

# **INTERREGIONAL ANALYSIS OF THE IMPACTS OF DEREGULATION ON U.S. DAIRY SECTOR**

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**ABSTRACT:** The late 1990's is a period of substantive change in U.S. dairy policy with respect to import quotas, export subsidies, price supports and classified pricing under state and federal milk marketing orders. An interregional model of the U.S. dairy sector is used to provide quantitative measures of the regional impacts of alternative domestic deregulation scenarios. This manuscript summarizes these simulation results for 6 of these scenarios.

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# **Interregional Analysis of the Impacts of Deregulation on U.S. Dairy Sector**

## **Introduction/Background**

The mid to late 1990's can be characterized as a period of substantive change in the policy context of four key U.S. dairy policy instruments: import quotas, export subsidies, price supports and classified pricing under state and federal milk marketing orders (MMO). U.S. commitments to the 1995 Uruguay Round (UR) of the General Agreement on Trade and Tariffs (GATT) necessitate moderate deregulation of U.S. domestic border protection. Under GATT, U.S. dairy import quotas, which have historically limited U.S. imports to around 2% of total domestic consumption, are converted to tariff rate quotas (TRQs). These import quotas will increase to 5% of domestic consumption, import tariff rates will fall 35%, and U.S. export subsidies under the Dairy Export Incentive Program (DEIP) will decline 35% by the year 2000 under these commitments.

The 1996 Federal Agricultural Improvement and Reform (FAIR) Act mandates some deregulation of the U.S. dairy sector, in particular, the elimination of U.S. dairy price supports by the year 2000 and reform of federal MMOs. Mandated federal MMO change includes order consolidation (reducing the number of MMOs to 10-14) and revision of the spatial minimum pricing of Class I (milk used in fluid products). Recent rulings from the 5<sup>th</sup> District Federal Court in Minneapolis have declared current federal Class I pricing to be "arbitrary and capricious" and mandate the Secretary of Agriculture, through the USDA, to establish a new system for setting these classified prices.

An interregional model of the U.S. dairy sector is used to provide quantitative measures of the regional impacts of alternative deregulation scenarios. This interregional model is

calibrated to a 1995 BASE scenario with 12 regions, 9 dairy products (fluid, soft, frozen, American cheese, Italian cheese, other cheese, nonfat dry milk (NDM), butter and a residual category) and three milk components (fat, protein and lactose). The BASE simulation includes Commodity Credit Corporation (CCC) minimum price floors on American cheese, butter and nonfat dry milk. Federal and California MMO Classified Pricing are modeled with endogenous price wedges for Class I (fluid) and IIIa (nonfat dry milk and butter) in federal MMO regions and for Class 1, 2, 3, 4a, and 4b in California. As well, the fat and solids-not-fat (SNF) milk quota in California is explicitly modeled.

This BASE scenario is calibrated to generate 1995 regional farm level all milk prices and production. Aggregate average commodity prices, production and consumption and regional fluid milk prices are calibrated within 4% of 1995 levels. Alternative deregulation scenarios are then simulated as percentage changes in aggregate and regional prices, production, consumption and trade relative to this BASE scenario. These scenarios include: total milk marketing order (MMO) deregulation: no federal and no California MMOs; Federal MMO Class I deregulation: dropping Class I pricing only in federal MMOs – a variant of Judge Doty’s ruling; No CCC: dropping federal prices supports to world market levels by the year 2000; No Class IIIa: dropping Class IIIa pricing in federal MMOs; adopting California pricing nationwide; and, adopting federal MMO pricing in California.

### **1995 Base Scenario Validation**

BASE regional milk prices and production align with 1995 actual data as they are calibrated to accomplish this. Base aggregate farm level commodity prices align with 1995 actual data with the following exceptions: fluid (+1.9%), American cheese (-0.7%), butter (-3.7%),

NDM (-3.5%). BASE butter and NDM prices are especially difficult to calibrate given the impact of CCC removals at 1995 price supports below the average market prices for 1995. Regional fluid milk prices also calibrate to 1995 actual levels with the following exceptions: Appalachia (+1%), Florida (+3%), and Southeast (+1%). These results reflect additional over-order premiums in these high Class I fluid markets. BASE aggregate commodity production and consumption calibrates within 2% of actual.

Other policy related wholesale prices in the BSE simulation calibrate very well with the following exceptions: CME butter prices (-2.8%) and the FMMO butterfat differential (-4.3%). These results again reflect the impacts of government removals at butter prices below the 1995-market average. BASE California classified prices calibrate very well: Class 1 (+2.7%); class 2 (+3%); class 3 (+3%); class 4b (-0.4%); class 4a (+1.4%). Average blend, quota and over-base milk prices within 0.5% of actual.

With the exceptions noted, the 1995 BASE simulation provides a reasonably accurate characterization of the 1995 US dairy sector. Next, the deregulation scenarios are described and summarized as changes from this BASE scenario. The changes in regional farm level price are summarized in Table 1 while Table 2 summarizes the aggregate wholesale level impacts.

### **FMMO and California MMO Deregulation**

This scenario keeps BASE price supports but removes all price wedges due California and Federal MMO classified pricing as well as the California FAT/SNF Quota.

One of the biggest impacts from removing MMO classified pricing is the drop in fluid price of \$2.17/cwt (-16%). Fluid production and consumption rise 1.2 billion pounds (+2.2%) while fluid milk revenues fall \$1.04 billion (14%). This indicates the magnitude of the Class I

"tax" on fluid consumers due to FMMO and California Class I price discrimination. Blend prices and milk production in regions with high Class I usage fall with this sharp drop in Class I price discrimination. Average all milk prices fall 1.8% (23 cents/cwt) and total milk production falls 0.6% (463 million pounds). Less milk production with increased fluid usage tightens manufacturing milk markets due to less milk for manufacturing. This raises manufactured milk prices and revenues. Cheese prices rise \$4-5/cwt (4%-5%), production falls 69 million pounds, and cheese revenues rise \$222 million (3%). Similarly, NDM prices rise \$11.92/cwt (13%), NDM production falls 84 million pounds (-6.7%). Total commodity expenditures fall \$648 million, a net gain to consumers from this deregulation.

Differences in regional farm level (Table 1) impacts are quite sharp: regions with high Class I differentials lose (Northeast, Appalachia, Florida, Southeast, Midwest, Southwest) while the primarily manufacturing milk regions gain. The price and revenue losses are large -- \$1.00-\$3.00/cwt (6%-19%) on milk price; \$100-\$300 million (5%-25%) on milk revenues. In contrast, the Upper Midwest (UMW) and California gain \$0.40-\$0.50/cwt (4%) on milk price and \$222 and \$144 million on milk revenues, respectively. There are also small gains in the other manufacturing regions (West and Northwest). In aggregate, regions with producer losses dominate gainers and aggregate revenues fall \$463 million (-2.4%).

### **Drop FMMO Class I Differentials**

This scenario approximates the Judge Doty "arbitrary and capricious" ruling concerning Class I differentials under the Minnesota Milk Producers lawsuit. Hence, this "partial deregulation" scenario is the same as the BASE, but drops FMMO Class I differentials while keeping BASE price supports, FMMO IIIa pricing, and California classified pricing.

Elimination of FMMO Class I pricing generates similar but slightly smaller impacts compared to the previous simulation, as expected with a "partial deregulation" scenario. Average fluid milk prices drop \$1.59/cwt (-11.4%), while production and consumption rises 877 million pounds (+1.6%). Consumers gain as fluid revenues fall \$760 million (-10%).

Blend prices and milk production in regions with high Class I usage fall with this sharp drop in Class I price discrimination. Average all milk prices fall 1.5% (19 cents/cwt) and total milk production fall 0.5% (376 million pounds). Less milk production with increased fluid usage tightens manufacturing milk markets due to less milk for manufacturing. This raises manufactured milk prices and revenues. Cheese prices rise \$4-4.5/cwt (4%), production falls 63 million pounds, and cheese revenues rise \$207 million (3%). Similarly, NDM prices rise \$4.85/cwt (5%), NDM production falls 47 million pounds (-3.8%). Total commodity expenditures fall \$429 million, a net gain to consumers from this "partial" deregulation.

Differences in regional farm level (Table 1) impacts are quite sharp: regions with high Class I differentials lose (Appalachia, Florida, Southeast, Mideast) while the primarily manufacturing milk regions gain. The regional price and revenue losses are large -- \$0.70-\$2.68/cwt (5%-18%) on milk price, \$100-\$250 million (5%-25%) on milk revenues. In contrast, the Upper Midwest (UMW) and California gain \$0.44-\$0.50/cwt (4%) on price and gain \$187 and \$185 million in milk revenues (+3%), respectively. There are also small gains in the other manufacturing regions (West and Northwest). In aggregate, regions with producer losses dominate gainers and aggregate revenues fall \$376 million (-1.9%).

Note how similar these "partial, FMMO Class I deregulation" results are to the full California and Federal MMO deregulation discussed previously. This suggests that FMMO Class I pricing accounts for most of the deregulation impacts identified under previous analysis.

## Drop FMMO IIIa

This scenario is identical to the BASE, but drops only the FMMO IIIa price wedge. Note that the FMMO Class IIIa prices milk used for NDM at a discount to milk used in cheese (Class III). The resulting Class IIIa price wedge is computed as ***BASE IIIa (\$10.90) - BASE BFP (\$11.83/cwt) = -\$0.93/cwt***. This is the discount for milk used in NDM relative to Class III milk. Converting to a product basis yields: ***-\$0.93/cwt Divided by 8.6 Pounds NDM/cwt Milk = -\$10.81/cwt***. This is the Class IIIa discount per cwt of NDM. These IIIa price discounts are offset by an increased processor margin of \$12.50/cwt versus standard \$9.84/cwt USDA margin used for CCC/price support computations. Note that California Class 4a generates as similar (though smaller) NDM discount relative to Class 4b (milk used for cheese).

Simulation results in Tables 1 and 2 indicate that FMMO IIIa pricing successfully "shorts" the domestic cheese (and fluid) market(s) where decreased revenues from Class IIIa utilization are more than offset by increased revenue from the cheese market. Removal of FMMO IIIa pricing causes NDM production to fall 64 million pounds (-5.1%) inducing a price rise of \$8.64/cwt (+9.3%). These milk solids move back into the cheese market and production expands 10 million pounds. As a result, cheese prices fall \$0.65-\$1.34/cwt (0.5%-1.2%). As well, the US average fluid price falls \$0.22/cwt (-1.6%) due to drop in the Class I mover (the FMMO Class III or basic formula price (BFP)). Fluid production and consumption rise 123 million pounds (+0.2%). Total commodity expenditures in the wholesale sector fall \$116 million, a net gain to consumers.

At the regional farm level, all regions lose from this deregulation. Regions with high Class I differentials have larger losses. Prices fall \$0.12-\$0.24/cwt (1%-1.5%) and milk revenues fall 1%-2%. Losses in manufacturing regions are much smaller: prices fall 2-8 cents/cwt (less

than -0.6%) and revenues fall less than 1%. Aggregate milk price and revenues fall \$0.10/cwt (-0.8%) and \$212 million (-1.1%). As well, US treasury costs fall as there is less excess butter/NDM purchased at CCC support prices.

Results from this scenario suggest that classified pricing schemes can work in various markets using negative as well as positive price wedges. Shorting the domestic cheese (and, to some extent, fluid) markets in order to additionally generate farm level price/revenue enhancement from these markets provides a cogent example of the cross-subsidization between markets that is feasible with these types of policies. In a post-GATT policy environment where the use of import quotas/tariffs and export subsidies are increasingly restricted, these types of policies become increasingly interesting. This is particularly true if there is decreased reliance on domestic price supports (to be eliminated to 2000 in the US or where the taxpayer cost of this support is increasingly politically problematical, as in the EU) for income maintenance. The GATT legality of these types of interventions will become increasingly scrutinized.

### **California as a FMMO Region**

This scenario is identical to BASE but with FMMO classified pricing in California. California fluid standards (higher nonfat solids content) in California is maintained. This scenario is motivated by the issues and tensions generated by the interface of two distinct regional policy interventions linked by common factor and output markets.

We compute the California Class I differential as *California Class I Price minus FMMO BFP*. The California Class I price wedge is then computed as: *Class I Differential Divided by 0.9397 (Pounds California Standard Fluid Commodity per Pound California Milk @ Test)*. Note that FMMO IIIa pricing has a larger negative price wedge on NDM than California 4a pricing (-5 cents/pound of NDM versus -11 cents/pound in the BASE scenario). As well,



California loses some Class 2 and 3 price discrimination under FMMO pricing, but Class 2 and 3 are a relatively small share of California milk (22% of fat and 10% of SNF in the BASE scenario).

The simulation results in Table 2 suggest that there will be minimal commodity sector impacts with less than 0.5% changes in prices, production and revenues with exception of butter and NDM, two key national markets where California and FMMO surplus product compete. NDM prices rise (\$2.11/cwt, +2.3%) and production falls 32 million pounds (-2.5%). Butter prices fall (\$0.61/cwt, -0.9%) and production falls 17 million pounds (-1.3%). Total commodity expenditures are virtually unchanged (-\$33 million, -0.2%).

As well, the simulation results of Table 1 suggest that the regional farm level impacts on FMMO regions will be minimal -- less than 0.3%, 0.2% and 0.5% impacts on farm price, production, and revenues. The impacts on the California dairy sector, however, are uniformly negative. This largely reflects that FMMO classified pricing generates a lower California Class I wedge (BFP mover versus California 4b) and a larger negative wedge on NDM under FMMO IIIa than California 4a. As well, the benefits of the California fat/SNF fluid milk quota are lost under this scenario. As a result, farm milk prices fall \$0.34/cwt (-3.1%), milk production falls 344 million pounds (-1.4%), and milk revenues fall \$123 million (-4.4%).

This scenario provides a counterfactual measure of the benefits of California pricing to California assuming BASE FMMO classified pricing as the alternative policy. These results suggest that BASE FMMO pricing is not particularly attractive to California producers.

### **FMMOs with BASE 1995 California Pricing**

In this scenario, California Class 1 (Fluid) price wedge generates smaller Class I differentials in FMMO regions with high Class I utilization (Northeast, Appalachia, Florida,

Southeast). As well, Class 4a (NDM/Butter) generates smaller NDM/Butter discounts than FMMO IIIa pricing (-5 cents/pound versus -11 cents/pound in the BASE scenario). California pricing generates small, positive Class 2 and 3 price wedges of \$0.43/cwt and \$0.28/cwt in BASE Scenario. Thus, the biggest impacts are due to changes in the Class I and Class IIIa price wedges.

Similar to modeling California under BASE FMMO pricing, modeling FMMOs under BASE California pricing generates relatively small commodity impacts. This scenario assumed uniform regional Class I differentials based on the California Class I price. These differentials are lower than BASE in the FMMO regions with high Class I usage. As a result, aggregate fluid price falls \$0.06/cwt (-0.4%), production/consumption falls 28 million pounds (+0.1%) and fluid revenues fall \$37 million (-0.5%). California 4a/4b pricing also generates smaller NDM/butter discounts than under FMMO IIIa -- 5 versus 11 cents/cwt discounts in the BASE scenario. As a result, NDM price falls \$1.04/cwt (-1.1%) and production drops 30 million pounds (-2.4%). Conversely, cheese production expands 13 million pounds, cheese prices fall \$0.87-\$1.47/cwt (-1%) and cheese revenues fall \$63 million. Total commodity expenditures fall \$60 million (-0.3%), a net gain to consumers.

As to regional farm level impacts, FMMO regions with high Class I differentials (Northeast, Appalachia, Florida, Southeast, Southwest) lose (or do not gain): milk prices fall \$0.00-\$1.74/cwt (0%-11%) and revenues fall 0%-16%. All other regions gain, but gains are small: prices rise \$0.06-\$0.21/cwt (0.5% - 1.6%) and revenues rise 1%-2%. Both California and the Upper Midwest, as well as other manufacturing milk regions (West and Northwest) gain due to decreased Class I spillovers into manufacturing milk markets compared to the BASE scenario.

Aggregate milk price and revenues fall \$0.07/cwt (-0.6%) and \$155 million (-0.8%). Treasury costs fall slightly due to less excess butter/NDM at CCC support prices.

These results suggest that regions with the biggest drop in Class I differentials under California pricing (Northeast, Appalachia, Florida, and Southeast) will be opposed to this type of change. In contrast, manufacturing milk regions or regions where the Class I differential increase under the California pricing assumption used in this simulation will likely gain.

## Summary

- 1) **Full California/FMMO Deregulation:** Current FMMOs discriminate against fluid consumers and producers of manufactured products and provide gains to the producers of fluid and consumers of manufactured products. Losses to beneficiaries of the *status quo* are large.
- 2) **Partial Deregulation: Drop FMMO Class I Pricing:** Same as full deregulation, but slightly less so.
- 3) **Drop FMMO IIIa:** FMMO IIIa pricing successfully "shorts" cheese (and fluid) market(s). Losses due to lower NDM pricing offset by gains in domestic cheese and fluid markets. A prototype, GATT legal "two-tier" pricing policy ???
- 4) **California as FMMO:** Models counter-factual impacts of California MMO on US and California assuming BASE FMMO pricing as the alternative. These simulation results suggest the BASE FMMO pricing alternative is not advantageous to California.
- 5) **FMMOs with 1995 California Pricing:** Favors manufacturing regions at expense of high Class I FMMO regions due to lower (implied) California Class I differentials.

**Table 1. Summary of Farm Price Changes Compared to 1995 Base Scenario (\$/cwt).**

Erreur! Liaison incorrecte.

**Table 2. Summary of Wholesale Level Changes Compared to 1995 Base Scenario (\$/cwt).**

Erreur! Liaison incorrecte.

