prices and consumption, a 100 percent same-year price pass-through from wholesale prices-to-retail prices was assumed, consistent with economic theory and a review of the economic literature. The 100 percent pass-through assumption means that the retail price and quantity changes should be equal to the wholesale price and quantity changes calculated in the Regional Econometric Model. The 100 percent pass-through assumption considerably simplifies the calculation of consumer surplus changes and helps to overcome issues related to aggregation of dairy products, lack or usability of some of the dairy retail prices, and the fact that some of the dairy products are marketed

[21] https://www.whitehouse.gov/omb/circulars_a004_a-4

mostly as ingredients.[22] Forecast changes in wholesale product prices (Table B3) and regional average Class I utilization were considered to determine the impact to consumers. As explained earlier, cheddar cheese and dry whey prices are forecast to increase on average $0.0288 and $0.0064 per pound, respectively, over the period 2018-2026. Butter and nonfat dry milk prices are estimated to decrease an average of $0.0948 and $0.0435 per pound, respectively, over the period 2018-2026. The table below contains projections of change in consumer surplus by product over the period 2018-2026.

Change in Consumer Surplus, by Product and Total, 2018-2026

	Units	2018	2019	2020	2021	2022	2023	2024	2025	2026	Average Consumer Surplus Change
Fluid	Mil. $	-185.3	-40.9	-41.2	-67.8	-76.6	-109.0	-101.4	-188.2	-256.9	-118.6
Frozen	Mil. $	0.0	0.1	-0.7	1.2	1.5	1.3	2.5	4.4	3.7	1.5
Other Class 2	Mil. $	0.0	0.0	-0.4	0.7	1.0	0.9	1.6	2.9	2.4	1.0
American Cheese	Mil. $	-216.5	-70.1	-94.6	-107.2	-117.2	-140.8	-136.6	-208.2	-205.3	-144.1
Other than American Cheese	Mil. $	-157.7	-171.9	-63.6	-134.3	-133.6	-167.0	-175.7	-244.0	-297.6	-171.7
Dry Whey	Mil. $	-3.1	-2.0	-1.1	-2.1	-2.0	-2.6	-2.5	-3.4	-3.8	-2.5
Butter	Mil. $	164.2	199.5	167.5	208.5	221.0	273.7	278.2	362.3	425.8	255.6
Nonfat Dry Milk	Mil. $	22.7	28.1	26.8	49.4	62.6	78.2	101.9	135.0	149.3	72.7
Total	Mil. $	-375.7	-57.2	-7.4	-51.5	-43.4	-65.3	-31.8	-139.3	-182.4	-106.0

The analysis forecasts a $106 million annual average decrease in domestic consumer surplus. The change in consumer surplus from fluid milk consumption is projected to be negative for all projected years, averaging almost $119 million annually. The consumer impact from Class II products (frozen and other Class 2) and dry whey are negligible. The change in consumer surplus attributed to American cheese and other than American cheese are negative for all of the projected years annually averaging $144 and $171 million, respectively. The impact of butter and NDM on consumer surplus are positive and annually average $256 million and $73 million, respectively, over 2018-2026. The decrease in consumer surplus from fluid milk and cheese consumption dominates the increase in consumer surplus from butter and nonfat dry milk consumption.

Because fluid milk is sold in regional markets, the consumer surplus from fluid milk consumption is disaggregated by region. The table below provides detailed changes forecast to occur to consumer surplus by region from fluid milk consumption with the implementation of the proposed California FMMO.

[22] Appendix D: Technical Supplement to the Consumer Welfare Analysis contains details on data, econometric analysis, results that validate the choice of a 100 percent same-year wholesale to retail price pass-through for dairy products, and a review of studies analyzing wholesale to retail price transmission and underlying assumptions for dairy products. Multiple economic studies analyzed both farm-to-retail and wholesale-to-retail price transmission and indicate that a 100 percent same-year price pass-through from wholesale to retail is a reasonable analytical assumption.

Change in Consumer Surplus for Fluid Milk, by Region and Total, 2018-2026

	Units	2018	2019	2020	2021	2022	2023	2024	2025	2026	Average Consumer Surplus Change
NE	Mil $.	-50.9	-24.9	-25.3	-30.0	-31.7	-37.6	-36.3	-51.8	-53.1	-37.9
AP	Mil $.	-22.6	-11.0	-11.3	-13.4	-14.2	-16.9	-16.4	-23.4	-24.1	-17.0
SE	Mil $.	-22.6	-10.9	-11.2	-13.4	-14.2	-16.5	-16.1	-23.2	-23.8	-16.9
FL	Mil $.	-13.1	-6.4	-6.6	-7.7	-7.9	-9.1	-8.6	-12.2	-12.3	-9.3
UM	Mil $.	-21.4	-11.4	-11.3	-13.6	-14.3	-17.0	-16.4	-23.2	-24.1	-17.0
CE	Mil $.	-28.7	-14.5	-14.7	-17.4	-18.4	-22.0	-21.3	-30.4	-31.6	-22.1
ME	Mil $.	-36.4	-18.5	-18.7	-22.0	-22.8	-26.9	-25.8	-36.4	-37.4	-27.2
PN	Mil $.	-11.6	-5.8	-5.9	-6.9	-7.2	-8.4	-8.0	-11.2	-11.6	-8.5
SW	Mil $.	-24.2	-11.5	-11.9	-14.1	-14.8	-17.6	-16.9	-24.2	-24.7	-17.8
AZ	Mil $.	-7.0	-3.4	-3.4	-4.0	-4.1	-4.9	-4.7	-6.6	-6.8	-5.0
CA	Mil $.	45.7	62.4	64.2	60.9	60.0	56.3	57.4	46.7	45.6	55.5
UNREG	Mil $.	7.4	15.0	14.9	13.7	13.0	11.6	11.9	7.8	-53.1	4.7
Total	Mil $.	-185.3	-40.9	-41.2	-67.8	-76.6	-109.0	-101.4	-188.2	-256.9	-118.6

California is estimated to gain the most in consumer surplus from fluid milk consumption, $55.5 million on average annually over the forecast period. The unregulated region also is forecasted to gain in consumer surplus with the implementation of the proposed California FMMO.

E. Impacts on International Trade

Because of the bulky and perishable nature of packaged fluid milk, most international trading of dairy products is in manufactured products. The adoption of the proposed California FMMO decreases imports of butter (Table B15) and increases exports of butter and nonfat dry milk (Table B16) due to decreases in butter and nonfat dry milk prices (Table B3).

With adoption of the proposed California FMMO, the value of United States total dairy product exports is estimated to increase an average $12.5 million per year, largely due to increased butter exports (Table B18). The value of dairy products imported into the United States is estimated to increase $15.6 million per year, with most of the increase arising from increased other-than-American cheese imports (Table B17). Altogether, net exports decline approximately $3 million annually through the forecast period (Tables B17 and B18). However, because international prices are held constant in the model, the forecast trade impact should be interpreted as the upper limit. It is reasonable to assume that cheese and dry whey manufacturers in the United States will continue to export at the higher product prices, although in lower quantities to trade partners having relatively low transportation costs and/or a preference for cheese and dry whey produced in the United States.

F. Summary

This analysis finds that throughout 2018-2026, adoption of the proposed California FMMO could increase California blend prices at test, which would increase the California all-milk price and California milk production, in turn increasing California producer revenues. The increase in California production causes an increase in U.S. milk production, which has variable impacts on product prices and blend prices across the United States.

IV. APPENDIX A: ABBREVIATIONS

AP:	Appalachian
AMS:	Agricultural Marketing Service
AZ:	Arizona
CA:	California
CD:	Class Draw
CDFA:	California Department of Food and Agriculture
CE:	Central
CSO:	California State Order
FL:	Florida
FMMO:	Federal Milk Marketing Order
FW:	Former Western
HIAK:	Hawaii and Alaska
ME:	Mideast
NE:	Northeast
PN:	Pacific Northwest
PPD:	Producer Price Differential
REIA-F:	Regulatory Economic Impact Analysis of the Final Decision
REIA-R:	Regulatory Economic Impact Analysis of the Recommended Decision
SE:	Southeast
SW:	Southwest
UM:	Upper Midwest
UNREG:	Unregulated milk
UW:	Unregulated West
U.S.:	United States
USDA:	United State Department of Agriculture

V. APPENDIX B: TABLES

TABLE B1—Statistical uniform prices at 3.5% BF[1], changes from the baseline

Federal Milk Marketing Order	Units	2018	2019	2020	2021	2022	2023	2024	2025	2026	Average	Min	Max
Northeast (1)	$/CWT	0.07	-0.16	-0.11	-0.17	-0.17	-0.20	-0.24	-0.26	-0.34	-0.17	-0.34	0.07
Appalachian (5)	$/CWT	0.23	-0.08	-0.04	-0.06	-0.08	-0.10	-0.15	-0.09	-0.20	-0.06	-0.20	0.23
Florida (6)	$/CWT	0.29	0.01	0.05	0.04	0.02	0.01	-0.04	0.02	-0.05	0.04	-0.05	0.29
Southeast (7)	$/CWT	0.21	-0.07	-0.02	-0.04	-0.05	-0.05	-0.08	-0.03	-0.12	-0.03	-0.12	0.21
Upper Midwest (30)	$/CWT	0.38	0.08	0.13	0.14	0.16	0.19	0.18	0.30	0.26	0.20	0.08	0.38
Central (32)	$/CWT	0.21	-0.05	-0.02	-0.06	-0.07	-0.09	-0.13	-0.12	-0.20	-0.06	-0.20	0.21
Mideast (33)	$/CWT	0.06	-0.15	-0.11	-0.18	-0.20	-0.24	-0.29	-0.33	-0.42	-0.21	-0.42	0.06
Pacific Northwest (124)	$/CWT	0.14	-0.09	-0.06	-0.11	-0.12	-0.13	-0.17	-0.16	-0.23	-0.10	-0.23	0.14
Southwest (126)	$/CWT	0.19	-0.08	-0.03	-0.06	-0.06	-0.06	-0.07	-0.02	0.00	-0.02	-0.08	0.19
Arizona (131)	$/CWT	0.03	-0.16	-0.12	-0.20	-0.21	-0.26	-0.31	-0.35	-0.45	-0.23	-0.45	0.03
California (51)	$/CWT	0.21	-0.01	0.01	0.02	0.03	0.04	0.00	0.06	0.02	0.04	-0.01	0.21

[1] For pooled milk

TABLE B2—Blend prices at test[1], changes from the baseline

Federal Milk Marketing Order	Units	2018	2019	2020	2021	2022	2023	2024	2025	2026	Average	Min	Max
Northeast (1)	$/CWT	0.05	-0.19	-0.14	-0.20	-0.21	-0.25	-0.29	-0.32	-0.40	-0.22	-0.40	0.05
Appalachian (5)	$/CWT	0.41	0.19	0.20	0.23	0.27	0.32	0.33	0.58	0.63	0.35	0.19	0.63
Florida (6)	$/CWT	0.31	0.06	0.14	0.15	0.11	0.04	-0.06	-0.05	-0.19	0.06	-0.19	0.31
Southeast (7)	$/CWT	0.30	0.03	0.05	0.05	0.04	0.01	0.01	0.15	0.22	0.10	0.01	0.30
Upper Midwest (30)	$/CWT	0.38	0.06	0.10	0.11	0.12	0.16	0.14	0.25	0.21	0.17	0.06	0.38
Central (32)	$/CWT	0.17	-0.10	-0.07	-0.13	-0.16	-0.21	-0.26	-0.29	-0.42	-0.16	-0.42	0.17
Mideast (33)	$/CWT	0.01	-0.22	-0.17	-0.26	-0.28	-0.34	-0.39	-0.46	-0.59	-0.30	-0.59	0.01
Pacific Northwest (124)	$/CWT	0.03	-0.20	-0.14	-0.20	-0.21	-0.22	-0.26	-0.26	-0.35	-0.20	-0.35	0.03
Southwest (126)	$/CWT	0.26	-0.03	0.00	-0.01	0.00	0.00	-0.01	0.06	0.12	0.04	-0.03	0.26
Arizona (131)	$/CWT	0.08	-0.14	-0.10	-0.16	-0.18	-0.22	-0.26	-0.28	-0.39	-0.18	-0.39	0.08
California (51)	$/CWT	0.60	0.38	0.42	0.42	0.44	0.45	0.42	0.47	0.42	0.45	0.38	0.60

[1] For pooled milk

TABLE B3—Dairy product prices, changes from the baseline

Product	Units	2018	2019	2020	2021	2022	2023	2024	2025	2026	Average	Min	Max
Cheddar Cheese	$/LBS	0.0449	0.0144	0.0190	0.0215	0.0235	0.0277	0.0269	0.0415	0.0395	0.0288	0.0144	0.0449
Butter	$/LBS	-0.0675	-0.0790	-0.0659	-0.0802	-0.0831	-0.1026	-0.1001	-0.1249	-0.1498	-0.0948	-0.1498	-0.0659
Nonfat Dry Milk	$/LBS	-0.0221	-0.0248	-0.0243	-0.0380	-0.0417	-0.0455	-0.0537	-0.0659	-0.0759	-0.0435	-0.0759	-0.0221
Dry Whey	$/LBS	0.0083	0.0054	0.0028	0.0052	0.0051	0.0061	0.0060	0.0088	0.0095	0.0064	0.0028	0.0095

TABLE B4—All-milk price[1], changes from the baseline

Milk supply region	Units	2018	2019	2020	2021	2022	2023	2024	2025	2026	Average	Min	Max
United States	$/CWT	0.28	0.05	0.08	0.06	0.06	0.06	0.03	0.06	0.01	0.08	0.01	0.28
Northeast	$/CWT	0.05	-0.17	-0.13	-0.18	-0.19	-0.22	-0.25	-0.28	-0.36	-0.19	-0.36	0.05
Appalachian	$/CWT	0.39	0.17	0.19	0.21	0.25	0.29	0.30	0.53	0.57	0.32	0.17	0.57
Florida	$/CWT	0.29	0.06	0.13	0.14	0.10	0.03	-0.05	-0.04	-0.18	0.05	-0.18	0.29
Southeast	$/CWT	0.28	0.03	0.05	0.04	0.04	0.01	0.01	0.14	0.20	0.09	0.01	0.28
Upper Midwest	$/CWT	0.35	0.06	0.09	0.10	0.11	0.15	0.13	0.24	0.20	0.16	0.06	0.35
Central	$/CWT	0.15	-0.09	-0.07	-0.12	-0.15	-0.19	-0.23	-0.26	-0.38	-0.15	-0.38	0.15
Mideast	$/CWT	0.01	-0.20	-0.16	-0.23	-0.25	-0.30	-0.35	-0.41	-0.53	-0.27	-0.53	0.01
Pacific Northwest	$/CWT	0.03	-0.19	-0.13	-0.19	-0.20	-0.21	-0.24	-0.25	-0.33	-0.19	-0.33	0.03
Southwest	$/CWT	0.24	-0.03	0.00	-0.01	0.00	0.00	-0.01	0.06	0.10	0.04	-0.03	0.24
Arizona	$/CWT	0.07	-0.13	-0.09	-0.15	-0.17	-0.20	-0.23	-0.26	-0.36	-0.17	-0.36	0.07
California	$/CWT	0.57	0.37	0.40	0.40	0.42	0.43	0.40	0.45	0.40	0.43	0.37	0.57
Former Western	$/CWT	0.49	0.31	0.34	0.34	0.36	0.36	0.33	0.38	0.33	0.36	0.31	0.49
Unregulated West	$/CWT	0.12	-0.07	-0.05	-0.09	-0.11	-0.14	-0.17	-0.19	-0.28	-0.11	-0.28	0.12
Hawaii and Alaska	$/CWT	0.22	0.23	0.26	0.29	0.32	0.36	0.38	0.46	0.51	0.33	0.22	0.51

[1]For all milk

TABLE B5—Milk production, changes from the baseline

Milk supply region	Units	2018	2019	2020	2021	2022	2023	2024	2025	2026	Average	Min	Max
United States	Mil. LBS	151	384	422	500	565	624	684	748	830	545	151	830
Northeast	Mil. LBS	0	6	-18	-26	-38	-46	-54	-62	-70	-34	-70	6
Appalachian	Mil. LBS	16	12	0	7	8	9	9	16	20	11	0	20
Florida	Mil. LBS	2	5	6	7	8	8	7	6	4	6	2	8
Southeast	Mil. LBS	57	6	9	8	8	2	1	27	36	17	1	57
Upper Midwest	Mil. LBS	0	102	94	115	135	157	192	215	274	143	0	274
Central	Mil. LBS	0	12	5	-1	-10	-22	-38	-58	-80	-21	-80	12
Mideast	Mil. LBS	2	-39	-42	-54	-63	-75	-90	-107	-137	-67	-137	2
Pacific Northwest	Mil. LBS	1	-6	-9	-11	-13	-14	-16	-17	-20	-11	-20	1
Southwest	Mil. LBS	0	27	25	26	26	26	28	28	36	25	0	36
Arizona	Mil. LBS	3	-3	-5	-9	-13	-19	-25	-32	-43	-16	-43	3
California	Mil. LBS	48	225	292	354	409	462	510	547	597	383	48	597
Former Western	Mil. LBS	21	37	63	84	110	135	161	188	215	113	21	215
Unregulated West	Mil. LBS	1	1	0	-1	-1	-2	-3	-4	-5	-2	-5	1
Hawaii and Alaska	Mil. LBS	0	1	1	1	1	2	2	2	2	1	0	2

TABLE B6—Milk marketings, changes from the baseline

Milk supply region	Units	2018	2019	2020	2021	2022	2023	2024	2025	2026	Average	Min	Max
United States	Mil. LBS	151	384	422	500	565	624	684	748	830	545	151	830
Northeast	Mil. LBS	0	6	-17	-26	-38	-46	-54	-62	-69	-34	-69	6
Appalachian	Mil. LBS	16	12	0	7	8	9	9	16	20	11	0	20
Florida	Mil. LBS	2	5	6	7	8	8	7	6	4	6	2	8
Southeast	Mil. LBS	57	6	9	8	8	2	1	26	36	17	1	57
Upper Midwest	Mil. LBS	0	102	94	115	135	157	192	215	274	143	0	274
Central	Mil. LBS	0	12	5	-1	-10	-22	-38	-57	-79	-21	-79	12
Mideast	Mil. LBS	2	-39	-41	-54	-63	-75	-89	-107	-136	-67	-136	2
Pacific Northwest	Mil. LBS	1	-6	-8	-11	-12	-13	-15	-17	-20	-11	-20	1
Southwest	Mil. LBS	0	27	25	26	26	26	28	28	36	25	0	36
Arizona	Mil. LBS	3	-3	-5	-9	-13	-19	-25	-32	-43	-16	-43	3
California	Mil. LBS	48	224	291	353	408	461	508	546	596	382	48	596
Former Western	Mil. LBS	21	37	63	84	109	135	160	187	214	112	21	214
Unregulated West	Mil. LBS	1	1	0	-1	-1	-2	-3	-4	-5	-2	-5	1
Hawaii and Alaska	Mil. LBS	0	1	1	1	1	2	2	2	2	1	0	2

TABLE B7—Producer revenue, changes from the baseline

Milk supply region	Units	2018	2019	2020	2021	2022	2023	2024	2025	2026	Average	Min	Max
United States	Mil. $	648	177	274	242	261	265	203	303	184	284	177	648
Northeast	Mil. $	15	-52	-43	-61	-66	-78	-90	-99	-124	-66	-124	15
Appalachian	Mil. $	21	10	9	11	12	15	15	25	28	16	9	28
Florida	Mil. $	8	3	5	5	5	3	1	0	-3	3	-3	8
Southeast	Mil. $	21	2	3	3	3	1	0	10	14	6	0	21
Upper Midwest	Mil. $	157	45	61	71	81	106	105	167	163	106	45	167
Central	Mil. $	26	-13	-11	-22	-30	-41	-55	-67	-100	-35	-100	26
Mideast	Mil. $	3	-53	-44	-64	-72	-89	-106	-130	-171	-81	-171	3
Pacific Northwest	Mil. $	3	-21	-16	-23	-24	-27	-32	-33	-44	-24	-44	3
Southwest	Mil. $	46	-1	5	2	4	6	3	19	33	13	-1	46
Arizona	Mil. $	4	-7	-6	-10	-12	-15	-19	-22	-31	-13	-31	4
California	Mil. $	252	201	234	250	271	288	287	323	313	269	201	323
Former Western	Mil. $	92	63	76	80	90	96	96	109	107	90	63	109
Unregulated West	Mil. $	1	0	0	0	-1	-1	-1	-1	-2	-1	-2	1
Hawaii and Alaska	Mil. $	0	0	0	0	0	1	1	1	1	0	0	1

TABLE B8—FMMO component prices, changes from the baseline

Component	Units	2018	2019	2020	2021	2022	2023	2024	2025	2026	Average	Min	Max
Butterfat	$/LB	-0.08	-0.10	-0.08	-0.10	-0.10	-0.12	-0.12	-0.15	-0.18	-0.11	-0.18	-0.08
Nonfat Solids	$/LB	-0.02	-0.02	-0.02	-0.04	-0.04	-0.05	-0.05	-0.07	-0.08	-0.04	-0.08	-0.02
Protein	$/LB	0.23	0.15	0.15	0.17	0.18	0.22	0.21	0.29	0.32	0.21	0.15	0.32
Other Solids	$/LB	0.01	0.01	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.01
Somatic Cell Adjuster	1/	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

[1] $/1,000 somatic cell count

TABLE B9—FMMO class prices at 3.5% BF, changes from the baseline[1]

FMMO class prices	Units	2018	2019	2020	2021	2022	2023	2024	2025	2026	Average	Min	Max
Class I Price	$/CWT	0.45	0.14	0.17	0.20	0.22	0.26	0.25	0.40	0.37	0.27	0.14	0.45
Class I Fat Price	$/LB	-0.08	-0.10	-0.08	-0.10	-0.10	-0.12	-0.12	-0.15	-0.18	-0.11	-0.18	-0.08
Class I Skim Price	$/CWT	0.77	0.49	0.47	0.56	0.59	0.72	0.70	0.96	1.04	0.70	0.47	1.04
Class II Price	$/CWT	-0.48	-0.55	-0.49	-0.67	-0.71	-0.83	-0.89	-1.10	-1.29	-0.78	-1.29	-0.48
Class II Skim Price	$/CWT	-0.20	-0.22	-0.22	-0.34	-0.37	-0.41	-0.48	-0.59	-0.68	-0.39	-0.68	-0.20
Class III Price	$/CWT	0.45	0.14	0.17	0.20	0.22	0.26	0.25	0.40	0.37	0.27	0.14	0.45
Class III Skim Price	$/CWT	0.77	0.49	0.47	0.56	0.59	0.72	0.70	0.96	1.04	0.70	0.47	1.04
Class IV Price	$/CWT	-0.48	-0.55	-0.49	-0.67	-0.71	-0.83	-0.89	-1.10	-1.29	-0.78	-1.29	-0.48
Class IV Skim Price	$/CWT	-0.20	-0.22	-0.22	-0.34	-0.37	-0.41	-0.48	-0.59	-0.68	-0.39	-0.68	-0.20

[1]Changes in the Class Fat Prices would be the same for each class of Fat.

TABLE B10—California FMMO class prices at 3.5% BF, changes from the baseline

CA class prices	Units	2018	2019	2020	2021	2022	2023	2024	2025	2026	Average	Min	Max
CA Class I price	$/CWT	0.22	-0.10	-0.07	-0.04	-0.02	0.02	0.01	0.17	0.15	0.04	-0.10	0.22
CA Class II price	$/CWT	-0.01	-0.09	-0.03	-0.21	-0.26	-0.38	-0.44	-0.65	-0.84	-0.32	-0.84	-0.01
CA Class III price	$/CWT	-0.10	-0.39	-0.37	-0.22	-0.15	-0.05	-0.07	0.22	0.26	-0.10	-0.39	0.26
CA Class IV price	$/CWT	-0.24	-0.32	-0.26	-0.44	-0.49	-0.61	-0.67	-0.88	-1.07	-0.55	-1.07	-0.24

TABLE B11—FMMO class prices at test, changes from the baseline

Order 1:													
	Units	2018	2019	2020	2021	2022	2023	2024	2025	2026	Average	Min	Max
NE Class I price	$/CWT	0.59	0.29	0.30	0.36	0.39	0.46	0.45	0.65	0.67	0.46	0.29	0.67
NE Class II price	$/CWT	-0.66	-0.76	-0.66	-0.88	-0.93	-1.10	-1.15	-1.43	-1.68	-1.03	-1.68	-0.66
NE Class III price	$/CWT	0.40	0.07	0.11	0.13	0.15	0.17	0.17	0.29	0.24	0.19	0.07	0.40
NE Class IV price	$/CWT	-0.52	-0.60	-0.54	-0.73	-0.77	-0.90	-0.96	-1.19	-1.40	-0.85	-1.40	-0.52
Order 5:													
	Units	2018	2019	2020	2021	2022	2023	2024	2025	2026	Average	Min	Max
AP Class I price	$/CWT	0.59	0.29	0.30	0.36	0.39	0.46	0.45	0.65	0.67	0.46	0.29	0.67
AP Class II price	$/CWT	-0.98	-1.14	-0.98	-1.27	-1.33	-1.59	-1.64	-2.03	-2.41	-1.48	-2.41	-0.98
AP Class III price	$/CWT	0.27	-0.07	0.00	-0.01	0.00	-0.01	-0.01	0.07	-0.02	0.03	-0.07	0.27
AP Class IV price	$/CWT	-0.60	-0.69	-0.61	-0.81	-0.86	-1.01	-1.06	-1.32	-1.55	-0.94	-1.55	-0.60
Order 6:													
	Units	2018	2019	2020	2021	2022	2023	2024	2025	2026	Average	Min	Max
FL Class I price	$/CWT	0.58	0.28	0.30	0.35	0.38	0.45	0.44	0.63	0.65	0.45	0.28	0.65
FLClass II price	$/CWT	-1.40	-1.63	-1.39	-1.77	-1.85	-2.24	-2.26	-2.81	-3.35	-2.08	-3.35	-1.39
FL Class III price	$/CWT	0.44	0.13	0.16	0.19	0.21	0.24	0.24	0.38	0.35	0.26	0.13	0.44
Fl Class IV price	$/CWT	-1.15	-1.34	-1.15	-1.46	-1.54	-1.85	-1.88	-2.33	-2.77	-1.72	-2.77	-1.15
Order 7:													
	Units	2018	2019	2020	2021	2022	2023	2024	2025	2026	Average	Min	Max
SE Class I price	$/CWT	0.58	0.28	0.29	0.35	0.38	0.45	0.44	0.63	0.65	0.45	0.28	0.65
SEClass II price	$/CWT	-0.99	-1.15	-0.99	-1.28	-1.35	-1.61	-1.66	-2.06	-2.44	-1.50	-2.44	-0.99
SE Class III price	$/CWT	0.37	0.04	0.09	0.11	0.12	0.13	0.13	0.25	0.19	0.16	0.04	0.37
SE Class IV price	$/CWT	-0.92	-1.07	-0.93	-1.19	-1.26	-1.50	-1.54	-1.91	-2.27	-1.40	-2.27	-0.92
Order 30:													
	Units	2018	2019	2020	2021	2022	2023	2024	2025	2026	Average	Min	Max
UM Class I price	$/CWT	0.63	0.34	0.34	0.41	0.43	0.52	0.51	0.72	0.75	0.52	0.34	0.75
UMClass II price	$/CWT	-0.94	-1.10	-0.94	-1.22	-1.28	-1.53	-1.57	-1.95	-2.32	-1.43	-2.32	-0.94
UM Class III price	$/CWT	0.48	0.15	0.18	0.22	0.24	0.28	0.27	0.42	0.40	0.29	0.15	0.48
UM Class IV price	$/CWT	-1.70	-1.98	-1.68	-2.10	-2.20	-2.67	-2.67	-3.32	-3.96	-2.47	-3.96	-1.68
Order 32:													
	Units	2018	2019	2020	2021	2022	2023	2024	2025	2026	Average	Min	Max
CE Class I price	$/CWT	0.61	0.31	0.32	0.38	0.40	0.49	0.47	0.68	0.70	0.48	0.31	0.70
CE Class II price	$/CWT	-0.85	-0.99	-0.85	-1.11	-1.17	-1.39	-1.44	-1.78	-2.11	-1.30	-2.11	-0.85
CE Class III price	$/CWT	0.47	0.14	0.18	0.21	0.23	0.26	0.26	0.41	0.38	0.28	0.14	0.47
CE Class IV price	$/CWT	-0.62	-0.71	-0.63	-0.84	-0.89	-1.04	-1.10	-1.36	-1.60	-0.98	-1.60	-0.62
Order 33:													
	Units	2018	2019	2020	2021	2022	2023	2024	2025	2026	Average	Min	Max
ME Class I price	$/CWT	0.60	0.31	0.31	0.38	0.40	0.48	0.47	0.67	0.70	0.48	0.31	0.70
ME Class II price	$/CWT	-0.76	-0.89	-0.77	-1.01	-1.06	-1.26	-1.31	-1.62	-1.92	-1.18	-1.92	-0.76
ME Class III price	$/CWT	0.46	0.14	0.17	0.20	0.22	0.26	0.25	0.40	0.37	0.28	0.14	0.46
ME Class IV price	$/CWT	-0.59	-0.68	-0.60	-0.81	-0.86	-1.00	-1.06	-1.31	-1.55	-0.94	-1.55	-0.59
Order 124:													
	Units	2018	2019	2020	2021	2022	2023	2024	2025	2026	Average	Min	Max
PN Class I price	$/CWT	0.60	0.30	0.31	0.37	0.39	0.47	0.46	0.66	0.68	0.47	0.30	0.68
PN Class II price	$/CWT	-0.95	-1.10	-0.95	-1.23	-1.29	-1.54	-1.58	-1.97	-2.33	-1.44	-2.33	-0.95
PN Class III price	$/CWT	0.48	0.13	0.17	0.20	0.22	0.26	0.25	0.41	0.37	0.28	0.13	0.48
PN Class IV price	$/CWT	-0.55	-0.63	-0.56	-0.75	-0.80	-0.94	-0.99	-1.23	-1.45	-0.88	-1.45	-0.55
Order 126:													
	Units	2018	2019	2020	2021	2022	2023	2024	2025	2026	Average	Min	Max
SW Class I price	$/CWT	0.58	0.28	0.29	0.35	0.37	0.44	0.43	0.62	0.64	0.45	0.28	0.64
SW Class II price	$/CWT	-0.93	-1.08	-0.93	-1.21	-1.27	-1.52	-1.56	-1.93	-2.29	-1.41	-2.29	-0.93
SW Class III price	$/CWT	0.47	0.14	0.18	0.21	0.23	0.26	0.26	0.41	0.38	0.28	0.14	0.47
SW Class IV price	$/CWT	-0.59	-0.68	-0.60	-0.80	-0.85	-0.99	-1.05	-1.30	-1.53	-0.93	-1.53	-0.59
Order 131:													
	Units	2018	2019	2020	2021	2022	2023	2024	2025	2026	Average	Min	Max
AZ Class I price	$/CWT	0.59	0.29	0.30	0.36	0.39	0.46	0.45	0.65	0.67	0.46	0.29	0.67
AZ Class II price	$/CWT	-1.10	-1.27	-1.10	-1.41	-1.48	-1.77	-1.81	-2.25	-2.67	-1.65	-2.67	-1.10
AZ Class III price	$/CWT	0.22	-0.12	-0.05	-0.06	-0.06	-0.08	-0.08	-0.02	-0.13	-0.04	-0.13	0.22
AZ Class IV price	$/CWT	-0.26	-0.29	-0.27	-0.41	-0.44	-0.49	-0.57	-0.69	-0.81	-0.47	-0.81	-0.26
Order 51:													
	Units	2018	2019	2020	2021	2022	2023	2024	2025	2026	Average	Min	Max
CA Class I price	$/CWT	-0.88	-1.21	-1.23	-1.17	-1.16	-1.10	-1.13	-0.93	-0.91	-1.08	-1.23	-0.88
CA Class II price	$/CWT	1.98	1.85	1.99	1.78	1.76	1.57	1.55	1.28	1.00	1.64	1.00	1.99
CA Class III price	$/CWT	0.26	-0.02	0.01	0.17	0.25	0.36	0.35	0.65	0.70	0.31	-0.02	0.70
CA Class IV price	$/CWT	1.42	1.26	1.59	1.30	1.14	0.95	0.93	0.56	0.45	1.07	0.45	1.59

TABLE B12—California class utilization, changes from the baseline[23]

Class	Units	2018	2019	2020	2021	2022	2023	2024	2025	2026	Average	Min	Max
CA Class I	Mil. LBS	698	665	682	681	678	678	675	675	665	678	665	698
CA Class II	Mil. LBS	-1091	-1099	-1085	-1110	-1122	-1137	-1118	-1067	-1068	-1100	-1137	-1067
CA Class III	Mil. LBS	-8206	-8430	-8935	-9158	-9293	-9511	-9860	-9867	-10210	-9274	-10210	-8206
CA Class IV	Mil. LBS	-5716	-5904	-5575	-5813	-6235	-6474	-6556	-7312	-7033	-6291	-7312	-5575

TABLE B13—National class utilization, changes from the baseline

Class	Units	2018	2019	2020	2021	2022	2023	2024	2025	2026	Average	Min	Max
National Class I	Mil. LBS	-61	-166	-141	-165	-196	-227	-263	-302	-369	-210	-369	-61
National Class II	Mil. LBS	489	502	504	577	617	617	669	744	700	602	489	744
National Class III	Mil. LBS	-422	-127	-103	-312	-306	-300	-405	-582	-551	-345	-582	-103
National Class IV	Mil. LBS	150	179	166	405	457	541	690	897	1060	505	150	1060

TABLE B14—FMMO Class I revenue/handler costs, changes from the baseline

Federal Milk Marketing Order	Units	2018	2019	2020	2021	2022	2023	2024	2025	2026	Average	Min	Max
Northeast (1)	Mil. $	48.8	23.8	24.2	28.7	30.3	36.1	34.8	49.6	50.9	36.4	23.8	50.9
Appalachian (5)	Mil. $	20.9	8.4	7.6	8.5	7.9	8.9	6.6	11.2	9.3	9.9	6.6	20.9
Florida (6)	Mil. $	12.0	5.0	5.0	5.9	6.0	7.0	6.4	9.5	9.3	7.3	5.0	12.0
Southeast (7)	Mil. $	22.6	6.7	9.2	11.3	11.7	14.0	13.0	20.2	19.5	14.2	6.7	22.6
Upper Miwest (30)	Mil. $	21.4	8.7	9.9	12.2	12.6	15.3	14.3	21.2	21.3	15.2	8.7	21.4
Central (32)	Mil. $	28.7	11.7	13.3	16.1	16.8	20.2	19.2	28.4	28.6	20.3	11.7	28.7
Mideast (33)	Mil. $	33.3	14.0	12.9	14.8	14.2	16.7	14.1	22.5	21.4	18.2	12.9	33.3
Pacific Northwest (124)	Mil. $	10.9	4.6	4.2	4.7	4.4	4.9	3.7	6.0	5.2	5.4	3.7	10.9
Southwest (126)	Mil. $	23.1	9.8	9.6	11.1	11.1	13.0	11.5	17.6	16.9	13.7	9.6	23.1
Arizona (131)	Mil. $	6.5	2.7	2.6	3.1	3.1	3.7	3.4	5.2	5.1	3.9	2.6	6.5
California (51)	Mil. $	49.6	29.5	33.0	36.7	38.1	42.8	42.5	53.4	53.2	42.1	29.5	53.4

TABLE B15—U.S. dairy product imports, changes from the baseline[24]

Product imported	Units	2018	2019	2020	2021	2022	2023	2024	2025	2026	Average	Min	Max
American Cheese	Mil. LBS	0.003	0.001	0.003	0.000	0.000	0.000	0.000	0.002	0.004	0.002	0.000	0.004
Other than American Cheese	Mil. LBS	1.243	2.344	2.378	2.928	3.354	3.905	4.408	5.290	6.276	3.569	1.243	6.276
Butter	Mil. LBS	-0.001	-0.009	-0.011	-0.018	-0.039	-0.040	-0.067	-0.064	-0.071	-0.036	-0.071	-0.001

TABLE B16—U.S. dairy product exports, changes from the baseline[25]

Product exported	Units	2018	2019	2020	2021	2022	2023	2024	2025	2026	Average	Min	Max
American Cheese	Mil. LBS	-13.477	-4.287	-5.533	-6.583	-7.334	-8.607	-8.365	-13.477	-13.102	-8.974	-13.477	-4.287
Other than American Cheese	Mil. LBS	-11.738	-12.320	-4.452	-9.098	-8.734	-10.469	-10.612	-14.165	-16.587	-10.908	-16.587	-4.452
Dry Whey	Mil. LBS	-6.853	-4.454	-2.331	-4.301	-4.197	-5.087	-5.009	-7.151	-7.589	-5.219	-7.589	-2.331
Butter	Mil. LBS	16.568	23.176	20.322	25.465	29.812	35.435	38.626	45.251	52.833	31.943	16.568	52.833
Nonfat Dry Milk	Mil. LBS	23.490	26.626	25.880	40.700	44.429	48.561	57.028	69.569	80.056	46.260	23.490	80.056

TABLE B17—Value of U.S. dairy product imports, changes from the baseline

Product imported	Units	2018	2019	2020	2021	2022	2023	2024	2025	2026	Average	Min	Max
Other Class II Total Solids	Mil. $	0.000	-0.001	0.009	-0.016	-0.019	-0.017	-0.031	-0.054	-0.045	-0.019	-0.054	0.009
Frozen	Mil. $	0.000	0.000	0.002	-0.003	-0.003	-0.003	-0.006	-0.011	-0.010	-0.004	-0.011	0.002
American Cheese	Mil. $	1.470	0.472	0.627	0.700	0.767	0.904	0.878	1.358	1.296	0.941	0.472	1.470
Other than American Cheese	Mil. $	13.510	16.460	9.529	14.719	15.259	17.750	18.657	23.630	27.169	17.409	9.529	27.169
Butter	Mil. $	-2.980	-3.502	-2.664	-2.608	-2.575	-2.549	-2.538	-2.384	-1.948	-2.639	-3.502	-1.948
Nonfat Dry Milk	Mil. $	-0.066	-0.074	-0.073	-0.114	-0.125	-0.136	-0.161	-0.198	-0.228	-0.131	-0.228	-0.066

[23] The changes in the California class utilization represent the changes in pooled milk. Currently under the CSO, almost all Grade A milk produced in California is required to pool. Under the Final California FMMO, Class II, III, and IV milk is not required to pool. This difference in pooling requirements is one factor for forecast changes in California class utilization.

[24] Products only with a change in quantity from the baseline are included.

[25] Products only with a change in quantity from the baseline are included.

TABLE B18—Value of U.S. dairy product exports, changes from the baseline

Product exported	Units	2018	2019	2020	2021	2022	2023	2024	2025	2026	Average	Min	Max
Other Class II Total Solids	Mil. $	0.000	-0.002	0.015	-0.026	-0.034	-0.031	-0.059	-0.108	-0.094	-0.038	-0.108	0.015
Frozen	Mil. $	0.000	-0.001	0.013	-0.022	-0.028	-0.025	-0.047	-0.086	-0.074	-0.030	-0.086	0.013
American Cheese	Mil. $	-18.592	-5.812	-7.652	-8.976	-9.839	-11.461	-11.036	-17.555	-17.196	-12.013	-18.592	-5.812
Other than American Cheese	Mil. $	-21.844	-22.946	-8.064	-16.261	-15.560	-18.193	-18.060	-23.743	-26.956	-19.070	-26.956	-8.064
Dry Whey	Mil. $	1.278	0.799	0.426	0.702	0.649	0.744	0.739	0.909	0.900	0.794	0.426	1.278
Butter	Mil. $	29.590	40.239	35.316	44.477	51.644	62.555	67.437	80.879	96.455	56.510	29.590	96.455
Nonfat Dry Milk	Mil. $	-13.395	-15.116	-14.372	-17.726	-15.490	-8.947	-9.832	-15.363	-12.397	-13.626	-17.726	-8.947

VI. APPENDIX C: TECHNICAL SUPPLEMENT TO THE MILK POOLING ANALYSIS

This supplement is intended to provide more detailed technical information for interpreting and understanding the milk pooling analysis (section C) in the Regulatory Economic Impact Analysis of the Final Decision (REIA-F).

The Final Decision sets pooling provisions for a proposed California FMMO that are conceptually similar to the current 10 FMMOs, but tailored for the California market. The pooling provisions are performance based and designed to admit to the pool those producers who consistently supply the Class I market, and therefore should be allowed to share in the revenues from the market. Since pooling would be optional for manufacturing milk, the REIA-F estimates how much milk would pool under a CA FMMO as compared to the baseline.

In the Regional Econometric Model, the milk-not-pooled under each current FMMO is implicitly determined based on the difference between the regional milk production and total milk pooled under each FMMO. Therefore, direct estimation of the milk-not-pooled in current FMMOs is not necessary. Since the current California State Order (CSO) requires nearly all Grade A milk production to be pooled, there is no way to implicitly estimate the volume of milk that would not be pooled under a CA FMMO. Therefore, the REIA-F includes an explicit estimation of the potential milk-not-pooled for a CA FMMO, as compared to the baseline under the current CSO's mandatory pooling policy.

To estimate milk-not-pooled under a CA FMMO, equations for each manufacturing class are estimated using monthly data from the Upper Midwest. The pooling provisions in the Final Decision for the CA FMMO and Class I utilization in California are most similar to those in the Upper Midwest. Although not a perfect comparison, the Upper Midwest data provide the most comparable analysis of decisions on not pooling milk relative to the other current FMMOs based on (1) its long history of milk not pooling and (2) the similarities in the structure of the Upper Midwest and California dairy industries. Furthermore, given these similarities, under the Final Decision provisions some manufacturing milk is expected not to pool under the proposed California FMMO. The analysis used Upper Midwest data from January 2007 to December 2016. This time period was selected to reflect the change in the Upper Midwest's repooling standards that were effective December 1, 2006.

The equations for each class of manufacturing milk that would not pool are estimated separately, where α is the intercept adjuster and β is the parameter estimate. The Class Draw per hundredweight (CD) represents the amount a handler would draw from the pool (if CD is positive) or pay into the pool (if the CD is negative). The CD is calculated—for Class II, III, and IV—as the statistical uniform price minus the respective class price.

$$\frac{\text{Class Milk Not Pooled}}{\text{Class Milk Pooled}} = \alpha + \beta * Class\ Draw \qquad \text{EQ 1.}$$

The results of the estimation are as follows (tables 1-3):

Table 1. Class II Monthly Milk-Not-Pooled Estimation Results
(R-Square: 0.6244)

Parameter	Estimate	Std. Error	t-Value	Pr>|t|
α	1.009297	0.0629	16.05	<.0001
β	-0.62034	0.0440	-14.10	<.0001

Table 2. Class III Monthly Milk-Not-Pooled Estimation Results
(R-Square: 0.5003)

Parameter	Estimate	Std. Error	t-Value	Pr>|t|
α	0.33371	0.0214	15.60	<.0001
β	-0.65422	0.0597	-10.96	<.0001

Table 3. Class IV Monthly Milk-Not-Pooled Estimation Results
(R-Square: 0.3574)

Parameter	Estimate	Std. Error	t-Value	Pr>|t|
α	1.297897	0.1252	10.36	<.0001
β	-0.59969	0.0732	-8.20	<.0001

Pooling decisions under FMMOs are made monthly whereas the Regional Econometric Model is an annual model. A way to incorporate the monthly estimated equations into an annual Regional Econometric Model is needed. Singularly using an annual number to calculate pooling decisions overly smooths the data. To mitigate this, it is necessary to make an assumption about the distribution of monthly values for the prices given an annual average. To accomplish this, for each month we calculate the distribution of deviations from the annual CD. For the time period January 2007 through December 2016, we calculate the deviations from the annual CD as compared to the monthly CD to generate a distribution of the deviations (i.e. Monthly Class II Draw minus Annual Class II Draw). Using a distribution of the deviations allows the monthly information to be incorporated into the annual model (through weighted iteration across the distribution of deviations) while avoiding issues with temporal aggregation and seasonality. These issues are avoided because the monthly data are not used chronologically nor as an absolute number, but rather through the deviations from the annual data across the ten years.

The histograms in Figures 1-3 display the distribution of CD values from January 2007 through December 2016. The histograms have 10 bins (range of CDs) and each bin is centered at the midpoint of the deviations from the annual CD average. The height of the bins represents the frequency of the deviations.

Figure 1. Class II CD

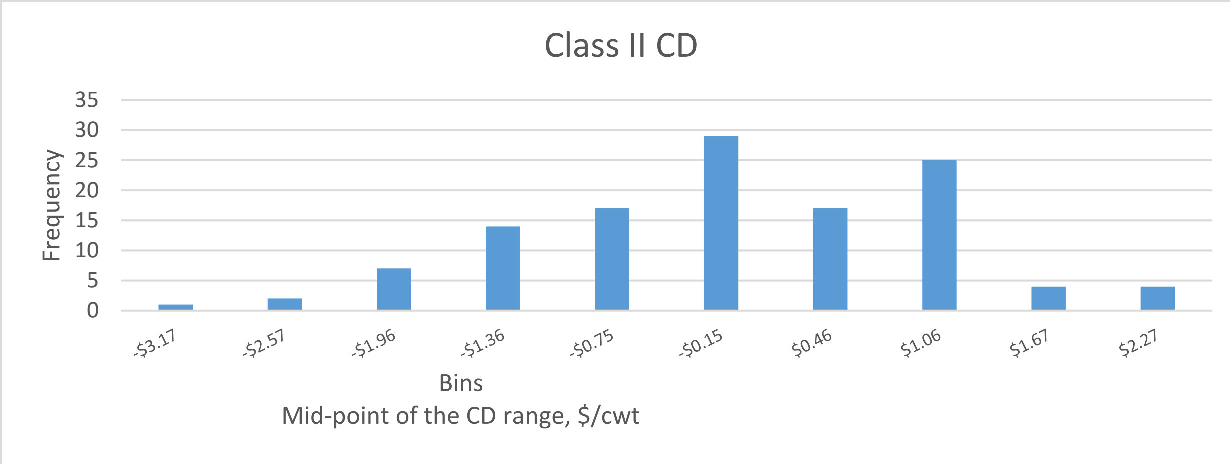

Figure 2. Class III CD

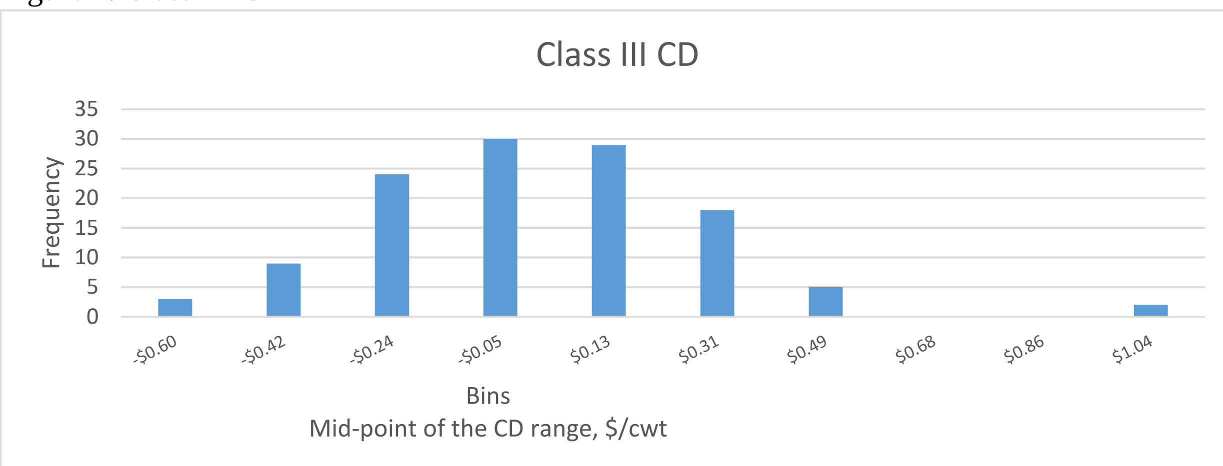

Figure 3. Class IV CD

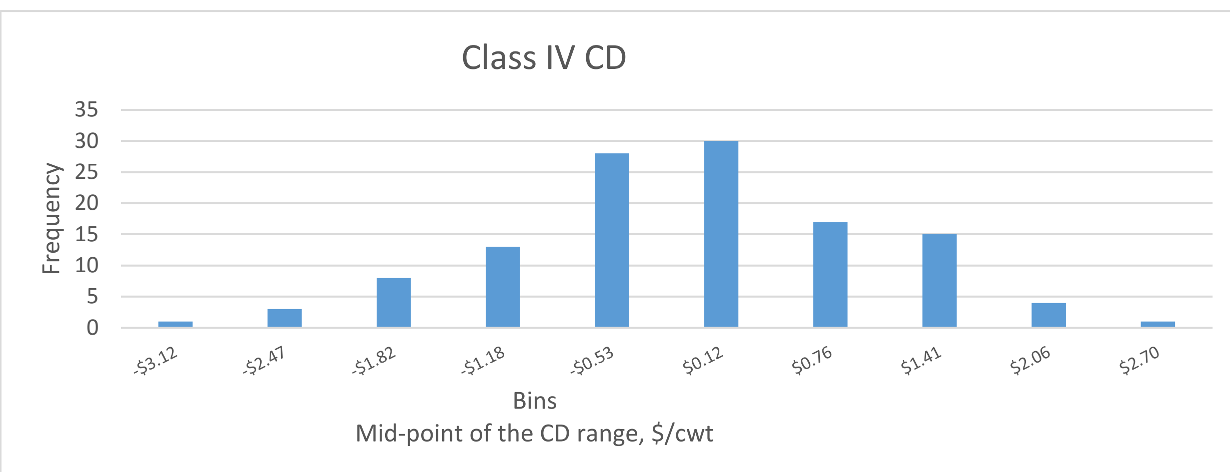

Table 4 gives selected summary statistics for the bins for the different CDs. Each bin has a proportional weight given the frequency of monthly occurrences over the respective period. When the annual CD price increases or decreases, the model assumes that the monthly distribution of CD prices increases or decreases by the same amount.

Table 4. CD Bin Summary Statistics for Deviations from the Annual Price

	Class II	Class III	Class IV
Midpoint for Lowest Bin	-3.17	-0.60	-3.12
Midpoint for Highest Bin	2.27	1.04	2.70
Midpoint Bin Difference	0.61	0.18	0.65

The distributions of the deviations from the annual CDs allow for the monthly pooling decision to be incorporated into the annual REIA-F. The parameter estimates from equation 1 are used, respectively, in Equation 2 below.

The CD for each class is modified to include a location adjustment. The four location adjustments (-$0.30, -$0.20, -$0.10, $0.00) are included to cover the $0.50 price surface spread in California (as compared to $0.20 price spread in the Upper Midwest, which is implicit in the data). Since the Upper Midwest data includes a $0.20 spread, the location adjustment covers the additional $0.30 spread in California. Hence the location adjustment zone of $0.0 would cover the spread of $1.90-$2.10. These location adjustments are then weighted by the amount of milk in each class in each zone that would be eligible to pool.[26]

The location adjustments and the estimated equations in equation 1, in conjunction with the forecast prices in the CA FMMO would account for the milk that may never pool under a CA FMMO.[27] However, in the context of the impact analysis, all milk no longer pooling was once pooling on the CSO.

Each combination of location adjustment and deviation bin are iterated through all 40 possibilities (10 years, 4 location zone adjustments for each year).

For each class and iteration:

1. The location adjustments and the deviations for each bin are added to the CD;
2. The parameter estimate multiplied by the modified CD are weighted by the deviation bin weight;
3. The bin-weighted modified CD is then weighted by the percent of total milk at each location adjustment.

[26] Regulated distribution plants would have to pool all of the milk received at that plant (regardless of use).
[27] This assumes that there would be plants not pooling in the CA FMMO similar to the case in the Upper Midwest

The iterations are then summed to get the weighted milk-not-pooled, milk pooled percentage.

$$\sum_{i=1}^{10}\sum_{l=1}^{4} f(x_n) = \begin{cases} \left(\alpha_n + \beta_n * \left(CPPD_n + b_{n,i} + z_{n,l}\right) * \delta_{n,i}\right) * \gamma_{n,l}, & x_n > 0 \\ 0, & x_n \leq 0 \end{cases} \qquad \text{EQ 2}$$

where:
i = the number of bins
n = the three classes (Class II, Class III, Class IV)
l = the four location zone adjustments (-0.30, -0.20, -0.10, 0)
α_n = the intercept adjuster for each CD equation
β_n = the parameter estimate for each CD equation
CD_n = the annual average CD price for the n^{th} class
$b_{n,i}$ = the price deviation from the annual average for the n^{th} class and the i^{th} bin
$z_{n,l}$ = the location adjustment from the base location for the n^{th} class and the l^{th} location
$\delta_{n,i}$ = the weight associated with the n^{th} class and the i^{th} bin
$\gamma_{n,l}$ = the weight associated with the n^{th} class and the l^{th} location

By iterating through all 40 options, the range of possibilities for monthly deviations from the annual CD (including any location adjustment effects) is covered. This method of capturing monthly data in an annual model by iterating monthly deviations was used for the MILC program in the Annual Econometric Model[28] (utilized in the 2007 Hearing on Class III and IV Prices[29]).

Once each milk-not-pooled percentage for each class is calculated, it is multiplied by the total pooled milk for each class in the CA FMMO order. For each class, this CA milk-not-pooled is then moved into its respective class as unregulated milk.

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28 https://www.ams.usda.gov/sites/default/files/media/nateconbase2016Dairy%20Hearing%20Analysis.pdf
29 https://www.ams.usda.gov/rules-regulations/moa/dairy/hearings/class-III-and-IV-prices

VII. APPENDIX D: TECHNICAL SUPPLEMENT TO THE CONSUMER WELFARE ANALYSIS

Impact of policy changes affecting the wholesale prices of dairy products on consumers is measured as the change in consumer surplus given changes in retail prices and quantities.[30] Consumer surplus is defined as the difference between what a consumer pays for a unit of a good and the maximum amount the consumer would be willing to pay for that unit. The Regional Econometric Model does not directly forecast changes in consumer retail prices. In order to conduct a consumer impact analysis of a policy change affecting wholesale prices of dairy products, one needs to define the relationship between the retail price of dairy product and the wholesale dairy prices.

The methodology to analyze the retail price of dairy products is discussed first. The agricultural economics literature studying the price transmission in agricultural commodities under various market structures and scenarios is extensive. The 100 percent price transmission of changes in wholesale price to retail price under perfect competition is a widely accepted result (Chouinard et al. 2008). A study specific to the dairy industry estimated pass-through rates of 73% to 103% in the U.S. processed cheese market under Bertrand-Nash equilibrium (Kim and Cotterill 2008). Looking at the European market, Ferrucci et al. (2012) found a full pass through from dairy commodity wholesale price to retail prices occurs after 4 quarters. In the United States, evidence specific to the dairy sector suggests that up to six months is required for retail dairy product prices to adjust fully to changes in wholesale prices (Lamm and Westcott 1981).[31]

For the purposes of defining relationship between wholesale and retail prices of dairy products, we divide main dairy products into two categories: (1) dairy products that are mostly sold as a consumer packaged goods (i.e. final product); (2) dairy products that are used predominantly as inputs. Fluid milk, frozen products, other Class II products, cheese and butter fall into the first category, while dry whey and nonfat dry milk (NFDM) fall into the latter category.[32]

The reason for this distinction is lack of available data of retail prices for dry whey and nonfat dry milk. We acknowledge that both cheese and butter are heavily used as inputs in processed food production. This analysis measures changes in the welfare of consumers that buy cheese and butter as final goods. The analysis implicitly assumes that butter and cheese that are not retailed as a final product: (1)

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[30] The methodology used in calculations of consumer surplus are standard in economics. Examples can be found in most Intermediate Economics textbooks, for example Paul A Samuelson, William D. Nordhaus "Economics" Sixth Edition, Chapter 5, p.91.

[31] See also Capps and Sherwell (2007) and Leibtag (2009).

[32] Other Class II total solids and frozen total solids use Consumer Price Indices (CPIs) in the model as their proxy prices. The CPIs were converted to a 2016 base year using the following calculated prices and conversion factors:

- The simple average of Dairy Market News (DMN) National Dairy Bi-Weekly market report in 2016 of ice cream, Greek yogurt and yogurt.
- A 40 percent market share for Greek yogurt based on the Yogurt Market (Product-Traditional, Australian, Icelandic, Greek, Non-dairy, and Kids; Packaged Containers – Cups, Pouch, Tubs, and Bottles)) – North America Industry Analysis, Size, Share, Growth, Trends, and Forecast 2016-2024. http://www.transparencymarketresearch.com/yogurt-market.html. Hence, the Greek yogurt price is weighted by 40 percent.
- Conversion factors for ice cream total solids were sourced from Weights, Measures, and Conversion Factors for Agricultural Commodities and Their Products. http://www.carolinafarmstewards.org/wp-content/uploads/2015/05/Weights-Measures-and-Conversion-Factors-for-Agricultural-Commodities-and-Their-Products.pdf).
- Conversion factors for yogurt total solids were sourced from Evaluation the Effect of Milk Total Solids on the Relationship between Growth and Activity of Starter Cultures and Quality of Concentrated Yogurt. http://www.idosi.org/aejaes/jaes2(5)/20.pdf

constitute a small share of costs in a large number of processed foods; (2) these processed food products have many substitutes; (3) the expenditure on these processed food products as a share of total expenditure is small. Therefore, the wholesale price changes in butter and cheese that are not used as final goods also follow a 100 percent price transmission.

As part of the consumer impact analysis, we developed a price transmission model for fluid milk, Class II dairy products, American cheese and AA grade butter. The empirical analysis uses monthly retail and wholesale data to validate the choice of an assumption that a full price transmission from wholesale to retail prices occurs within a year.

For the retail price of fluid milk, two data sources are used: (1) Monthly U.S. city average whole milk price per gallon from July 1995 to December 2016 provided by BLS. (2) Monthly whole milk retail price per gallon from January 1999 to May 2015 obtained from California Department of Food and Agriculture.[33] For the retail price of Class II products we use data from AMS Dairy Market News. The retail price series used are for non-organic ice cream in 48-64 ounce containers and non-organic Greek yogurt in 32 once containers.[34] Both series are monthly and span from March 2012 to December 2016. The ice cream and yogurt price series were converted to one pound basis and are averaged to obtain a single retail price series for Class II products.

Data sources for the retail prices of American cheese are: (1) The BLS monthly data for retail list price of cheddar cheese from January 2000 to December 2016. The data series provided by BLS are U.S. City averages of the listed price. (2) The USDA AMS weekly advertised retail sales prices to consumers at major retail supermarkets.[35] For retail price of butter, two data sources are used: (1) Monthly BLS Butter retail price index from January 2000 to December 2016.[36] (2) The USDA AMS provides weekly advertised retail sales prices of butter to consumers at major retail supermarkets.[37] We use 16oz. block of non-organic butter as the representative retail butter product. The butter retail price data from AMS are available from March 2012 to December 2016. The table below summarizes the retail data information. The matching wholesale price and manufacturing class price data are obtained from Dairy Product Mandatory Reporting Program.[38]

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[33] AC Nielson Scantrack Reports on Refrigerated Milk. www.cdfa.ca.gov/dairy/retail_prices_main.html.
[34] The ice cream prices were averaged at 56 ounces. A simple average of the bi-weekly ice cream and weighted yogurt prices were used to create an annual average for the respective products.
[35] These data are aggregated from weekly to monthly observations using simple averages by week.
[36] Butter retail price, U.S. city average not seasonally adjusted, all urban consumers, base period 1982-1984=1. Series id: CUUR0000SS10011.
[37] These data are aggregated from weekly to monthly observations using simple averages by week.
38 The most recent data are available at:
https://mpr.datamart.ams.usda.gov/menu.do?path=Products\Dairy\All%20Dairy

Dairy Product Retail Prices by Product and Data Source

Retail Price	Data Source	Period	Obs	Mean
Fluid Milk $/Gallon	BLS	July-1995 to Dec-2016	258	3.123
	AC Nielson	Jan-1999 to May-2015	197	3.120
Class II products $/lb.	AMS Retail	Mar-2012 to Dec-2016	58	1.369
Cheddar Cheese $/lb.	BLS	Jan-2000 to Dec-2016	204	4.707
Cheese $/lb.	AMS Retail	Mar-2012 to Dec-2016	58	3.930
Butter Index	BLS	Jan-2000 to Dec-2016	204	1.852
Butter $/lb.	AMS Retail	Mar-2012 to Dec-2016	58	2.960

For fluid milk, Class II dairy products, American cheese and AA butter we use rolling average wholesale prices and seasonally adjusted hourly real wages of production and nonsupervisory employees for retail trade in the industry of grocery stores as main explanatory variables.[39] In setting a price transmission model, we follow (Heien 1980). The pricing rule used is of this general form:

$$P_r = b_1 P_w + b_2 W,$$

where the retail price of a given dairy product, P_r, is a function of wholesale price of the product, P_w, and the retail marginal costs approximated by the retail wage, W.

The assumptions underlying this pricing rule are: (1) a competitive market; (2) fixed proportions production technology between dairy inputs and other retail marketing costs; and (3) constant returns to scale in food marketing. Implicit in the price transmission model is that retail prices change in response to changing wholesale or farm prices (Lamm and Westcott 1981). Another aspect of the price pass-through process is that responses of retail prices to changes in wholesale prices are generally not instantaneous (Kinnucan and Forker 1987).[40]

The table below summarizes the regression results. For whole fluid milk, a full price transmission from wholesale to retail occurs in about 9 months. The results for cheese suggest statistically significant evidence for a full price transmission of change from whole sale to retail in about six to nine months. The regression results for butter and Class II dairy products suggest close to full price transmission from wholesale to retail price in about 9 months. It is important to note that most of the wholesale-to-retail price pass-through occurs in the first half of the year.

[39] Nominal retail wage variable is converted to real wages by dividing nominal wages by normalized CPI. https://data.bls.gov/timeseries/CES4200000008?data_tool=XGtable.
[40] Simple moving average of lags of whole sale price are used to accommodate the consideration of gradual response to retail prices to wholesale prices.

Estimation Results for Wholesale to Retail Price Transmission

Explanatory Variables	Retail Price						
	Fluid Milk Price		Cheese Price		Butter Price		Class 2 Dairy Products
	Neilson	BLS	AMS Retail	BLS Price	AMS Retail	BLS Index	AMS Retail Price
Trend	0.0002***	0.0001***	0.006	0.008***			
	(0.00005)	(0.00004)	(0.002)	(0.096)			
Constant					2.671	2.500***	-0.116
					(2.404)	(0.290)	(0.502)
Real Wages	0.020***	0.020***	0.006***	0.247***	-0.118	-0.169	0.126***
	(0.001)	(0.0007)	(0.001)	(0.011)	(0.259)	(0.027)	(0.046)
6 month average lag wholesale price			0.938***				
			(0.181)				
9 month average lag wholesale price	0.881***	0.970***		0.850***	0.808***	0.733***	0.966***
	(0.070)	(0.066)		(0.090)	(0.189)	(0.023)	(0.316)
Observations	176	195	52	195	58	195	58
R^2	0.997	0.996	0.996	0.997	0.442	0.854	0.186
Adjusted R^2	0.997	0.996	0.996	0.997	0.422	0.853	0.156
Residual std. Error	0.022	0.024	0.249	0.265	0.236	0.108	0.067
Degrees of Freedom	(df=173)	(df=192)	(df=49)	(df=192)	(df=55)	(df=192)	(df=55)
F Statistics	16,841***	16,124***	4,367***	7,747***	21***	562***	6.27***
	(df=3;173)	(df=3;192)	(df=3;49)	(df=3;198)	(df=2;55)	(df=2;192)	(df=3;55)

The assumption used for this consumer impact analysis is that a full retail price transmission in response to changing wholesale prices takes no more than one year. The regression results in this analysis support this assumption. This analysis serves as a further justification of using the assumption of one to one pass through from wholesale prices to retail prices when analyzing policy changes that affect the wholesale prices for fluid milk, Class II dairy products, cheese and butter. Since the data used in the Regional Econometric Model is on an annual basis, a one-to-one wholesale-to-retail price transmission within a year implies that all the changes in wholesale prices are fully transferred to the retail level within the same period. Given the analysis above, we follow the antecedent literature described and use the assumption of 100 percent same-year price pass-through from wholesale to retail for all major dairy products including dry whey and nonfat dry milk.

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