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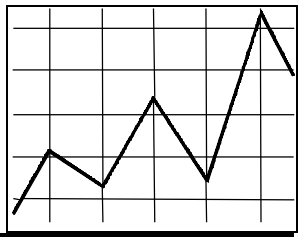

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INTERREGIONAL ANALYSIS OF INTERSTATE DAIRY COMPACTS

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INTRODUCTION

In 1981, the US dairy industry experienced a major change in federal policy. From 1950 until 1981 farm level milk prices were supported at a minimum of 75 to 90 percent of parity. Under parity the support price and farm level milk prices trended upward most years. But in 1981, support prices were de-coupled from the parity index. Instead, the support price would be based on the level of milk surplus and associated government costs. Under this new support policy, the level of price support dropped from $13.10 per hundredweight (cwt) in 1981 to $10.10 by 1990. The 1996 Farm Bill further ratchets down the support price with complete elimination by January 1, 2000. This relatively low support price has resulted in a near flat trend line for farm level milk prices but considerable within-year and year-to-year price volatility.

Further, in the late 1980's, major objections to certain pricing provisions of federal milk marketing orders (FMMOs) developed, primarily in the Midwest. The Midwest charged that modern production, processing and transportation technologies and resulting regional shifts in milk production no longer justified the existing pricing system of increasing Class I differentials with distance from Eau Claire, Wisconsin. Attempts to flatten the Class I price surface through a national hearing held in 1990 eventually failed. A lawsuit filed by the Minnesota Milk Producers Association against the US Secretary of Agriculture challenging the Secretary's decision also proved unsuccessful.

The 1996 Farm Bill authorizes the Secretary of Agriculture to reform federal milk marketing orders to reflect a modern dairy industry. The Secretary responded with proposed changes in 1998 and a Final Rule in March 1999. A producer referendum is slated to be held in August 1999, and, upon favorable approval, implementation would occur October 1,1999.

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The rather flat trend in farm level milk prices and the potential for FMMO reform that would lower the relatively high class I differentials in the Northeast and the Southeast have spurred interest in interstate dairy compacts. Compacts raise the price of milk used in fluid milk products (Class I). Their objective is to isolate a portion of producer milk, Class I use, from some market forces and thereby enhance revenue to the producers selling milk to dairy plants that market class I products within the compact area. Compact proponents argue that this increased revenue will help to maintain the number of family dairy farms and the milk supply within the compact area.

Dairy compacts require approval by the both the compact states and by US Congress. The first compact, the Northeast Dairy Compact among six New England states, was established under provisions of the 1996 Farm Bill. Authorization for the Northeast Dairy Compact was granted only for the period of time preceding implementation of the mandated FMMO reform process.

Northeast lobbying groups are pushing for a time extension for the current Northeast Interstate Dairy Compact. Many individual states have passed Compact legislation to allow for participation in an expanded Northeast Compact or in a proposed Southern Dairy Compact. The Northeast is actively lobbying for the extension and expansion of the Northeast compact and has joined together with dairy farmer lobbying groups in the South –from the Appalachian region to the Southeast and Southwest- who are also actively promoting their entry into interstate dairy compacts.

Compacts are popular in some dairy farmer circles and despised in others. Compacts are promoted on the basis that they will increase farm milk prices in compact regions and help keep farmers in business by offering price protection, especially in down markets. Because compacts directly affect fluid milk prices only, they increase consumer fluid milk prices and decrease fluid consumption. But, due to spillover effects, interstate dairy compacts also affect prices for milk used in manufacturing by increasing the supply of milk to that sector.

Higher fluid milk prices decrease fluid consumption and encourage producers within the compact area to increase milk production. The result is more milk available for manufacturing use that lowers the prices for manufactured dairy products. This translates into lower prices to producers outside of the compact area and results in complex tradeoffs between winners and losers both inside the Compact region and externally. Experience with the Northeast Dairy Compact provides first-hand observations on these tradeoffs and whether the purported compact goals are actually accomplished.

Congress is expected to consider Interstate Dairy Compacts in this session either in freestanding legislation or through appropriations legislation. Two Compact proposals are being considered: one for the Northeast and one for the Southern region. Quantitative interregional economic analysis of these proposals was performed using the UW-Madison Interregional Dairy Competition Model by making certain assumptions about state participation and pricing provisions in the Northeast and a potential Southern Interstate Dairy Compacts.

INDIVIDUAL STATES ASSUMED TO PARTICIPATE

The states being considered in the proposed authorizing legislation for Interstate Dairy Compacts are as follows.

Northeast Dairy Compact:
Connecticut, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island and Vermont.

Southern Dairy Compact:
Alabama, Arkansas, Florida, Georgia, Kansas, Kentucky, Louisiana, Mississippi, Missouri, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia and West Virginia.

THE UW-MADISON DAIRY IRCM

Since 1988, researchers in the Department of Agricultural and Applied Economics at UW-Madison have developed and systematically revised and refined a complex interregional competition model of the U.S. dairy industry. Denoted the UW Dairy IRCM97, the model is designed to evaluate the effects of specified changes in factors that affect milk and dairy product supply and demand on regional prices, production, consumption, and trade flows. In particular, the model was developed to address issues associated with milk pricing under federal and California milk marketing orders.

The version of the UW Dairy IRCM used in this analysis defines 12 regions of the U.S. that represent separate milk and dairy product production/consumption areas. These regions approximate to the current USDA proposed FMMOs (with regions aggregated at the state level) plus California. In each of the regions, there is a milk supply relationship based on estimated supply elasticities; i.e., the responsiveness of milk production to changes in farm-level milk prices.

Each region has demand relationships for nine dairy products: fluid milks; "soft" manufactured products (e.g., yogurt, cream products and cream cheese); American cheese; Italian cheese; other cheese; butter; nonfat dry milk; frozen dairy products; and residual manufactured dairy products (mainly whey products and evaporated and condensed milks). These regional demands are based on estimates of per capita wholesale demand relationships at the national level.

The supply and demand elasticities used in the model are intermediate-run. This means that changes in production and consumption are assumed to occur over a three-to-five year period.

The model is forced to meet consumption requirements within the regions for the nine dairy products from a combination of local production and "imports" from other regions. Similarly, the model allocates regional milk supply to dairy products that are either consumed locally (within the region) or "exported" to other regions.

The model simulates farm-level milk prices and milk production, wholesale product prices and production, and interregional trade flows. The model generates production, prices, and trade flows that result in maximum producer and consumer benefits given regional supply and demand relationships, and starting values for production, consumption, and prices.

Prices are linked among the regions through 1995 transportation cost estimates provided by the dairy researchers at Cornell University. Product prices in any two regions cannot differ by more than the cost of hauling the product between regions. In generating a solution, price differences greater than transportation costs trigger interregional shipments. This increases supply in the receiving region and decreases supply in the shipping region, ultimately leading to a spatial price equilibrium.

A unique aspect of the Dairy IRCM is farm-level component pricing of butterfat, protein, and lactose. Component values are converted to associated raw milk and wholesale dairy product prices in evaluating supply and demand relationships. Intermediate product usage of skim/whole milk powders, evaporated/condensed milks, and whey products are incorporated using 1997 data from the American Dairy Products Institute (ADPI).

Model solutions are achieved through an iterative process. Given starting values, the model looks to see if it can improve upon the current situation by reallocating milk components to different products or reallocating dairy products among regions. It continues the process of seeking more beneficial solutions until no further improvement is possible. Typically, several thousand iterations are performed in deriving optimal solutions.

A unique aspect of using an interregional supply/demand model such as the UW Dairy IRCM97 is that both primary and secondary impacts of alternative policies can be evaluated. In particular, the model allows for changes in regional milk and dairy product production over a 3-5 year adjustment period. In contrast, assessment of FMMO reform proposals is often performed using only the direct impacts on "regulated" blend prices without allowing for supply/demand adjustments, a much narrower and often more limited analysis of the impacts.

However, the UW Dairy IRCM pursues the goal of maximizing producer and consumer welfare without regard to certain market characteristics. For example, while the model might show the elimination of production of some dairy product in a region, it is unlikely that existing manufacturing facilities would disappear overnight or even over a 3-5 year adjustment period. Hence, the model results tend to reflect less “brick and mortar” than the real world. For this reason, model results need to be interpreted with some caution, particularly for policy simulations that involve large changes from BASE 1997 conditions.

A 1997 BASE and several policy scenarios are used to analyze the impacts of Interstate Dairy Compacts. The BASE97 scenario attempts to simulate the key aspects of the 1997 domestic US dairy sector. Key aspects include:

1) 1997 Commodity Credit Corporation (CCC) Price Supports:
   a) Butter: $65/cwt
   b) American Cheese: $113/cwt
   c) Nonfat Dry Milk: 104.70/cwt
2) 1997 FMMOs and California Pricing:
   a) Class I, Class II and Class IIIa price wedges are computed relative to the BFP (Class III) for FMMO regions.
   b) Class 1, 2, 3, 4a, 4b prices and the FAT/SNF Quota in California. California classified pricing wedges are computed relative to California 4b (cheese) price.
3) BFP (M-W) is modeled as the Class I mover only.
4) California Fluid Standards: only in California.
5) Price Calibration Exercise: The 1997 BASE model calibrates regional farm and fluid milk prices, and average commodity prices to align a closely as possible with the 1997 data.

The 1996 Farm Bill eliminates domestic dairy price supports by the year 2000. To model this policy context, a No CCC BASE scenario is developed. This scenario is identical to the 1997 BASE except that US minimum prices for American cheese, skim milk powder and butter are lowered to world market levels using 1998-02 average world prices from FAPRI’s 1999 World Agricultural Outlook (May, 1999). These prices are $81.64/cwt for butter, $62.43 for NDM and $106.88/cwt for American cheese. Given US import quotas/tariffs, domestic prices do no fall to these world market levels, especially for cheese. Aggregate and regional milk price impacts due to removal of domestic price supports average about –10 cents/cwt. All Interstate Dairy Compact scenarios include this assumption and are compared to the 1997 No CCC scenario to simulate the likely impacts of Interstate Dairy Compacts over the next 3-5 years.

ASSUMED PRICING PROVISIONS

We analyze three versions of Interstate Dairy Compacts:
1) Northeast Dairy Compact (including all regions in the USDA Final Rule Northeast FMMO);
2) Southern Dairy Compact (including the Appalachia, Southeast, Florida and Southwest regions of the USDA Final Rule FMMO);
3) Combined Northeast/Southern Dairy Compact (combining 1 and 2 from above).

We model the economic impacts of regional dairy compacts by adding $2.00/cwt to the 1997 regional Class I differentials. The assumption of a $2.00/cwt Class I premium is derived from the Northeast Compact premium for 1997. For example, the average 1997 BFP of $12.05/cwt plus the approximately $3.00/cwt FMMO Northeast Class I differential equal $15.05/cwt, about $2.00/cwt less than the Northeast Compact minimum price of $16.94/cwt.

In addition, we prohibited trade in fluid milk from any region not associated with the respective compacts. Thus, no other region is able to ship fluid milk to the Northeast in our modeling of the Northeast Compact. Similarly, regions other than Appalachia, Southeast, Florida, or Southwest are not able to ship fluid milk to the Southern Dairy Compact regions under our modeling of this policy.[2]

All other market and pricing assumptions other than these regional compact Class I premiums and restraint of fluid milk trade, were held constant at the 1997 NO CCC BASE scenario levels.

SIMULATION RESULTS: Impacts of the Northeast Dairy Compact under 1997 BASE Assumptions

Column 3 of Tables 1 and 2 indicate that adding $2.00/cwt to the Class I differential for the Northeast region and restraining trade in fluid products from all other regions raises farm milk prices and milk revenues in the Northeast by $0.66/cwt and $237 million over the No CCC 1999 BASE simulation. While the average US farm milk price rises 6 cents/cwt and total farm milk revenues rise $91 million, farm milk prices and revenue fall 5-10 cents/cwt and $146 million in non-Compact regions. Aggregate US expenditures on all dairy products increase $92 million (column 3, Table 4), a net loss to consumers.

The average US fluid milk price rises $0.32/cwt due to the additional $2.00/cwt in the Northeast Class I differential (column 3, Table 3). This increases fluid milk expenditures $148 million (column 3, Table 4), a loss to fluid milk consumers. With higher farm milk prices (and hence, higher milk production) in the Northeast and with less fluid milk consumption (due to the higher Class I prices), there is downward pressure on manufacturing milk markets. Average US cheese prices fall 50-70 cents/cwt while nonfat dry milk price falls $1.15/cwt (column 3, Table 3).

The economic impacts of the Northeast Dairy Compact are essentially similar to a general increase in Class I prices. But the benefits of this additional Class I price discrimination are limited to Northeast milk producers (milk revenues increase $91 million) and consumers of manufactured

[2] It is recognized, however, that certain milk movements could occur. Interstate Dairy Compacts may not explicitly limit the marketing of fluid milk within the Compact region from any other region. But they severely limit the imports of non-Compact fluid milk by forcing the Compact price on any milk sold in the Compact region. This effectively removes any pricing incentive to ship fluid milk into the Compact region. Producers located outside the compact who ship into the region receive the benefits associated with the Compact price.

products, especially cheese and milk powder. The costs of this policy are shared by milk producers in all non-Compact regions (lower farm milk prices and a decline of $146 million in aggregate milk revenue) and fluid milk consumers in the Northeast (higher fluid milk prices and expenditures).

SIMULATION RESULTS: Impacts of a Southern Dairy Compact under 1997 BASE Assumptions

Adding $2.00/cwt to the Class I differential for the Southern regions and restraining trade in fluid products from all other regions would raise farm milk prices by $0.86/cwt, $1.51/cwt, $1.35/cwt and $0.67/cwt in the Appalachia, Florida, Southeast and Southwest regions, respectively (column 4, Table 1). Farm milk prices in non-Compact regions decline 13-15 cents/cwt while the average US farm milk price rises 3 cents/cwt. Farm milk revenues in the Compact region increase $321 million ($99, $54, $76 and $92 million in the Appalachia, Florida, Southeast and Southwest regions, respectively (column 4, Table 2)). Farm milk revenues in all non-Compact regions decline $259 million. Total U.S. farm milk revenue increases $62 million. Aggregate US expenditures on dairy products increase $77 million (Column 4, Table 4), a net loss to consumers.

Average fluid milk prices rise $0.38/cwt due to the additional $2.00/cwt in the Southern regional Class I differentials (column 4, Table 3). This increases fluid milk expenditures $178 million, a loss to fluid milk consumers (column 4, Table 4). With higher farm milk prices (hence milk production) in the Southern Compact regions and with less fluid milk consumption (due to the higher Class I prices), there is downward pressure on manufacturing milk markets. Average US cheese prices fall $0.72/cwt - $1.28/cwt while the average US nonfat dry milk price falls $1.76/cwt (column 4, Table 4).

The economic impacts of the Southern Dairy Compact, as modeled here, are essentially similar to the impacts of the Northeast compact, but somewhat larger as the there is slightly more fluid milk in the Southern compared to Northeast Compact region. The benefits of this additional Class I price discrimination is limited to milk producers in the Southern Dairy Compact region (regional milk revenue increases $321 million) and to consumers of manufactured products, especially cheese and milk powder. The costs of this policy are shared by milk producers in non-Compact regions (lowered farm milk prices and an aggregate decline of $259 million in milk revenues) and Southern fluid milk consumers (increased fluid milk prices and expenditures).

SIMULATION RESULTS: Impacts of the Combined Northeast and Southern Dairy Compact under 1997 BASE Assumptions

Column 5 of Tables 1 and 2 indicate that combining the impacts of the Northeast and Southern Compacts tends to slightly reduce the regional farm price/revenue gains in Compact regions and considerably increase the losses in non-Compact regions compared to the 1997 No CCC BASE scenario. In particular, the predominately manufacturing milk regions (Upper Midwest, Western, Northwest, California) and/or regions without compacts (Mideast, Central, Arizona) suffer substantive losses in farm milk price (-14 to -26 cents/cwt). Total milk revenue in the non-Compact regions declines $340 million ($92 million in the Upper Midwest and $110 million in California). In contrast, aggregate milk revenues in the Compact regions increase $495 million (column 5, Table 2). The average farm milk price rises 9 cents/cwt and total US milk revenues increase $156 million. Aggregate US expenditures on dairy products increase $172 million, a net loss to consumers (Column 5, Table 4).

Average fluid milk prices rise $0.70/cwt due to the additional $2.00/cwt in the Northeast and Southern regional Class I differentials (column 5, Table 3). This increases fluid milk expenditures $326 million (column 5, Table 4), a loss to fluid milk consumers. With higher farm milk prices (hence milk production) in the Northeast and Southern Dairy Compact regions and with less fluid milk consumption (due to the higher Class I prices), there is downward pressure on manufacturing milk markets. Average US cheese prices fall $0.96/cwt-$1.74/cwt while the average US nonfat dry milk price falls $3.84/cwt (column 5, Table 3).

The economic impacts of combining both the Northeast and Southern Dairy Compacts, as modeled here, are nearly additive and quite substantial. The benefits of this additional Class I price discrimination is shared by milk producers in Compact regions (milk revenue increase $495 million) and consumers of manufactured products, especially cheese and milk powder. The costs of this policy are shared by milk producers in all other regions (lowered farm milk prices and an aggregate $340 million decrease in milk revenues) and Northeast/Southern Dairy Compact fluid milk consumers (increased fluid milk prices).

SUMMARY/CONCLUSIONS

Compacts enhance the Class I pricing impacts of Federal Milk Marketing Orders: they raise milk prices and production in Compact regions, decrease fluid milk consumption (due to higher fluid milk prices), and result in more milk for manufacturing usage. Since manufacturing milk markets tend to be national rather than local in scope, the spillover effects of Interstate Dairy compacts are primarily through the manufacturing milk markets. To the extent that the manufacturing commodity prices influence or set the California and/or FMMO classified prices, Interstate Dairy Compacts have additional substantive negative impacts on non-Compact regions.

As well, Compacts place additional taxes on fluid milk consumers (in terms of higher fluid milk prices) while subsidizing consumers of manufactured products (milk powder in particular). Aggregate expenditures on dairy products increase under all Compact scenarios evaluated, indicating that consumers will pick up the tab for much of the increased revenues in the Compact regions.

All scenarios presented here assume No CCC dairy price supports due to their termination in 2000 under the 1996 Farm Bill. If CCC price supports are reinstated so that butter and NDM prices are above world market levels, then Interstate Dairy Compacts will have the effect of building CCC stocks at considerable cost to the treasury. These government stock/purchases will also lessen the farm and wholesale level impacts on non-Compact regions.

In contrast to full elimination of FMMO and California classified pricing (column 1, Tables 1-4), Interstate Dairy Compacts generate increases in average US milk prices and aggregate milk revenues at the expense of consumers and non-Compact regions. Compared to the USDA Final Rule (column 2, Tables 1-4), Interstate Dairy Compacts generate much larger regional distortions relative to the No CCC BASE scenario. These simulation results indicate that Interstate Dairy Compacts will reduce the "market orientation", exacerbate current policy induced interregional pricing distortions, and further increase interregional strife in the US dairy sector. Thus, while Interstate Dairy Compacts will enhance Compact region economic advantage, they are, from a general public perspective, terrible public policy.

TABLE 1. FARM LEVEL PRICE IMPACTS OF INTERSTATE DAIRY COMPACTS UNDER 1997 BASE CONDITIONS: Change from No CCC BASE97 ($/cwt).

	No CCC/ No MMOs	USDA Final Rule, No CCC BASE	Northeast Compact, No CCC BASE	Southern Compact, No CCC BASE	NE/SO Compacts, No CCC BASE
Northeast	-0.72	-0.08	0.66	-0.14	0.53
Appalachia	-1.25	-0.12	-0.09	0.86	0.86
Florida	-2.94	0.08	-0.08	1.51	1.48
Southeast	-2.20	-0.06	-0.08	1.35	1.32
Mideast	-0.36	0.21	-0.10	-0.15	-0.26
Upper Midwest	0.61	0.05	-0.10	-0.15	-0.22
Central	-0.29	0.13	-0.07	-0.13	-0.24
Southwest	-0.53	-0.18	-0.05	0.67	0.58
Western	0.39	0.03	-0.08	-0.14	-0.21
Northwest	0.11	0.07	-0.08	-0.14	-0.14
California	0.74	-0.19	-0.08	-0.15	-0.28
Arizona	-0.37	-0.12	-0.05	-0.13	-0.22
USA	-0.10	-0.02	0.06	0.03	0.09

TABLE 2. FARM LEVEL REVENUE IMPACTS OF INTERSTATE DAIRY COMPACTS UNDER 1997 BASE CONDITIONS: Change From No CCC BASE97 (Million $).

	No CCC/ No MMOs	USDA Final Rule, No CCC BASE	Northeast Compact, No CCC BASE	Southern Compact, No CCC BASE	NE/SO Compacts, No CCC BASE
Northeast	(254)	(29)	237	(50)	190
Appalachia	(135)	(13)	(10)	99	99
Florida	(97)	3	(3)	54	53
Southeast	(115)	(3)	(4)	76	74
Mideast	(57)	34	(16)	(24)	(42)
Upper Midwest	258	20	(42)	(63)	(92)
Central	(63)	28	(15)	(29)	(52)
Southwest	(71)	(25)	(7)	92	79
Western	42	3	(8)	(15)	(22)
Northwest	11	7	(8)	(14)	(14)
California	301	(75)	(31)	(59)	(110)
Arizona	(14)	(4)	(2)	(5)	(8)
USA	(194)	(54)	91	62	156

TABLE 3. AGGREGATE (FARM LEVEL) COMMODITY PRICE IMPACTS OF INTERSTATE DAIRY COMPACTS UNDER 1997 BASE CONDITIONS: Changes From NO CCC BASE97 ($/cwt).

	No CCC/ No MMOs	USDA Final Rule, No CCC BASE	Northeast Compact, No CCC BASE	Southern Compact, No CCC BASE	NE/SO Compacts, No CCC BASE
Fluid	-1.71	-0.10	0.32	0.38	0.70
Soft Products	0.27	0.84	-0.10	-0.18	-0.30
American Cheese	6.90	-0.21	-0.70	-1.28	-1.74
Italian Cheese	5.85	0.06	-0.70	-1.14	-1.46
Other Cheese	4.78	-0.19	-0.52	-0.72	-0.96
Butter	-4.06	-4.94	0.67	0.51	0.70
Frozen Products	-0.24	0.47	-0.06	-0.12	-0.20
Other Manufactur	2.36	0.14	-0.30	-0.52	-0.86
Nonfat Dry Milk	1.02	-0.88	-1.15	-1.76	-3.84

TABLE 4. AGGREGATE COMMODITY REVENUE IMPACTS OF INTERSTATE DAIRY COMPACTS UNDER 1997 BASE CONDITIONS: Changes From No CCC BASE97 (Million $).

	No CCC/ No MMOs	USDA Final Rule, No CCC BASE	Northeast Compact, No CCC BASE	Southern Compact, No CCC BASE	NE/SO Compacts, No CCC BASE
Fluid	(816)	(47)	148	178	326
Soft Products	7	20	(3)	(5)	(8)
American Cheese	186	(6)	(19)	(35)	(48)
Italian Cheese	123	(0)	(15)	(25)	(32)
Other Cheese	34	(0)	(4)	(4)	(5)
Butter	(38)	(44)	6	5	7
Frozen Products	(22)	40	(5)	(10)	(17)
Other Manufactur	75	4	(9)	(17)	(28)
Nonfat Dry Milk	2	(5)	(6)	(9)	(21)
Total Expenditures	(449)	(39)	92	77	172