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THE EFFECT OF ADOPTING CALIFORNIA FLUID MILK STANDARDS IN THE UNITED STATES

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Introduction

At the request of the four co-chairmen of the Congressional Dairy Farmer Caucus, Congressman Joe Courtney, Congressman Timothy Walz, Congressman Devin Nunes, and Congressman Peter Welch, the Food and Agricultural Policy Research Institute at the University of Missouri (FAPRI-MU) has analyzed the impact of adopting the current California fluid milk standards throughout the U.S. To accomplish this analysis, a small working group of industry analysts was assembled to help with the questions surrounding this work. We thank the group that provided help and feedback on the preliminary analysis.

Milk as it comes from the cow contains water, nonfat solids and butterfat. The nonfat milk solids are composed of proteins, lactose and minerals. The percentage content of each varies by breed of cow, season and region. Changes in feed rations can affect component composition as well. Nationally, the average annual composition of milk is 8.72 percent nonfat solids and 3.67 percent butterfat, with the remainder being water.

Food and Drug Administration (FDA) regulations allow fluid processors to affect the composition of milk by adding or removing butterfat or by blending milk of varying compositions to achieve a particular fluid product. Fluid milk processors cannot add water to adjust the butterfat content of milk. Minimum standards for fluid milk are established by the FDA. States can also establish standards for fluid milk marketed within the state.

There have been numerous studies of the effects of imposing California fluid milk standards across the U.S. (Salathe and Price, Outlaw et. al., Boynton). In general, these studies tended to reach similar conclusions. The increased use of solids nonfat reduced Commodity Credit Corporation (CCC) inventories of nonfat dry milk and raised prices for nonfat solids, which tended to increase farmer milk prices.

Although similar results are found in this analysis, the market situation is very different today than when those studies were conducted. Uncommitted inventories of nonfat dry milk are virtually non-existent in the current FAPRI-MU 10 year baseline and exports of skim milk powder are important. That compares to high levels of nonfat dry milk in CCC storage when most of the other work was conducted.

The true impact of any policy change depends on the exact implementation of the new policy. Analysis of imposing California fluid milk standards across the rest of the U.S. is dependent on some key variables. Two examples of these variables are how costs of fluid milk fortification will be shared and how consumers will accept a higher solids fluid product. Assumptions regarding these unknowns are important to the analysis and will help drive the conclusions reached in this report.

The baseline used to compare the effects of fortification is equally important. In a market situation of large government stocks of nonfat dry milk, the effects of fortification would reduce government costs and increase the likelihood that nonfat dry milk prices move above support levels. In a market situation of increased trade of nonfat products like skim milk powder, the effect of fortification reduces exports as fewer nonfat solids are available. The additional use of nonfat solids for fortification can affect the demand side of the equation in many ways.

To set the stage for this analysis, table one compares the standards for fluid milk between California and the U.S. In all cases, U.S. minimums for nonfat solids are less than California nonfat solids standards. The largest differences between the U.S. and California standards are in the reduced and low fat products.

Table 1. Comparison of California and U.S. Fluid Milk Standards

Product	California	U.S.
Fat		
Whole	3.5%	3.25%
Reduced Fat	1.9 – 2.1%	2.1%
Low Fat	0.9 – 1.1%	1.2%
Non Fat	0.2%	0.2%
Solids Non Fat		
Whole	8.7%	8.25%
Reduced Fat	10.0%	8.25%
Low Fat	11.0%	8.25%
Non Fat	9.0%	8.25%

The FAPRI Model

The FAPRI dairy model consists of a set of economic equations that attempt to replicate the major decisions that occur in the U.S. dairy industry but are a simplification of the industry. The system includes behavioral equations for the supply of milk that estimate dairy cow inventories and milk yield per cow on a state-level basis. These supply side equations are driven by expected net returns, and supplies of milk increase as returns move higher.

The retail demand side of the model includes equations estimated for American-type cheese, other cheese types, butter, nonfat dry milk, evaporated milk, ice cream, whole fluid milk and lowfat fluid milk products. These demand equations are specified as a function of own price, relevant substitute product prices and real consumer income. In between these demand and supply functions are milk allocation equations that allocate fat and solids nonfat among the various dairy products.

There is also a representation of federal milk market orders and other federal dairy policy such as the Milk Income Loss Contract (MILC) program. This modeling system undergoes continual change as dairy policy and the dairy industry continue to evolve. Dairy product trade is maintained by FAPRI colleagues at Iowa State University with U.S. dairy product exports depending on the difference between world prices in the global dairy model and the level of U.S. dairy product prices.

Milk supplies are allocated in the model to the different manufactured and fluid milk products in a fashion that ensures a balance in the supply and demand for fat and solids nonfat. Adopting California fluid milk standards will in general change the amount of solids nonfat needed for fluid products. The model has been adjusted to incorporate into fluid products the amount of solids nonfat necessary to meet California fluid standards. This increases the utilization of solids nonfat in fluid products and reduces solids nonfat available to other dairy products.

The FAPRI Dairy Baseline

Critical to the analysis of any policy change is the benchmark against which the policy alternative is measured. This is certainly true in the examination of introducing California fluid standards nationwide. The dairy portion of the 2010 U.S. FAPRI baseline is shown in table two. The full U.S. FAPRI baseline can be found at: http://www.fapri-mu.org/outreach/publications/2010/FAPRI_MU_Report_01_10.pdf .

This dairy baseline is optimistic in terms of expected milk prices and returns to producers in the coming decade. Much of the reason for the optimism in prices is related to a strong global market for U.S. dairy products. For example, nonfat dry milk exports rise from 528 million pounds in 2009 to 851 million pounds by 2019 (this is the nonfat dry milk equivalent of actual skim milk powder exports). Similarly strong international demand for other dairy products exists in this baseline.

This global strength results in very few dairy products ever entering CCC inventories. Table two shows that total CCC outlays for dairy average $17 million from 2010 to 2019, with the bulk of those expenditures made through the MILC program.

If analysis of the adoption of California fluid standards was conducted against a baseline with significant CCC inventories of nonfat dry milk, the results would include the removal of those inventories from the CCC before there would be much price effect.

The FAPRI baseline process has evolved from a single-point deterministic baseline to a multiple-outcome stochastic process. That is, given the uncertainty in agriculture today, the FAPRI baseline now attempts to incorporate much of this uncertainty by generating 500 unique outcomes that include variability in weather, macro-economic factors like consumer income and many other factors that add to the volatility agriculture faces today. Table two and tables that summarize the effect of adopting California fluid standards will report the average of these 500 outcomes.

Table 2. FAPRI U.S. Dairy Baseline

Year	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
U.S. Milk Supply										
Dairy Cows (thou. head)	9,024	8,972	8,952	8,940	8,930	8,923	8,919	8,916	8,912	8,916
Milk Yield (lbs. per cow)	20,918	21,316	21,610	21,881	22,161	22,444	22,699	22,959	23,208	23,465
Milk Production (bil. lbs.)	188.8	191.3	193.5	195.6	197.9	200.3	202.5	204.7	206.8	209.2
Min. FMMO Class Price:	(Dollars per hundredweight)									
Class I Mover	16.37	16.65	16.92	17.18	17.27	17.68	17.85	17.97	18.19	18.45
Class II	14.34	14.82	15.25	15.51	15.76	16.06	16.25	16.48	16.77	17.00
Class III	15.41	15.86	15.98	16.10	16.28	16.49	16.68	16.77	16.96	17.12
Class IV	13.97	14.45	14.87	15.13	15.38	15.69	15.87	16.10	16.40	16.63
All Milk Price	16.92	17.40	17.65	17.85	18.01	18.30	18.48	18.60	18.82	19.02
MILC Payment Rate	0.17	0.02	0.03	0.01	0.01	0.00	0.00	0.00	0.00	0.00
MILC Trigger	17.18	17.25	16.95	16.95	16.94	16.96	16.95	16.96	16.97	16.96
Wholesale Prices	(Dollars per pound)									
Butter, CME	1.46	1.49	1.48	1.47	1.48	1.51	1.52	1.53	1.54	1.56
Cheese, Amer., 40#, CME	1.68	1.72	1.73	1.74	1.76	1.77	1.79	1.80	1.81	1.83
Nonfat Dry Milk, AA	1.25	1.29	1.34	1.38	1.40	1.42	1.44	1.46	1.49	1.51
Evaporated Milk	1.52	1.54	1.56	1.58	1.60	1.62	1.64	1.66	1.68	1.70
Dairy Product Production	(Million pounds)									
American Cheese	4,245	4,335	4,407	4,480	4,548	4,626	4,701	4,774	4,844	4,923
Other Cheese	5,948	6,067	6,126	6,226	6,321	6,413	6,503	6,597	6,684	6,779
Butter	1,570	1,590	1,613	1,628	1,640	1,652	1,660	1,671	1,682	1,693
Nonfat Dry Milk	1,677	1,736	1,766	1,791	1,820	1,846	1,865	1,890	1,914	1,942
	(Million dollars)									
Dairy, CCC Outlays	88	27	23	11	13	4	1	2	-1	0

Analysis Assumptions

The analysis assumes that the composition of all fluid milk meets the California standards of composition (Table one). In the model, this change is made by increasing the quantity of nonfat solids needed to produce the alternative fluid products. Since the demand structure of the FAPRI model is national in scope, adjustments were made to account for the fact that California fluid milk already contained higher nonfat solids content in the baseline.

This analysis does not consider what form of product would be used to raise the nonfat solids of the different fluid products. Many times the discussion of changing fluid milk composition turns to the effect on nonfat dry milk markets. That will certainly be important to the conclusions of this research, but that does not mean that nonfat dry milk will be the most likely product used to raise the nonfat solids composition of fluid milk. Today, fortification of fluid milk in California is accomplished in large part by the addition of condensed skim milk, with the use of nonfat dry milk accounting for less than 5 percent of fortification use. There may be some issues regarding the regional availability of condensed skim if

California fluid milk standards are adopted. However, the ease of movement of milk and milk products within the U.S. has continued to improve over time.

The role of make allowances in helping fluid milk processors deal with the added financial cost of milk fortification has been discussed by many. To set the stage for this research, California currently provides fluid processors a condensed skim make allowance of $0.0987 per pound of nonfat solids. This make allowance level has not been altered since May 1983, perhaps suggesting that this level of compensation has been sufficient for fluid processors to meet the higher minimum standards level with little additional cost.

This analysis assumes no make allowance will be available for the increase in nonfat solids. If a make allowance were adopted nationally to address the added costs of fortification, the results would look different to the extent that the make allowance covered the cost of fortification. This assumption was made to simplify the analysis and does not suggest that will be the actual outcome on whether a make allowance will be available.

Besides the cost associated with the addition of more nonfat solids, fluid processors will have additional capital costs for storage tanks and other equipment that will be necessary to handle the increased need for nonfat solids. There seems to be no consensus about the level of these additional costs. Although it is clear there would be some capital costs involved in increasing nonfat solids in fluid milk products, this analysis has assumed no additional capital costs since there is no clear answer about what the level of these costs would be.

This research assumes no change in consumer demand for fluid milk products as a result of fortification. Fluid milk consumption declines slightly in this analysis as a result of higher retail milk prices, but there is no demand change due to the fortification itself. Though there has been discussion in the industry that a fluid product that meets the higher nonfat solids levels would be preferred by consumers, no solid research could be identified to assume that kind of demand shift in this report.

Results

The effect of adopting California fluid standards across the U.S. is an increase in nonfat solids use in fluid products of around 350 million pounds, depending on the year of the analysis. This increase in nonfat solids use is the primary reason for the increase in nonfat dry milk prices shown in table three. The increase in nonfat dry milk prices would have been even larger had it not been for the reduction in skim milk powder exports. Roughly 65 percent of the increase of nonfat solids use in fluid milk products through fortification is offset by lower skim milk powder exports.

The higher nonfat dry milk price is responsible for the rise in farm-level milk prices shown in table three. The additional supplies of milk for non-fluid products resulting from both additional milk production and reduced fluid milk consumption drive cheese and butter prices lower in the analysis.

The largest increase in milk price of $0.27 per cwt. occurs in the first year of the analysis and is reduced in subsequent years as milk production grows due to producer response to higher milk prices.

As fluid milk consumers see the additional cost of fortification passed along from fluid milk processors, retail milk prices increase by $0.17 per gallon.

These results are very dependent on the FAPRI baseline, which has strong international demand for many dairy products. The stochastic baseline process does allow consideration of the 500 outcomes sorted by level of international trade. In general, outcomes where international trade was not as important resulted in larger increases in nonfat dry milk prices and farm-level milk prices than shown in these average results.

Government outlays for federal dairy programs are lower under this scenario. However, there are only small savings in CCC outlays since the baseline has very small outlays to begin with as shown in table two. The increase in fluid milk prices will increase the cost of nutrition programs, but the increase will be small relative to total spending.

Table 3. Results of Imposing California Fluid Standards on the U.S.

Year	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
All Milk Price, (dollars/cwt)										
Base	16.92	17.40	17.65	17.85	18.01	18.30	18.48	18.60	18.82	19.02
Scenario	17.20	17.57	17.79	17.97	18.13	18.40	18.56	18.70	18.91	19.12
Change	0.27	0.17	0.14	0.13	0.12	0.10	0.09	0.09	0.09	0.09
Nonfat Dry Milk Price, (cents/pound)										
Base	124.5	128.6	133.8	137.6	140.1	142.1	144.0	146.0	148.7	150.7
Scenario	137.7	140.4	145.5	149.4	151.9	154.1	156.3	158.4	161.2	163.4
Change	13.2	11.7	11.7	11.7	11.8	12.1	12.2	12.3	12.5	12.7
Butter Price, (cents/pound)										
Base	146.0	149.0	148.4	146.9	147.9	151.0	151.5	152.8	154.5	155.8
Scenario	138.4	139.1	137.2	135.6	136.4	138.5	138.3	140.0	141.0	142.0
Change	-7.6	-9.9	-11.2	-11.3	-11.5	-12.5	-13.2	-12.9	-13.5	-13.8
Cheese Price, (cents/pound)										
Base	168.4	172.2	173.0	174.1	175.7	177.4	179.1	179.7	181.4	182.7
Scenario	168.2	171.9	172.4	173.2	174.6	176.2	177.8	178.3	179.9	181.1
Change	-0.1	-0.2	-0.6	-0.9	-1.1	-1.2	-1.3	-1.4	-1.5	-1.6
Milk Production, (billion pounds)										
Base	188.8	191.3	193.5	195.6	197.9	200.3	202.5	204.7	206.8	209.2
Scenario	189.0	191.6	193.9	196.1	198.4	200.8	203.1	205.3	207.5	209.8
Change	0.2	0.4	0.4	0.5	0.5	0.6	0.6	0.6	0.6	0.6
Retail Milk Price, (dollars/gallon)										
Base	3.54	3.58	3.62	3.65	3.67	3.72	3.75	3.76	3.79	3.83
Scenario	3.71	3.74	3.78	3.82	3.83	3.88	3.91	3.93	3.96	4.01
Change	0.17	0.15	0.16	0.16	0.16	0.16	0.16	0.17	0.17	0.18

Summary

Imposing California fluid standards in the U.S. has been a policy alternative that has been debated many times over the past several years. When the dairy industry was burdened by large surpluses of nonfat dry milk, many believed it was a way to eliminate those surpluses. Today, with some nonfat solids entering export markets the potential for exports of nonfat solids to grow, the effects of imposing California fluid standards results in a slightly different outcome than was found in a period of surplus nonfat solids.

Imposing California fluid standards increases producer milk prices and consumer fluid milk prices. These effects become less over time as the industry adjusts to the changing standards. Fortification allowances could work to minimize these effects depending on how they would be implemented. The increase in producer milk prices would reduce CCC dairy outlays but the effect is small against the current FAPRI baseline.

There is the potential for some differing regional effects depending on the availability of condensed skim to meets the needs of fluid processors who need product to meet the new minimum standards.

The effect of imposing California fluid milk standards is lessened over time as supplies of milk increase in response to higher milk prices.

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Congress of the United States
Washington, DC 20515

March 11, 2010

D. Scott Brown, Ph.D.
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Dear Dr. Brown:

As a leading industry analyst for agriculture policy, we are writing to ask for your analysis of the potential economic impact for the dairy industry and on government expenditures should the minimum solids not fat (SNF) standards for fluid milk be increased.

As you know, the minimum standard for SNF for the majority of the US is 8.25% for fluid milk at the retail level. For fluid milk marketed in California, the current standard is 8.7% SNF for whole milk, 10% for reduced fat (2% fat) milk, 11% for low fat (1% fat) milk and 9% nonfat solids in skim milk. There are several fluid milk products on the market in other states with similar solids levels. The difference is that those products are usually sold at a significant premium while consumers in California appear to be paying competitive retail prices for milk with more calcium and protein.

The potential benefit to the public of routinely offering fluid milk with higher calcium and protein levels warrants further study of increasing SNF standards. To better understand the cost/benefit ratio of such a move, we would like you to provide your analysis of the potential economic impact on several factors including cost to consumers, dairy producer income and the cost of federal feeding programs and surplus dairy product removals should the minimum SNF standards for fluid milk be increased.

We would also be interested in your analysis of the likely impact on consumption and what that would mean for government outlays, on both purchases for feeding programs and for the dairy producer economic safety net programs. For example, fortifying fluid milk would move more milk solids into bottling plants, resulting in less nonfat dry milk being produced by balancing plants. In times of depressed prices, the government's Commodity Credit Corporation would purchase less nonfat dry milk, resulting in less taxpayer expense for buying and storing surplus product.

Thank you for your consideration of this request. We will look forward to receiving the results of your analysis as soon as possible.

Sincerely,

JOE COURTNEY
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